

TECHNICAL SPECIFICATION

Requirements for industrial water quality analyzer system – Photometry



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

preview generated by EVS

TECHNICAL SPECIFICATION

Requirements for industrial water quality analyzer system – Photometry

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.060.25

ISBN 978-2-8327-0089-1

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Procedure for specification	10
4.1 Procedure for specification.....	10
4.2 General.....	10
4.2.1 Rated operating conditions	10
4.2.2 Storage and transportation conditions.....	10
4.2.3 Safety of people, environment and equipment	10
4.2.4 Construction materials	10
4.3 Performance characteristics requiring statements of rated values	10
4.4 Performance characteristics.....	11
4.5 Functional characteristics requiring statements.....	11
4.5.1 Measured component	11
4.5.2 Analysis principle.....	11
4.5.3 Detection wavelength	11
4.5.4 Automatic calibration	11
4.5.5 Sample conditions	11
4.5.6 Explosion-proof	11
4.5.7 Ingress protection.....	11
5 Functional requirements of analyzer system	12
5.1 Internal and external interface.....	12
5.1.1 Electrical interface	12
5.1.2 Liquid interface.....	12
5.2 Automatic verification.....	12
5.3 Access and control protocol	12
5.3.1 General	12
5.3.2 Data record	13
5.3.3 Status and information query	13
5.3.4 Parameter setting	14
5.3.5 Remote control	14
5.3.6 Network security management.....	14
5.3.7 Analyzer system self-recovery	15
5.3.8 Fault diagnosis information output	15
5.4 Additional information	15
6 Verification of values	15
6.1 Test preparation.....	15
6.1.1 General	15
6.1.2 Operational conditions	15
6.1.3 Calibration	16
6.2 Testing procedures	16
6.2.1 Precision	16
6.2.2 Accuracy	16
6.2.3 Zero drift.....	16
6.2.4 Span drift.....	17

6.2.5	Bias	18
6.2.6	Linearity	18
6.2.7	Standard verification	18
6.2.8	Retest of the retained sample	18
6.2.9	Interference of colour and suspended particles	19
6.2.10	Interference of ion	19
6.2.11	Interference of pH	19
6.2.12	Limit of quantitation	19
6.2.13	Memory effect	19
6.2.14	Rate of valid data	20
6.2.15	Consistency of parallel measurements	20
6.2.16	Interference of ambient temperature	21
6.2.17	Interference of supply voltage	21
6.3	Additional information	21
Annex A (informative)	Automatic and manual verification during work	22
A.1	Verification plan	22
A.2	Assurance operations and data audit	22
Annex B (informative)	Operation and maintenance	24
B.1	Operation and maintenance plan	24
B.2	Remote maintenance	24
B.2.1	Remote diagnosis	24
B.2.2	Remote verification	24
B.3	Routine inspection	24
B.3.1	State and parameters	24
B.3.2	Consumables	25
B.3.3	Reagent	25
B.4	Regular preventive maintenance	25
Bibliography	26
Table 1	– Performance characteristics	11
Table 2	– Liquid interfaces	12
Table 3	– Definition of measurement data content	13
Table 4	– Labels of the measurement data	13
Table 5	– Status and information query content	13
Table 6	– Parameter setting	14
Table 7	– Remote control content	14
Table 8	– Security functions	15
Table A.1	– Verification plan	22
Table B.1	– Overall plan list of the operation and maintenance	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

REQUIREMENTS FOR INDUSTRIAL WATER QUALITY ANALYZER SYSTEM – PHOTOMETRY

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 63165 has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
65B/1253/DTS	65B/1274/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification: is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

This document is a preview generated by EVS

REQUIREMENTS FOR INDUSTRIAL WATER QUALITY ANALYZER SYSTEM – PHOTOMETRY

1 Scope

This document applies to the industrial water quality analyzer system that uses a photometric method to determine the concentration of one or more chemical components in industrial water (water used in manufacturing, processing, cooling, washing, boiler, etc).

The objective of this document is to:

- specify the terminology and definitions related to the performance characteristics of a photometric industrial water quality analyzer system;
- unify the performance expression and verifying methods of such an analyzer system;
- specify the test procedures to be used in making statements on the performance characteristics of a photometric industrial water quality analyzer system.

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.

IEC 62443-3-3, *Industrial communication networks – Network and system security – Part 3-3: System security requirements and security levels*

IEC 62443-4-2, *Security for industrial automation and control systems – Part 4-2: Technical security requirements for IACS components*

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:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

photometry

determination of the concentration of a dissolved substance in a solution by using the absorption of light by this substance

[SOURCE: ISO 14532:2014, 2.4.12]

3.2

measurand

particular quantity subject to measurement

[SOURCE: IEC 60050-311:2001, 311-01-03]