



DPC: 24 / 30498547 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 27 September 2024
Origin: International**Latest date for receipt of comments: 20 November 2024**

Project No. 2024/02253

Responsible committee: GEL/65/1 Systems aspects

Interested committees:

Title: BS EN IEC 61285 Industrial-process control - Safety of analyser houses

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

**WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD.
THIS DRAFT IS NOT CURRENT BEYOND 20 November 2024**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Responsible Committee Secretary: **Ms Charmaine Mukherjee (BSI)**
Direct tel:
E-mail: charmaine.mukherjee@bsigroup.com

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.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

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.	



65B/1272/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

IEC 61285 ED4

DATE OF CIRCULATION:

2024-09-27

CLOSING DATE FOR VOTING:

2024-12-20

SUPERSEDES DOCUMENTS:

65B/1225/RR

IEC SC 65B : MEASUREMENT AND CONTROL DEVICES

SECRETARIAT:

United States of America

SECRETARY:

Mr Wallie Zoller

OF INTEREST TO THE FOLLOWING COMMITTEES:

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

☒ SUBMITTED FOR CENELEC PARALLEL VOTING

☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Industrial-process control - Safety of analyser houses

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

Copyright © 2024 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.



Documents

Document Sharing Hub

CONTENTS

CONTENTS	2
FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Location of AHs and connection within the process plant areas	12
4.1 General	12
4.2 Response time	12
4.3 Utilities	12
4.4 Safety	12
4.4.1 Location	12
4.4.2 Escape	12
4.4.3 Area classification	12
4.4.4 Peripheral hazards	12
4.4.5 Access	12
5 Design, construction and layout of AHs	12
5.1 General	12
5.2 General requirements	13
5.3 Dimensions and layout	13
5.4 Structural requirements	13
5.4.1 Construction materials	13
5.4.2 Walls	13
5.4.3 Floors and foundation	13
5.4.4 Doors	13
5.4.5 Windows	13
5.4.6 Roof	14
5.5 Equipment	14
5.5.1 Lighting	14
5.5.2 Communications	14
5.5.3 Piping, tubing and valves	14
5.5.4 Utilities	14
5.5.5 Protection Equipment	14
5.5.6 Ventilation	14
5.5.7 Temperature	15
5.6 Labelling/instructions/documentation	15
5.6.1 Entrance	15
5.6.2 Alarms	15
5.6.3 Safety procedures	16
5.6.4 Additional data	16
6 Explosion protection of AHs	16
6.1 General	16
6.2 General requirements	16
6.3 Protection of AHs against explosion hazards by means of artificial ventilation	16
6.3.1 Classification	16
6.3.2 Requirements for AHs where the explosion hazard originates externally	17

48	6.3.3	Requirements for AHs where the explosion hazard originates from internal gases or vapours	17
49			
50	6.3.4	Requirements for AHs where the explosion hazard originates from internal liquids	18
51			
52	6.3.5	Requirements for AHs where the explosion hazard originates from any combination of the above	19
53			
54	6.4	Protection of AHs against explosion hazards by means of natural ventilation	19
55	6.4.1	General	19
56	6.4.2	Ventilation requirements	19
57	6.4.3	Heating requirements	20
58	6.4.4	Gas detectors	20
59	7	Measures to prevent health hazards to personnel in AHs	20
60	7.1	General	20
61	7.2	Guidelines	20
62	7.3	General requirements	20
63	7.4	Safety measures	21
64	7.4.1	Storage of toxic materials	21
65	7.4.2	Design of lines carrying toxic material	21
66	7.4.3	Flushing	21
67	7.4.4	Observation windows	21
68	7.4.5	Design of components carrying toxic material	21
69	7.4.6	Additional measures	21
70	7.4.7	Gas detection	21
71	7.4.8	Emergency measures	21
72	7.4.9	Toxicity consideration	22
73	7.4.10	Warning signs	22
74	7.4.11	Vacuum exhaust system	22
75	7.5	External hazards	22
76	7.5.1	Fresh air supply	22
77	7.5.2	Alarm signalisation	22
78	7.6	Additional measures for abnormal working conditions	22
79	7.7	Labelling/instructions/documentation	22
80	Annex A (informative)	Examples of hazardous area classification inside of AHs	24
81	A.1	General	24
82	A.2	Examples	24
83	Example 1		24
84	Example 2		26
85	Annex B (informative)	Checklist for analyser houses	28
86	B.1	General	28
87	B.2	Example for checklist	29
88	Bibliography		43
89			

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL-PROCESS CONTROL – SAFETY OF ANALYSER HOUSES

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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.
- IEC 61285 has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.
- This 4th edition cancels and replaces the 3rd edition published in 2015. This edition constitutes a technical revision.
- This edition includes the following significant technical changes with respect to the previous edition:
- a) incorporation of previously issued corrigendum;
 - b) adaption to latest version of standard IEC 60079-1-10:2020 for the classification of areas;
 - c) minor updates to several sections and references.

139 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

140
141 Full information on the voting for its approval can be found in the report on voting indicated in
142 the above table.

143 The language used for the development of this International Standard is English.

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

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

- 151 • reconfirmed,
- 152 • withdrawn,
- 153 • replaced by a revised edition, or
- 154 • amended.

INTRODUCTION

Process analysers measure the characteristics of a process stream continuously and automatically. The process sample is introduced automatically and the system is designed for unattended operation and minimal maintenance.

The placement of devices for process analysis in analyser houses is beneficial for technical and economic reasons:

- in order to facilitate appropriate environmental conditions;
- to simplify servicing and maintenance issues;
- to enable the use of a common infrastructure (see 3.6).

This document is designed to set forth minimum safety requirements for typical analyser houses (AHs). It is superseded in all cases by national, local, or corporate requirements, if additional or more stringent requirements will apply.

INDUSTRIAL-PROCESS CONTROL – SAFETY OF ANALYSER HOUSES

1 Scope

This International Standard describes the physical requirements for the safe operation of the process analyser measuring system installed in an analyser house (AH) in order to ensure its protection against fire, explosion and health hazards. This standard applies for analyser houses with inner and/or external potential explosive atmospheres and it applies to hazards caused by toxic substances or asphyxiant gases. (Refer to national guidelines on toxic hazards.)

This standard does not address facilities where solids (dust, powder, fibres) are the hazard.

This standard does not seek to address all functional safety issues related to analyser houses.

Clause 4 addresses the location of the AH and connection within the process plant areas.

Clause 5 addresses the design, construction and layout of the AH.

Clause 6 addresses measures for reducing the danger of explosion for AHs while permitting maintenance of equipment with the power on and the case open.

For most fluids, the major constraint is that the concentration of vapours, which are toxic for personnel, is lower than the lower explosive (flammable) limit (LFL) (see Clause 7).

Using n-Pentane as an example, the LFL is 1,5 % or $15\,000 \times 10^{-6}$ [Source OSHA], the level immediately dangerous to life or health (which is the maximum level from which a worker could escape within 30 min without any escape-impairing symptoms or any irreversible health effects) is only 0,1 % or $1\,000 \times 10^{-6}$.

Clause 7 addresses those measures for protecting personnel from materials in the atmosphere of AHs that are hazardous to health.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60079-0:2017, *Explosive atmospheres – Part 0: General requirements*

IEC 60079-10-1:2020, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

ISO/IEC80079-20-1:2017, *Explosive atmospheres — Part 20-1: Material characteristics for gas and vapour classification — Test methods and data*

3 Terms and definitions

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

ISO and IEC maintain terminological 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

analyser cabinet

housing in which analysers are installed individually or grouped together

Note 1 to entry: Maintenance is performed from outside the cabinet with the door(s) open.

3.2

analyser shelter

structure with one or more sides open and free from obstruction to the natural passage of air, in which one or more analysers are installed

Note 1 to entry: The maintenance of the analysers is normally performed in the protection of the shelter.

3.3

analyser house (AH)

enclosed building or part of a building containing process analysers and associated equipment where streams for analysis are brought in and which is regularly entered by authorized personnel

Note 1 to entry: An AH is not a permanent workplace. Within the scope of this standard, the term AH is used regardless of the structure configuration as either a room, a walk-in cabinet, an analyser container or an analyser building and whether or not it is an integral part of, or attached to, another structure.

3.4

sample conditioning cabinet (SCC)

Cabinet in which sample conditioning systems are installed individually or grouped together.

Note 1 to entry: Maintenance is performed from outside the cabinet with the door(s) open.

3.5

sample conditioning room (SCR)

room that is separated from the AH and has modules for sample conditioning, auxiliary material, or sample disposal equipment.

Note 1 to entry: A SCR is not a permanent workplace.

3.6

infrastructure

required means and supply with auxiliaries to operate an AH with all equipment therein, for example, instrument air, nitrogen, water, power supply, incidental disposal of waste and disposal of substances introduced to be analysed

Note 1 to entry: The infrastructure occasionally comprises the fundament of an AH, the positioning of gas bottles and containers for gas supply and test gases. The infrastructure comprises in addition the ventilation and climatisation of the AH and the needed alarm devices within and outside of the AH.

3.7

maintenance

servicing, inspection, repair, improvement and weakness analysis of process analyser devices and infrastructure

3.8**toxic substances**

gaseous or liquid substances that, if released in a room, will cause a health hazard by contact with the skin or by inhalation from the surrounding atmosphere

3.9**safety back-up**

additional personnel, in constant contact with a person or persons in hazardous working condition, who could assist or call for additional help

3.10**external explosion hazard**

hazard existing when the AH is erected at a location where flammable substances may ingress from the outside resulting in dangerous concentrations of flammable gases and vapours inside the AH

3.11**internal explosion hazard**

hazard existing when a flammable mixture can result from release of samples or auxiliary supplies inside the AH

3.12**lower flammable limit (LFL)**

concentration of flammable gas or vapour in air below which an explosive gas atmosphere does not form

Note 1 to entry: The term “lower explosive limit” is used especially in European standardization and regulations interchangeably to describe this limit.

[SOURCE: ISO/IEC 80079-20-1:2017, 3.6.1]

3.13**explosive gas atmosphere**

mixture with air, under atmospheric conditions, of flammable substances in the form of gas or vapour, which, after ignition, permits self-sustaining flame propagation

[SOURCE: IEC 60079-10-1:2020, 3.40]

3.14**hazardous area**

area in which an explosive gas atmosphere is present or can be expected to be present, in quantities such that special precautions for the construction, installation and use of equipment are required

[SOURCE: IEC 60079-10-1:2020, 3.3.1]

3.15**non-hazardous area**

area in which an explosive gas atmosphere is not expected to be present in quantities such that special precautions for the construction, installation and use of equipment are required

[SOURCE: IEC 60079-10-1:2020, 3.3.2]

3.16**zone 0**

area in which an explosive gas atmosphere is present continuously or for long periods or frequently

[SOURCE: IEC 60079-10-1:2020, 3.3.4]

3.17**zone 1**

area in which an explosive gas atmosphere is likely to occur in normal operation occasionally

[SOURCE: IEC 60079-10-1:2020, 3.3.5]]

3.18**zone 2**

area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only

[SOURCE: IEC 60050-426:2020, 426-03-05]

3.19**source of release**

a point or location from which a gas, vapour, mist or liquid may be released into the atmosphere so that an explosive gas atmosphere could be formed

[SOURCE: IEC 60050-426:2020, 426-03-06, modified (addition of "mist")]

3.20**continuous grade of release**

release which is continuous or is expected to occur frequently or for long periods

Note 1 to entry: Both "frequently" and "long" are the terms which are intended to describe a very high likelihood of a potential release. In that respect, those terms do not necessarily need to be quantified.

[SOURCE: IEC 60079-10-1:2020, 3.4.2]

3.21**primary grade of release**

release which can be expected to occur periodically or occasionally during normal operation

[SOURCE: IEC 60079-10-1:2020, 3.4.3]

3.22**secondary grade of release**

release which is not expected to occur in normal operation and, if it does occur, is likely to do so only infrequently and for short periods

[SOURCE: IEC 60079-10-1:2020, 3.4.4]

3.23**release rate**

quantity of flammable gas, vapour or mist emitted per unit time from the source of release

[SOURCE: IEC 60079-10-1:2020, 3.4.5]

3.24**flashpoint**

lowest liquid temperature at which, under certain standardized conditions, a liquid gives off vapours in a quantity such as to be capable of forming an ignitable vapour/air mixture

[SOURCE: IEC 60079-10-1:2020, 3.6.8]

3.25**auto-ignition temperature (AIT)**

lowest temperature (of a surface) at which under specified test conditions an ignition of a flammable gas or vapour in mixture with air or air-inert gas occurs

[SOURCE: ISO/IEC 80079-20-1:2017, 3.3]

3.26**equipment protection level (EPL)**

level of protection assigned to equipment based on its likelihood of becoming a source of ignition and distinguishing the differences between explosive gas atmospheres, explosive dust atmospheres, and the explosive atmospheres in mines susceptible to firedamp

[SOURCE: IEC 60079-0:2017, 3.26]

339 **3.27**340 **containment system**341 parts within the room or building containing the hazardous substance that may constitute an
342 internal source of release