



DPC: 25 / 30507111 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: 29 January 2025

Origin: International

Latest date for receipt of comments: 19 February 2025

Project No. 2025/00017

Responsible committee: EXL/23 Explosion and fire precautions in industrial and chemical plant

Interested committees:

Title: BS EN ISO /IEC 80079-20-1 Explosive atmospheres

Part 20-1: Material characteristics for gas and vapour classification - Test methods and data

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 19 February 2025**

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: **Mr Christopher Brown (BSI)**Direct tel: **02089967441**E-mail: **christopher.brown@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.	



31M/249/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

ISO/IEC 80079-20-1 ED2

DATE OF CIRCULATION:

2025-01-24

CLOSING DATE FOR COMMENTS:

2025-03-21

SUPERSEDES DOCUMENTS:

31M/244/RR

IEC SC 31M : NON-ELECTRICAL EQUIPMENT AND PROTECTIVE SYSTEMS FOR EXPLOSIVE ATMOSPHERES

SECRETARIAT:

Germany

SECRETARY:

Mrs Anke Sachtleben

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 31, SC 31G, SC 31J

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

Safety

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 local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data

NOTE FROM TC/SC OFFICERS:

To NCs: Please note the DRAFTING NOTES in the CD.

Please note that due to the transfer to OSD there are some editorial issues which could not be solved before the CD stage

Copyright © 2025 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
AVA Document Sharing Hub

Link to Committee Draft (CD) online document:

<https://osd.iec.ch/#/editor/archive/28d82825-e031-6785-e063-3613000ab6af/en/CD/1>

How to access

This link will lead you to the Online Standards Development (OSD) platform for national mirror committee's comments. It replaces the project content, which is usually circulated as a PDF.

For OSD NC Managers

If not already done, your respective National Committee Administrator will create your profile via Symphony (<https://symphony.iec.ch>) as an OSD NC Manager to oversee the comment resolution process for the preparation of your national comments. Once you have been granted access via Symphony, please use your usual IEC credentials to access the link.

If you do not have access, please contact your National Committee Administrator or our OSD support team.

For OSD NC Commenters

If not already done, your OSD NC Manager will create your profile via Symphony as an OSD NC Commenter. Once you have been granted access via Symphony, please use your usual IEC credentials to access the link. You may then provide your comments directly in the OSD.

As an alternative solution, OSD NC Commenters who wish to continue using the IEC comment form can use the regular template together with a PDF of the draft document downloadable from the OSD platform. However, please note that line numbers are no longer available, and it is not possible to add tables and graphics or use track changes.

For Voters

Once all your national comments have been resolved, it is no longer necessary to upload the comment form to the IEC Voting System anymore. Instead, please use the following radio buttons in the IEC Voting System to indicate whether or not your National Committee has submitted comments in the OSD:

☐ **Comment:** ☐ **No Comment at this stage** ☐ **Comments in**

Reference materials

We recommend that OSD NC Managers and OSD NC Commenters review the available materials to better understand the member commenting on the OSD platform. This includes:

- latest videos and presentations on the [OSD webpage](#), and
- step-by-step explanations on [Helpscout](#).

Contact

Should you require any assistance, please contact the OSD project team at osd_support@iec.ch.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Classification of gases and vapours	12
4.1 General	12
4.2 Classification according to the maximum experimental safe gap (MESG)...	12
4.3 Classification according to the minimum igniting current ratio (MIC ratio) ..	13
4.4 Classification according to the similarity of chemical structure	13
4.5 Classification of mixtures of gases	13
5 Data for flammable gases and vapours, relating to the use of equipment	14
5.1 Determination of the properties.....	14
5.1.1 General	14
5.1.2 Equipment group	14
5.1.3 Flammable limits	14
5.1.4 Flash point (FP)	14
5.1.5 Temperature class.....	15
5.1.6 Minimum igniting current (MIC).....	15
5.1.7 Auto-ignition temperature (AIT)	15
5.2 Properties of particular gases and vapours	15
5.2.1 Coke oven gas	15
5.2.2 Ethyl nitrite (109-95-5)	15
5.2.3 MESG of carbon monoxide	15
5.2.4 Methane, Equipment Group IIA	16
6 Method of test for the maximum experimental safe gap (MESG)	16
6.1 Outline of method	16
6.2 Test apparatus	16
6.2.1 General	16
6.2.2 Material and mechanical strength	17
6.2.3 Exterior chamber	17
6.2.4 Interior chamber	17
6.2.5 Gap adjustment.....	17
6.2.6 Injection of mixture	17
6.2.7 Position of ignition source	18
6.3 Procedure.....	18
6.3.1 Preparation of gas mixtures.....	18
6.3.2 Temperature and pressure	18
6.3.3 Gap adjustment.....	18
6.3.4 Ignition	18
6.3.5 Observation of the ignition process	18
6.4 Determination of maximum experimental safe gap (MESG).....	18
6.4.1 General	18
6.4.2 Preliminary tests	18

6.4.3	Confirmatory tests	19
6.4.4	Reproducibility of maximum experimental safe gaps (MESG)	19
6.4.5	Tabulated values	19
6.5	Verification of the MESG determination method	19
7	Test method for auto-ignition temperature (AIT)	19
7.1	Outline of method	19
7.2	Apparatus	20
7.2.1	General	20
7.2.2	Test vessel and support	20
7.2.3	Thermocouples	20
7.2.4	Oven	20
7.2.5	Metering devices	21
7.2.6	Mirror	21
7.2.7	Timer	21
7.2.8	Equipment for purging the test vessel with air	21
7.2.9	Automated apparatus	22
7.3	Sampling, preparation and preservation of test samples	22
7.3.1	Sampling	22
7.3.2	Preparation and preservation	22
7.4	Procedure	22
7.4.1	General	22
7.4.2	Sample injection	23
7.4.3	Determination of the auto-ignition temperature (AIT)	23
7.5	Auto-ignition temperature (AIT)	24
7.6	Validity of results	24
7.6.1	Repeatability	24
7.6.2	Reproducibility	24
7.7	Data	24
7.8	Verification of the auto-ignition temperature determination method	25
8	Determination of explosion characteristics of flammable gases or vapours in air.	25
8.1	General	25
8.2	Test Method	26
8.2.1	Apparatus	26
8.2.2	Procedure	27
8.3	Interpretation of test results	28
8.4	Test report	28
Annex A (normative)	Ovens of test apparatus for the tests of auto-ignition temperature	30
A.1	General	30
A.2	“IEC oven”	30
A.3	“DIN oven”	30
Annex B (informative)	Tabulated values	38
Annex C (informative)	Determination of cool flames	39
Annex D (informative)	Volume dependence of auto-ignition temperature	41
Annex E (normative)	Potential annex for Verification of maximum explosion pressure values and maximum rates of explosion pressure rise	42

Annex F (normative) Potential Annex on Smoothing of pressure-time curves	43
Bibliography	44
Figure 1 – Test apparatus.....	17
Figure 2 – Determination of explosion characteristics from measurements at a range of flammable gas concentrations	28
Figure A.1 – Test apparatus: assembly.....	31
Figure A.2 – Section A-A (flask omitted)	32
Figure A.3 – Base heater (board made of refractory material)	32
Figure A.4 – Flask guide ring (board made of refractory material)	33
Figure A.5 – Neck heater (board made of refractory material)	33
Figure A.6 – Oven	35
Figure A.7 – Lid of steel cylinder	35
Figure A.8 – Lid of steel cylinder	36
Figure A.9 – Injection of gaseous sample	36
Figure C.1 – Additional thermocouple to detect cool flames	39
Figure C.2 – ‘Negative temperature coefficient’ shown for butyl butyrate as an example	40
Figure D.1 – Volume dependence of auto-ignition temperature	41
Table 1 – Classification of temperature class and range of auto-ignition temperatures 15	
Table 2 – Values for verification of the apparatus	19
Table 3 – Values for verification of the apparatus	25

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data –

FOREWORD

1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work..

2) The formal decisions or agreements of IEC and ISO 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 and ISO National bodies.

3) IEC and ISO documents have the form of recommendations for international use and are accepted by IEC and ISO National bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC and ISO documents is accurate, IEC and ISO 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 and ISO National bodies undertake to apply IEC and ISO documents transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC and ISO document and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC and ISO do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC and ISO marks of conformity. IEC and ISO are not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this document.

7) No liability shall attach to IEC and ISO or their directors, employees, servants or agents including individual experts and members of its technical committees and IEC and ISO National bodies 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 ISO/IEC document or any other IEC and ISO documents.

8) Attention is drawn to the Normative references cited in this document. Use of the referenced publications is indispensable for the correct application of this document.

9) IEC and ISO draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC and ISO take 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 and ISO [had/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> and www.iso.org/patents. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

IEC 80079-20-1 has been prepared by subcommittee 31M, Non-electrical equipment and protective systems for explosive atmospheres, of IEC technical committee 31, Equipment for explosive atmospheres. It is an International Standard.

This second edition cancels and replaces the first edition published in 2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) *[short description of the main changes]*
- b) ...

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

Draft	Report on voting

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 International Standard 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/publications.

A list of all parts in the ISO/IEC 80079 series, published under the general title *Explosive atmospheres*, can be found on the IEC website.

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.

INTRODUCTION

Further reading:

.

[ASTM E659 \[1\]](#)

[EN ISO 3170 \[2\]](#)

[EN ISO 3171 \[3\]](#)

[EN ISO 15528 \[4\]](#)

E. Brandes and T. Redeker: Maximum experimental safe gap of binary and ternary mixtures, *Journal de Physique (Proceedings)* Vol 12, No.7, p.207, 2002 [\[5\]](#)

H. Phillips: A comparison of 'Standard' methods for the determination of Maximum Experimental Safe Gap (MESG). *Proceedings of the international symposium on the explosion hazard classification of vapours, gases and dusts*. National Academy Press, Washington DC, USA, 1987 [\[6\]](#)

M.G. Zabetakis: Flammability characteristics of combustible gases and vapours. *US Bureau of Mines Bulletin* 627. 1965 [\[7\]](#)

C.J. Hilado and S.W. Clark: Auto-ignition temperatures of organic chemicals. *Chemical Engineering*. Sept. 4. 1972. p.75 - 80 [\[8\]](#)

Fire and related properties of industrial chemicals. Fire Protection Association, London. Reprinted 1974 [\[9\]](#)

Toxic and Hazardous Industrial Chemicals Safety Manual: for handling and disposal with toxicity and hazard data. The International Technical Information Institute, Tokyo, 1982 [\[10\]](#)

NMAB-447, *Proceedings of the international symposium on the explosion hazard classification of vapors, gases, and dusts*. National Academy Press, Washington DC, USA, 1987 (Maximum experimental safe gap, apparatus groups) [\[11\]](#)

N. Marinovic: *Elekttricni Uredajii Instalacije za Eksplozivnu Atmosferu Plinova i Para* (Handbook on explosion protected electrical equipment and installations for explosive gas atmospheres – Apparatus Groups and Temperature Classes, >4 500 titles of chemicals in languages: Latin, English, German, and French); in Croatian, Zagreb 1999 [\[12\]](#)

Carl L. Yaws: *Matheson Gas Data Book* (Seventh Edition). McGraw Hill Book Co, 2001 [\[13\]](#)

Fire protection guide on hazardous materials (Thirteenth Edition). National Fire Protection Association, Boston, USA, 2002 [\[14\]](#)

Sax's Dangerous Properties of Industrial Materials (Eleventh Edition) Volumes 1-3, John Wiley & Sons, 2004 [\[15\]](#)

E. Brandes, W. Möller: *Sicherheitstechnische Kenngrößen, Band 1: Brennbare Flüssigkeiten und Gase*, NW, Verlag für neue Wissenschaft, 2003 [\[16\]](#)

M. Molnarne, Th. Schendler, V. Schröder: *Sicherheitstechnische Kenngrößen, Band 2: Explosionsbereiche von Gasgemischen*, 2003 [\[17\]](#)

K. Nabert, G. Schön and T. Redeker: *Sicherheitstechnische Kennzahlen brennbarer Gase und Dämpfe Band I und II*. Third Edition. Deutscher Eichverlag, 2004 [\[18\]](#)

CHEMSAFE – database for safety characteristics in explosion protection: www.chemsafe.ptb.de, Project by Bundesanstalt für Materialforschung und -prüfung, DECHEMA, Physikalisch-Technische Bundesanstalt [\[19\]](#)

Gestis Substance database by IFA <https://gestis-database.dguv.de/search> [20]

Setchkin, N. P. (1954) Self-ignition temperatures of combustible liquids The Journal of Research of the National Institute of Standards and Technology , Vol. 53, No. 1 p. 49 [21]

Snee & Griffiths (T. J. Snee and J. F. Griffiths, Criteria for spontaneous ignition in exothermic, autocatalytic reactions: Chain Branching and self-heating in the oxidation of cyclohexane in closed vessels, Combustion and Flame, Vol 75, Issues 3 – 4 pp 381 – 395, 1989) [22]

Coffee (Coffee, R. D. Cool Flames and Autoignitions: Two Oxidation Processes 13th Loss Prevention Symposium, Houston, TX p 74 -82 , 1979 [23]

Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data –

1 Scope

This part of ISO/IEC 80079 provides guidance on classification of gases and vapours. It specifies a test method intended for the measurement of the maximum experimental safe gaps (MESG) for gas-air mixtures or vapour-air mixtures under normal conditions of temperature and pressure (20 °C, 101,3 kPa) so as to allow the selection of an appropriate group of equipment. This document also specifies a test method intended for use in the determination of the auto-ignition temperature (AIT) of a vapour-air mixture or gas-air mixture at atmospheric pressure, so as to allow the selection of an appropriate temperature class of equipment.

Furthermore, this part of ISO/IEC 80079 specifies a method for the determination of the explosion indices of flammable gases and vapours with air in an enclosed space. It gives the criteria by which results obtained using other test procedures can be correlated to yield explosion indices as determined by the method specified in this part of ISO/IEC 80079.

Clause 8 is applicable only to the determination of explosion indices pertaining to the development of contained gas/air explosions after ignition of the reactants. It does not apply to indices pertaining to conditions necessary to cause ignition of the reactants. If the specified experimental procedure for the determination of explosion indices does not result in ignition of the gas/air mixture, it should not be concluded that the gas in question cannot explode. The interpretation of such cases should be left to specialists in the field of explosions and explosion protection.

Values of chemical properties of materials are provided to assist in the selection of equipment to be used in hazardous areas. Further data may be added as the results of validated tests become available.

The materials and the characteristics included in a table (see Annex B) have been selected with particular reference to the use of equipment in hazardous areas. The data in this document have been taken from a number of references which are given in the bibliography.

These methods for determining the MESG or the AIT may also be used for gas-air-inert mixtures or vapour-air-inert mixtures. However, data on air-inert mixtures are not tabulated.

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 60050-426, *International Electrotechnical Vocabulary – Part 426: Electrical apparatus for explosive atmospheres* (available at <http://www.electropedia.org/>)

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

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

EN 15967:2022, *Determination of maximum explosion pressure and the maximum rate of pressure rise of gases and vapours*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-426 and the following apply.

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

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

3.1

auto-ignition

reaction which is evidenced by a clearly perceptible flame and/or explosion, and for which the ignition delay time does not exceed 5 min

Note 1 to entry: See 7.2.2 for a test method.

3.2

ignition delay time

time between the completed injection of the flammable material and the ignition

3.3

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

Note 1 to entry: See Clause 7 for a test method.

3.4

maximum experimental safe gap

MESG

maximum gap of a joint of 25 mm in length which prevents any transmission of an explosion during tests made under the specified conditions

Note 1 to entry: See Clause 6 for a test method.

3.5

minimum igniting current

MIC

minimum current in a specified test circuit that causes the ignition of the explosive test mixture in the spark test apparatus according to IEC 60079-11

Note 1 to entry: See 5.1.6 for the test circuit.

3.6

flammable limits

lower flammable limit (LFL) and upper flammable limit (UFL) of gas in a gas-air mixture, between which a flammable mixture is formed

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

Note 2 to entry: The concentration can be expressed as either a volume fraction or a mass per unit volume.

3.6.1

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: For the purposes of Ex Equipment, this was previously referred to as the lower explosive limit (LEL).

Note 2 to entry: The concentration can be expressed as either a volume fraction or a mass per unit volume.

3.6.2

upper flammable limit

UFL

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

Note 1 to entry: For the purposes of Ex Equipment, this was previously referred to as the upper explosive limit (UEL).

Note 2 to entry: The concentration can be expressed as either a volume fraction or a mass per unit volume.

3.7

equipment grouping

classification system of equipment related to the explosive atmosphere for which they are intended to be used

Note 1 to entry: IEC 60079-0 identifies three equipment groups:

- a) Group I – equipment for mines susceptible to fire damp;
- b) Group II, which is sub-divided into groups IIA, IIB and IIC – equipment for all places with an explosive gas atmosphere other than mines susceptible to fire damp;
- c) Group III, which is sub-divided into groups IIIA, IIIB and IIIC – equipment for all places with an explosive dust atmosphere other than mines susceptible to fire damp.

[SOURCE: IEC 60079-0, 3.32]

3.8

flash point

FP

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

3.9

gas

gaseous phase of a substance that cannot reach equilibrium with its liquid or solid state in the temperature and pressure range of interest

Note 1 to entry: This is a simplification of the scientific definition, and merely requires that the substance is above its boiling point or sublimation point at the ambient temperature and pressure.

3.10

vapour

gaseous phase of a substance that can reach equilibrium with its liquid or solid state in the temperature and pressure range of interest

Note 1 to entry: This is a simplification of the scientific definition, and merely requires that the substance is below its boiling point or sublimation point at the ambient temperature and pressure.

3.11

explosion

sudden increase of pressure and temperature, due to oxidation or other exothermic reaction

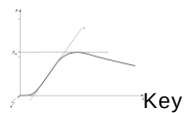
3.12

explosion index

numerical term, determined in accordance with the test methods specified in this part of ISO/IEC 80079 which characterises the contained explosion of a specified concentration of reactants in a vessel having a volume of 1m³

DRAFTING NOTE: 20-2 comments included using “explosion characteristic” rather than “indices” or “index”. NCs to decide on appropriate term. Also later parts of this draft do not specify a 1m³ vessel.

Note 1 to entry: Figure 1 shows the pressure/time curve, expressed in MPa and seconds respectively, of a typical explosion.



p
 p_{ex}
 t
 a

explosion
 maximum
 rate
 of
 pressure
 pressure
 time
 rise

3.13 explosion pressure

p_{ex}

highest pressure occurring in a closed vessel during the explosion of a specific mixture of flammable substances with air or air and inert gases determined under specified test condition

Note 1 to entry: Figure 1 shows the pressure - time curve for an explosion with pm marked

Note 2 to entry: p_{ex} is expressed as absolute pressure with gases and vapour and as overpressure with dusts.

[SOURCE: EN 15967:2022, 3.1, modified - Note 1 to entry has been modified]

3.14 maximum explosion pressure

p_{max}

maximum value of the explosion pressure (p_{ex}) determined by tests over a wide range of reactant concentrations

3.15 rate of explosion pressure rise

dp/dt

maximum rate of pressure rise with time of an explosion in a confined volume for a given test

Note 1 to entry: Figure 1 shows the pressure- time curve for an explosion with the rate of explosion pressure rise marked

3.16 maximum rate of explosion pressure rise

$(dp/dt)_{max}$

maximum value of the rate of explosion pressure rise determined by tests over a wide range of reaction concentrations.

DRAFTING NOTE: index or constant or characteristic?

3.17 explosion index

K_{max}

normalised constant defining the maximum rate of pressure rise with time $(dp/dt)_{max}$ of an explosion in a volume V , according to the equation. The violence of an explosion is evaluated from the value of K_{max}

Note 1 to entry: Under certain circumstances, this equation is not valid for vessels with a length to diameter ratio greater than 2:1 or with a volume of less than 1m³.

DRAFTING NOTE: the following definitions apply to measurements under turbulent conditions rather than the quiescent conditions which are normal for maximum pressure and maximum rate of pressure rise measurements. NCs to decide whether these are relevant or whether the standard restricts itself to quiescent conditions.

3.17.1

K_{max_t}

explosion index for turbulent conditions