ICS 29.260.20, 43.060.50 SLOVENSKÁ TECHNICKÁ NORMA Január 2026

STN	**Výbušné atmosféry Časť 45: Elektrické zapaľovacie systémy pre spaľovacie motory**	**STN EN IEC 60079-45** 33 2320

Explosive atmospheres - Part 45: Electrical ignition systems for internal combustion engines

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/25

Obsahuje: EN IEC 60079-45:2025, IEC 60079-45:2025

141638

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60079-45

October 2025

ICS 29.260.20; 43.060.50

English Version

Explosive atmospheres - Part 45: Electrical ignition systems for internal combustion engines (IEC 60079-45:2025)

Atmosphères explosives - Partie 45: Systèmes d'allumage électrique pour les moteurs à combustion interne (IEC 60079-45:2025)

Explosionsgefährdete Bereiche - Teil 45: Elektrische Zündsysteme für Verbrennungsmotoren (IEC 60079-45:2025)

This European Standard was approved by CENELEC on 2025-10-01. CENELEC 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 60079-45:2025 E

EN IEC 60079-45:2025 (E)

European foreword

The text of document 31/1880/FDIS, future edition 1 of IEC 60079-45, prepared by TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60079-45:2025.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2026-10-31
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2028-10-31

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60079-45:2025 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60079-14	NOTE	Approved as EN IEC 60079-14
IEC 60079-15	NOTE	Approved as EN IEC 60079-15
IEC 60079-18	NOTE	Approved as EN 60079-18
IEC 60079-25	NOTE	Approved as EN IEC 60079-25
IEC 60079-33	NOTE	Approved as CLC/TR 60079-33
ISO 19879:2021	NOTE	Approved as EN ISO 19879:2021 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN IEC 60079-0	-
IEC 60079-1	-	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"	EN 60079-1	-
IEC 60079-7	-	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"	EN 60079-7	-
IEC 60079-11	-	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN IEC 60079-11	-
ISO 11565	-	Road vehicles - Spark-plugs - Test methods and requirements	-	-
ISO/IEC 80079-41[1]	-	Explosive atmospheres - Part 41: Reciprocating internal combustion engines	EN ISO/IEC 80079-41[2]	-
SAE J2031	-	High-Tension Ignition Cable	-	-

[1] Under preparation. Stage at the time of publication: ISO/IEC/CCDV 80079-41:2025.

[2] Under preparation. Stage at the time of publication: prEN ISO/IEC 80079-41:2025.

IEC 60079-45

Edition 1.0 2025-08

INTERNATIONAL STANDARD

Explosive atmospheres -
Part 45: Electrical ignition systems for internal combustion engines

ICS 29.260.20; 43.060.50 ISBN 978-2-8327-0651-0

IEC 60079-45:2025-08(en)

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

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

CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 System overview 10
4.1 General 10
4.2 Spark containment 10
4.3 Spark prevention 11
4.4 Spark detection/prevention 11
4.5 Ignition system equipment 11
4.6 Engine enclosed systems 12
5 Construction and testing requirements 12
5.1 General 12
5.2 Impact 12
5.3 Chemical compatibility 12
5.4 Terminations and connections 13
5.5 Power source 13
5.6 Engine control module and ignition control unit 13
5.7 Engine primary wiring 13
5.8 Ignition coils 14
5.9 Secondary leads 14
5.9.1 General 14
5.9.2 Flexible secondary lead 14
5.9.3 Rigid secondary lead 15
5.10 Spark plugs 15
6 Spark containment 16
7 Spark prevention 16
7.1 General 16
7.2 Terminations, connections, and enclosures 16
7.3 Ignition coil requirements 16
7.4 Spark plug well applications 17
8 Spark detection/prevention 17
8.1 General 17
8.2 Design requirements 17
9 Ex Equipment certificate 17
10 Marking 18
10.1 General 18
10.2 Warning markings 18
10.3 Example markings 19
11 Manufacturer's instructions 20
11.1 General 20
11.2 Manufacturer’s instructions and installation drawings 20
11.3 Warnings 21
11.4 Commissioning checklist 21
11.5 Maintenance 22

12 Test procedures 22
12.1 General 22
12.2 Abrasion test for flexible secondary leads 23
12.2.1 General 23
12.2.2 Abrasive wheel test 23
12.2.3 Emery cloth abrasion test 24
12.3 Ignition coils, extensions or non-flexible secondary leads elevated temperature exposure test 25
12.4 Chemical compatibility 25
12.4.1 General 25
12.4.2 Chemical compatibility for non-flexible leads and equipment 26
12.4.3 Chemical compatibility for flexible leads 26
12.5 Vibration test 27
12.6 Shielded secondary system tests 28
12.6.1 General 28
12.6.2 Explosion test exemption for metallic flexible leads 29
12.7 Spark plug gas tightness test 29
12.7.1 Spark plug gas tightness test (primary test) 29
12.7.2 Spark plug gas tightness test (alternate test) 30
12.8 Flashover tests 30
12.8.1 General 30
12.8.2 Rigid secondary lead test configuration 31
12.8.3 Flexible lead test configurations 32
12.9 Flexible Secondary lead bending and dielectric voltage withstand tests 33
12.10 Spark prevention test 34
12.11 Primary and secondary lead terminations pull test 35
12.12 Flexible secondary lead insulation cut test 35
12.13 Flexible secondary lead insulation pull test 36
Annex A (informative) Guidance for spark containment 37
Annex B (informative) Guidance for spark prevention 38
Bibliography 43

Figure 1 – Components of an electrical ignition system 11
Figure 2 – Warning "do not disconnect" pictogram 19
Figure 3 – Abrasive wheel test apparatus 24
Figure 4 – Emery cloth abrasion test apparatus 25
Figure 5 – Vibration curve 28
Figure 6 – Flexible lead example 29
Figure 7 – Spark plug test apparatus 30
Figure 8 – Rigid secondary flashover test apparatus 31
Figure 9 – Flexible hybrid secondary flashover test apparatus 32
Figure 10 – Flexible secondary flashover test apparatus 33
Figure 11 – Flexible secondary dielectric voltage withstand test apparatus 34
Figure 12 – Secondary lead or wiring insulation cut test apparatus 36
Figure A.1 – Guidance flowchart for spark containment tests 37
Figure B.1 – Guidance flowchart for spark prevention testing 38
Figure B.2 – Terminations, connections and enclosures test 39

Figure B.3 – Cut test 40
Figure B.4 – Abrasion test 40
Figure B.5 – Chemical compatibility test 41
Figure B.6 – Pull test 41
Figure B.7 – Ignition coils and rigid extenders test 42
Figure B.8 – Spark prevention test 42

Table 1 – List of critical parameters 18
Table 2 – List of performance tests for spark containment and spark prevention 22
Table 3 – Chemical compatibility 27
Table 4 – Vibration test requirements 28
Table 5 – Compositions of explosive test mixtures 34

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Explosive atmospheres - Part 45: Electrical ignition systems for internal combustion engines

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 60079-45 has been prepared by IEC technical committee TC 31, Equipment for explosive atmospheres. It is an International Standard.

ANSI/UL 122001 Standard for safety, *General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations*, has served as a basis for the elaboration of this document.

Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the "history" tab of the page for each document.

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

Draft	Report on voting
31/1880/FDIS	31/1895/RVD

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 IEC 60079 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

This part of IEC 60079 also refers to IEC 60079-0 and its associated standards for the construction, testing and marking requirements of suitable electrical Ex Equipment.

This document has been developed from ANSI/UL 122001 Standard for safety, *General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations.*

The original content was developed primarily by the user community in response to operations and maintenance problems arising from the use of shielded ignition systems (flameproof or explosionproof) on reciprocating engines driving compressors and pumps handling flammable materials and installed in hazardous areas. Experience has shown that these types of ignition systems are subjected to significant dielectric stress due to being completely encapsulated in grounded metallic raceways and suffer premature failure resulting in engine cylinder misfiring and engine miss-operation and shutdown.

This document is intended to supplement ISO/IEC 80079-41 with the requirements for ignition systems for reciprocating spark-ignited engines to be installed in hazardous areas for EPL Gc applications. In addition, it is a standalone set of requirements for a complete ignition system or for the individual components thereof to be installed on a reciprocating engine to meet EPL Gc requirements in a repair or replacement activity.

Examples of reciprocating gas engines which typically need to be EPL Gc are:

a) Offshore oil and gas platforms that are typically crowded or congested by design and the gas engine and driven equipment is required to achieve EPL Gc.
b) Onshore facilities where the gas engine and driven equipment assembly is located under a shelter or in an enclosed building for environmental protection or noise suppression.

NOTE 1 Certified ignition systems can also be considered as an alternative replacement to non-Ex systems for engines located in a non-hazardous area where the driven equipment is located in an EPL Gc area. This could provide the additional explosion protection for larger than anticipated flammable releases.

NOTE 2 Ongoing inspection, maintenance and repair aspects also play an important role in control of hazardous area installations and the user's attention is drawn to IEC 60079-17, IEC 60079-19 and manufacturer's instructions for further information concerning these aspects.

NOTE 3 In any industrial installation, irrespective of size, there can be numerous sources of ignition apart from those associated with electrical equipment. Precautions are necessary to ensure safety from other possible ignition sources, but guidance on this aspect is outside the scope of this document.

1 Scope

This part of IEC 60079 is intended to enhance the safety of personnel by providing minimum requirements for electrical ignition systems for spark-ignited reciprocating internal combustion engines, parts of which provide Equipment Protection Level (EPL) Gc.

This document provides minimum construction and test requirements, in addition to manufacturer installation and maintenance recommendations, for the safe operation of ignition systems and components for spark-ignited reciprocating internal combustion engines providing EPL Gc for equipment Group IIB+H_2, IIB or IIA. These requirements apply to systems rated for normal operation with secondary voltages less than or equal to 60 kV.

This document applies only to the ignition systems or the individual ignition system components used on reciprocating internal combustion engines that are stationary when in operation and mobile machinery where the internal combustion engine can be potential source of ignition. Applications addressed by the scope of this document include but are not limited to gas compressors, electric power generators, forklift trucks, and pumps.

This document does not apply to:

a) Engine ignition systems that utilize a breaker point or magneto type ignition systems as these would not be suitable for use in a hazardous area.

b) Road vehicles.

c) Low voltage parts and electrical installation that are not included in the ignition system, such as various sensors and thermocouples, throttle actuator(s), fuel control valve(s), human machine interface (HMI), respective harness and wiring and all the other items that might belong to the integrated control system besides the ignition system.

This document supplements and modifies the general requirements of IEC 60079-0 and the requirements of ISO/IEC 80079-41. Where a requirement of this document conflicts with IEC 60079-0 or ISO/IEC 80079-41, the requirement of this document takes precedence.

NOTE See ISO/IEC 80079-41 for the requirements for explosion protection for EPL Gc reciprocating internal combustion engines.

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 60079-0, *Explosive atmospheres - Part 0: Equipment - General requirements, Edition 7.0*

IEC 60079-1, *Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-7, *Explosive atmospheres - Part 7: Equipment protection by increased safety "e"*

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

ISO 11565, *Road vehicles - Spark-plugs - Test methods and requirements*

ISO/IEC 80079-41, *Explosive atmospheres - Part 41: Reciprocating internal combustion engines*[1]

SAE J2031, *High-Tension Ignition Cable*