

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Mobile and fixed offshore units – Electrical installations –
Part 7: Hazardous areas**

**Unités mobiles et fixes en mer – Installations électriques –
Partie 7: Emplacements dangereux**



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**Mobile and fixed offshore units – Electrical installations –
Part 7: Hazardous areas**

**Unités mobiles et fixes en mer – Installations électriques –
Partie 7: Emplacements dangereux**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MOBILE AND FIXED OFFSHORE UNITS –
ELECTRICAL INSTALLATIONS –****Part 7: Hazardous areas**

FOREWORD

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International Standard IEC 61892-7 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

- a) The EPL (Explosion Protection Level) concept has been introduced.
- b) The requirements to installations in hazardous area has been rewritten, based on the requirements of IEC 60079-14:2013.

The text of this standard is based on the following documents:

FDIS	Report on voting
18/1432/FDIS	18/1446/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61892 series, under the general title *Mobile and fixed offshore units – Electrical installations*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 61892 forms a series of International Standards intended to ensure safety in the design, selection, installation, maintenance and use of electrical equipment for the generation, storage, distribution and utilization of electrical energy for all purposes in offshore units which are used for the exploration or production of petroleum resources.

This part of IEC 61892 also incorporates and co-ordinates, as far as possible, existing rules. It forms a code of interpretation, where applicable, of the requirements laid down by the International Maritime Organization, and constitutes a guide for future regulations which may be prepared and a statement of practice for offshore unit owners, constructors and appropriate organizations.

IEC 60079-14 has been used as reference document. Clauses related to gas, vapour and liquid have been used, where suitable, for offshore purposes. Additional text is added to meet offshore requirements.

This standard is based on equipment and practices which are in current use, but it is not intended in any way to impede development of new or improved techniques.

The ultimate aim has been to produce a set of International Standards exclusively for the offshore petroleum industry.

Withdrawing

MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 7: Hazardous areas

1 Scope

This part of IEC 61892 contains provisions for hazardous areas classification and choice of electrical installation in hazardous areas in mobile and fixed offshore units, including pipelines, pumping or 'pigging' stations, compressor stations and exposed location single buoy moorings, used in the offshore petroleum industry for drilling, processing and for storage purposes.

It applies to all installations, whether permanent, temporary, transportable or hand-held, to AC installations up to and including 35 000 V and DC installations up to and including 1 500 V. (AC and DC voltages are nominal values).

This standard does not apply to electrical installations in rooms used for medical purposes, or in tankers.

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 60079-0:2011, *Explosive atmospheres – Part 0: Equipment – General requirements*

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

IEC 60079-2, *Explosive atmospheres – Part 2: Equipment protection by pressurized enclosure "p"*

IEC 60079-5, *Explosive atmospheres – Part 5: Equipment protection by powder filling "q"*

IEC 60079-6, *Explosive atmospheres – Part 6: Equipment protection by oil immersion "o"*

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

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

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

IEC 60079-13, *Explosive atmospheres – Part 13: Equipment protection by pressurized room "p"*

IEC 60079-14:2013, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60079-15, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC TR 60079-16, *Electrical apparatus for explosive gas atmospheres – Part 16: Artificial ventilation for the protection of analyser(s) houses*

IEC 60079-17, *Explosive atmospheres – Part 17: Electrical installations inspection and maintenance*

IEC 60079-18, *Explosive atmospheres – Part 18: Equipment protection by encapsulation "m"*

IEC 60079-19, *Explosive atmospheres – Part 19: Equipment repair, overhaul and reclamation*

IEC 60079-25, *Explosive atmospheres – Part 25: Intrinsically safe electrical systems*

IEC 60079-26, *Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga*

IEC 60079-28, *Explosive atmospheres – Part 28: Protection of equipment and transmission systems using optical radiation*

IEC 60079-29 (all parts), *Explosive atmospheres – Part 29: Gas detectors*

IEC 60079-30-2, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance*

IEC 60079-33, *Explosive atmospheres – Part 33: Equipment protection by special protection "s"*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 61008-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61285, *Industrial-process control – Safety of analyser houses*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

IEC 61892-2, *Mobile and fixed offshore units – Electrical installations – Part 2: System design*

IEC 61892-3, *Mobile and fixed offshore units – Electrical installations – Part 3: Equipment*

IEC 61892-4, *Mobile and fixed offshore units – Electrical installations – Part 4: Cables*

IEC 61892-6, *Mobile and fixed offshore units – Electrical installations – Part 6: Installation*

IEC 62485-2:2010, *Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries*

IEC/ISO 80079 (all parts), *Explosive atmospheres*

IMO MODU code, *Code for the construction and equipment of mobile offshore drilling units*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 and the following apply. For the definitions of any other term, particularly those of a more general nature, reference should be made to IEC 60050-426 or other appropriate parts of IEC 60050 (International Electrotechnical Vocabulary).

3.1

appropriate authority

governmental body and/or classification society with whose rules a unit is required to comply

[SOURCE: IEC 60092-101:1994, 1.3.2, modified – The word “ship” has been replaced with “unit”.]

3.2

normal operation

operation of apparatus conforming electrically and mechanically with its design specification and used within the limits specified by the manufacturer

Note 1 to entry: Minor releases of flammable material may be part of normal operation. For example, releases from seals which rely on wetting by the fluid which is being pumped are considered to be minor releases.

Note 2 to entry: Failures (such as the breakdown of pump seals, flange gaskets or spillages caused by accidents) which involve urgent repair or shutdown are not considered to be part of normal operation nor are they considered to be catastrophic.

Note 3 to entry: Normal operation include start-up and shutdown conditions.

[SOURCE: IEC 60050-426:2008, 426-04-10, modified – The notes to entry have been added.]

3.3

valve regulated lead acid battery VRLA

secondary battery in which cells are closed but have a valve which allows the escape of gas if the internal pressure exceeds a predetermined value

Note 1 to entry: The cell or battery cannot normally receive additions to the electrolyte.

Note 2 to entry: This note applies to the French language only.

[SOURCE: IEC 60050-482:2004, 482-05-15]

3.4

inspection

action comprising careful scrutiny of an item carried out either without dismantling, or with the addition of partial dismantling as required, supplemented by means such as measurement, in order to arrive at a reliable conclusion as to the condition of an item

[SOURCE: IEC 60050-426:2008, 426-14-02]

3.5

maintenance

combination of any actions carried out to retain an item in or restore it to, conditions in which it is able to meet the requirements of the relevant specification and perform its required functions

[SOURCE: IEC 60050-426:2008, 426-14-01]

3.6 **terms related to area classification**

3.6.1 **area classification**

assessed division of a facility into hazardous and non-hazardous areas, and the subdivision of the hazardous areas into zones

3.6.2 **explosive atmosphere**

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

[SOURCE: IEC 60050-426:2008, 426-01-06, modified – The words "dust, fibres, or flyings" have been replaced by "or mist".]

3.6.3 **hazardous area**

area in which an explosive gas atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of electrical apparatus

[SOURCE: IEC 60050-426:2008, 426-03-01, modified – The word "gas" has been added and the notes have been deleted.]

3.6.4 **non-hazardous area**

area in which an explosive atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of electrical apparatus

[SOURCE: IEC 60050-426:2008, 426-03-02]

3.7 **terms related to zones**

3.7.1 **zones**

hazardous areas classified into zones based upon the frequency of the occurrence and duration of an explosive atmosphere

[SOURCE: IEC 60079-14, 3.2.6]

3.7.2 **zone 0**

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

Note 1 to entry: The MODU code definition is "Zone 0: in which an explosive gas/air mixture is continuously present or present for long periods."

[SOURCE: IEC 60050-426:2008 426-03-03, modified – A note to entry has been added.]

3.7.3 **zone 1**

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

Note 1 to entry: The MODU code definition is “Zone 1: in which an explosive gas/air mixture is likely to occur in normal operation.”

[SOURCE: IEC 60050-426:2008, 426-03-04, modified – The note to entry has been added.]

3.7.4 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

Note 1 to entry: In this definition, the word "persist" means the total time for which the flammable atmosphere will exist. This will normally comprise the total of the duration of the release, plus the time taken for the flammable atmosphere to disperse after the release has stopped.

Note 2 to entry: Indications of the frequency of the occurrence and duration may be taken from codes relating to specific industries or applications.

Note 3 to entry: The MODU code definition is “Zone 2: in which an explosive gas/air mixture is not likely to occur, or in which such a mixture, if it does occur, will only exist for a short time.”

[SOURCE: IEC 60050-426:2008, 426-03-05, modified – Note 3 to entry has been added.]

3.7.5 extent of zone

distance in any direction from the source of release to the point where the gas/air mixture has been diluted by air to a value below the lower explosive limit

3.8 terms related to release

3.8.1 source of release

point or location from which a flammable gas, vapour, or liquid may be released into the atmosphere in such a way that an explosive gas atmosphere could be formed

[SOURCE: IEC 60050-426:2008, 426-03-06, modified – The note has been deleted.]

3.8.2 continuous grade of release

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

[SOURCE: IEC 60050-426:2008, 426-03-10]

3.8.3 primary grade of release

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

[SOURCE: IEC 60050-426:2008, 426-03-11]

3.8.4 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 60050-426:2008, 426-03-12]

3.8.5 release rate

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

[SOURCE: IEC 60050-426:2008, 426-03-13]

3.9 terms related to properties of materials

3.9.1 lower explosive limit LEL

concentration of flammable gas or vapour in air, below which an explosive gas atmosphere will not be formed

Note 1 to entry: The terms "explosive limit" and "flammable limit" are equivalent. IEC 60079-20-1 and IEC 61779-1 use the term "flammable limit" whilst all the other standards use the more widely accepted term "explosive limit".

Note 2 to entry: This note applies to the French language only.

[SOURCE: IEC 60050-426:2008, 426-02-09, modified – The notes to entry have been added.]

3.9.2 relative density relative density of a gas or a vapour

ratio of the density of a gas or a vapour to the density of air at the same pressure and at the same temperature

Note 1 to entry: The relative density of air is equal to 1.

[SOURCE: IEC 60050-426:2008, 426-03-15]

3.9.3 flammable material

material which is flammable by itself, or is capable of producing a flammable gas or vapour

[SOURCE: IEC 60050-426:2008, 426-03-16]

3.9.4 flammable liquid

liquid capable of producing a flammable vapour under any foreseeable operating conditions

[SOURCE: IEC 60050-426:2008, 426-03-17]

3.9.5 flammable gas or vapour

gas or vapour which, when mixed with air in certain proportions, will form an explosive gas atmosphere

[SOURCE: IEC 60050-426:2008, 426-03-18]

3.9.6 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 60050-426:2008, 426-02-14]

3.9.7 boiling point

temperature of a liquid boiling at an ambient pressure of 101,3 kPa (1 013 mbar)

Note 1 to entry: The initial boiling point that should be used for liquid mixtures is to indicate the lowest value of the boiling point for the range of liquids present, as determined in a standard laboratory distillation without fractionation.

[SOURCE: IEC 60050-426:2008, 426-03-19]

3.9.8

vapour pressure

pressure exerted when a solid or liquid is in equilibrium with its own vapour

Note 1 to entry: It is a function of the substance and of the temperature of the substance.

[SOURCE: IEC 60050-426:2008, 426-03-20]

3.9.9

ignition temperature of an explosive gas atmosphere

lowest temperature of a heated surface at which, under specified conditions, will ignite a flammable substance in the form of gas or vapour mixture with air

Note 1 to entry: IEC 60079-20-1 standardizes a method for the determination of this temperature.

[SOURCE: IEC 60050-426:2008, 426-02-01, modified – In the note to entry the reference to IEC 60079-4 has been replaced with IEC 60079-20-1.]

3.10

terms related to equipment

3.10.1

intrinsically-safe circuit

circuit in which any spark or any thermal effect produced in the conditions specified in IEC 60079-11, including normal operation and specified fault conditions, are not capable of causing ignition of a given explosive atmosphere

[SOURCE: IEC 60050-426:2008, 426-11-01]

3.10.2

intrinsically safe electrical system

assembly of interconnected items of electrical equipment, described in a descriptive system document, in which the circuits or parts of circuits intended to be used in an explosive atmosphere, are intrinsically safe

[SOURCE: IEC 60079-14:2013, 3.5.7]

3.10.3

simple apparatus

electrical component or combination of components of simple construction with well-defined electrical parameters which is compatible with the intrinsic safety of the circuit in which it is used

[SOURCE: IEC 60050-426: 2008, 426-11-09]

3.10.4

exposed conductive part

conductive part of electrical equipment, which can be touched and which is not normally live, but which can become live when basic insulation fails

Note 1 to entry: A conductive part of electrical equipment which can only become live through contact with an exposed-conductive-part which has become live is not considered to be an exposed-conductive-part itself.

Note 2 to entry: Typical exposed conductive parts are walls of enclosures, operating handles, etc.

[SOURCE: IEC 60050-442:1998, 442-01-21, modified – Note 2 to entry has been added.]

3.10.5

extraneous-conductive-part

conductive part not forming a part of the electrical installation and liable to propagate a potential, generally the electric potential of a local earth

[SOURCE: IEC 60050-195: 1998, 195-06-11, modified – The word "introduce" has been replaced by the word "propagate".]

3.10.6

radio frequency identification

RFID

data collection technology that uses electronic tags for storing data

Note 1 to entry: The tag, also known as an "electronic label", "transponder" or "type plate" is made up of an RFID chip attached to an antenna. Transmitting in the kilohertz, megahertz and gigahertz ranges, tags may be battery-powered or derive their power from the RF waves coming from the reader.

Note 2 to entry: This note applies to the French language only.

[SOURCE IEC 60079-14:2013, 3.15]

3.10.7

transportable equipment

equipment not intended to be carried by a person nor intended for fixed installation which can be moved when energized

3.10.8

portable equipment

equipment intended to be carried by a person which can be moved when energized

3.10.9

personal equipment

equipment intended to be supported by a person's body during normal use

3.10.10

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

Note 1 to entry: This note applies to the French language only.

[SOURCE IEC 60079-0:2011, 3.26, modified – The note has been deleted.]

3.11

terms related to area and ventilation

3.11.1

enclosed area

any room or space within which, in the absence of artificial ventilation, the ventilation will be limited and any flammable atmosphere will not be dispersed naturally

**3.11.2
enclosure**

all the walls which surround the live parts of electrical apparatus including doors, covers, cable entries, rods, spindles and shafts, ensuring the protection of the electrical apparatus

**3.11.3
air lock**

compartment connecting two different environments, usually at different pressures, that enables personnel to transfer from one environment to the other

**3.11.4
ventilation**

movement of air and its replacement with fresh air due to the effects of wind, temperature gradients, or artificial means (for example, fans or extractors)

**3.11.5
gas-tight door**

solid, close fitting door designed to resist the passage of gas under normal atmospheric conditions

**3.11.6
natural ventilation**

movement of air and its replacement with fresh air due to the effects of wind and/or temperature gradients

[SOURCE: IEC 60050-426:2008, 426-03-07]

**3.11.7
opening**

any aperture, door, window or non-gas-tight fixed panel

**3.11.8
purging**

in a pressurized enclosure, the operation of passing a quantity of protective gas through the enclosure and ducts, so that the concentration of the explosive gas atmosphere is brought to a safe level

[SOURCE: IEC 60050-426: 2008, 426-09-03]

**3.11.9
room or building**

enclosure (or enclosures) provided with doors, cable ducting, conduits, etc. containing electrical apparatus and of sufficient size to permit the entry of a person who may be expected to work or remain inside the enclosure for a prolonged period

**3.11.10
semi-enclosed locations**

locations where natural conditions of ventilation are notably different from those on open decks due to the presence of structures such as roofs, windbreaks and bulkheads and which are so arranged that the dispersion of gas may not occur

**3.11.11
sheltered open area
obstructed open area**

area within or adjoining an open area, which may include a partially open building or structure, where, owing to obstruction, natural ventilation may be less than in a true open area, and this may enlarge the extent of the hazard zone