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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

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

IEC 61892-7:2019-04(en-fr)

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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

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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 fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

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

a) the document has been completely rewritten. References are, to the extent possible, made to IEC 60079-14 and to other relevant standards, as appropriate, from IEC TC 31; only requirements concerning offshore installations that deviate from the general requirements for installations in hazardous areas are given;
b) requirements as to gas detection have been transferred to an informative annex;

c) requirements concerning emergency shutdown (ignition source control) have been transferred to IEC 61892-1.

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

FDIS	Report on voting
18/1655/FDIS	18/1666/RVD

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

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

A list of all parts in the IEC 61892 series, published 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document 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 for safety in the design, selection, installation, maintenance and use of electrical equipment for the generation, transmission, storage, distribution and utilization of electrical energy for all purposes in offshore units which are used for the purpose of exploration or exploitation of petroleum resources.

This part of IEC 61892 incorporates and coordinates, as far as possible, existing rules and forms a code of interpretation, where applicable, of the requirements of the International Maritime Organization (IMO), and constitutes a guide for future regulations which may be prepared and a statement of practice for offshore unit owners, designers, installers and appropriate organizations.

This document is based on solutions and methods which are in current use, but it is not intended to impede development of new or improved techniques.

In this revision, voltage limitations have been removed. However, voltage limitations may be given in the referenced equipment standards. The removal of voltage limitations is considered necessary due to the interconnection of, and supply from shore to offshore units. In such cases, transmission voltages up to 132 kV AC and 150 kV DC are used and higher voltages are being planned.

The IEC 61892 series aims to constitute a set of International Standards for the offshore petroleum industry, but it is not intended to prevent their use beyond petroleum installations.

MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 7: Hazardous areas

1 Scope

This part of IEC 61892 provides requirements for hazardous area classification and selection of electrical equipment and installation in hazardous areas in mobile and fixed offshore units, including pipeline, pumping or "pigging" stations, compressor stations and single buoy moorings, used in the offshore petroleum industry for drilling, production, accommodation, processing, storage and offloading purposes.

It applies to all installations, whether permanent, temporary, transportable or personal, to AC installations and DC installations without any voltage level limitation. Referenced equipment standards may give voltage level limitations.

This document is based on the requirements of International Standards developed by IEC TC 31 regarding area classification and requirements as to installations in hazardous areas and gives additional requirements for installations on mobile and fixed offshore units.

This document specifies requirements such as those concerning

– area classification,
– electrical systems,
– selection of electrical equipment,
– cables and wiring systems,
– ventilation,
– ventilation requirement for battery compartments, and
– inspection, maintenance, repair and overhaul.

This document gives information on topics such as

– gas detection systems, and
– electrical installations in extremely low ambient temperatures.

This document does not apply to

– fixed equipment for medical purposes,
– electrical installations of tankers, and
– control of ignition sources other than those created by electrical equipment.

NOTE 1 For medical rooms, IEC 60364-7-710 provides specific requirements. Requirements for tankers are given in IEC 60092-502.

NOTE 2 Guidance on protection of non-electrical equipment can be found in ISO 80079-36, ISO 80079-37 and IMO 2009 MODU Code, 6.7

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 60079-10-1:2015, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

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

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

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

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

IEC 61892-1:2019, *Mobile and fixed offshore units – Electrical installations – Part 1: General requirements and conditions*

IEC 61892-2:2019, *Mobile and fixed offshore units – Electrical installations – Part 2: System design*

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

IMO, 2009 MODU Code, *Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009,* 2010 edition

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61892-1, IEC 60079-14 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
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 substances 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 includes start-up and shutdown conditions.

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

3.2
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]

3.3
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]

3.4
terms related to area classification

3.4.1
area classification
assessed division of a facility into hazardous and non-hazardous areas, and the subdivision of the hazardous areas into zones

3.4.2
explosive gas 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

Note 1 to entry: Although a mixture which has a concentration above the upper flammable limit (UFL) is not an explosive gas atmosphere, it can readily become so and, generally for area classification purposes, it is advisable to consider it as an explosive atmosphere.

[SOURCE: IEC 60079-10-1:2015, 3.2, modified – The word "mist" has been added to the definition, and Note 2 to entry has been deleted.]

3.4.3
hazardous area (on account of explosive gas atmosphere)
area in which an explosive gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment

Note 1 to entry: The interior of many items of process equipment are commonly considered as a hazardous area even though a flammable atmosphere may not normally be present to account for the possibility of air entering the equipment. Where specific controls such as inerting are used the interior of process equipment may not need to be classified as a hazardous area.

[SOURCE: IEC 60079-10-1:2015, 3.3.1]

3.4.4
non-hazardous area (on account of explosive gas atmosphere)
an 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 equipment

[SOURCE: IEC 60079-10-0:2015, 3.3.2]

3.5
terms related to zones

3.5.1
zone
hazardous area classification based upon the frequency of the occurrence and duration of an explosive atmosphere

[SOURCE: IEC 60079-10-1:2015, 3.3.3]

3.5.2
zone 0
area in which an explosive gas atmosphere is present continuously or for long periods or frequently

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

Note 2 to entry: The 2009 MODU Code definition is "Zone 0: in which ignitable concentrations of flammable gases or vapours are continuously present or present for long periods".

[SOURCE: IEC 60079-10-1:2015, 3.3.4, modified – Note 2 to entry has been added.]

3.5.3
zone 1
area in which an explosive gas atmosphere is likely to occur periodically or occasionally in normal operation

Note 1 to entry: The 2009 MODU Code definition is "Zone 1: in which ignitable concentrations of flammable gases or vapours are likely to occur in normal operation".

[SOURCE: IEC 60079-10-1:2015, 3.3.5, modified – The note to entry has been added.]

3.5.4
zone 2
area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, it will exist for a short period only

Note 1 to entry: Indications of the frequency of the occurrence and duration may be taken from codes relating to specific industries or applications.

Note 2 to entry: The 2009 MODU Code definition is "Zone 2: in which ignitable concentrations of flammable gases or vapours are not likely to occur, or in which such a mixture, if it does occur, will only exist for a short time".

[SOURCE: IEC 60079-10-1:2015, 3.3.6, modified – Note 2 to entry has been added.]

3.5.5
extent of zone
distance in any direction from the source of release to where a gas/air mixture will be diluted by air to a concentration below the lower flammable limit

[SOURCE: IEC 60079-10-1:2015, 3.3.7]

3.6
terms related to release

3.6.1
source of release
point or location from which a flammable gas, vapour, mist or liquid may be released into the atmosphere in such a way that an explosive gas atmosphere could be formed

[SOURCE: IEC 60079-10-1:2015, 3.4.1]

3.6.2
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 60079-10-1:2015, 3.4.2]

3.6.3
primary grade of release
release which can be expected to occur periodically or occasionally during normal operation

[SOURCE: IEC 60079-10-1:2015, 3.4.3]

3.6.4
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 60079-10-1:2015, 3.4.4]

3.6.5
release rate
quantity of flammable gas or vapour emitted per unit time from the source of release

[SOURCE: IEC 60079-10-1:2015, 3.4.5, modified – The words "liquid" and "mist" have been deleted from the definition.]

3.7
terms related to properties of materials

3.7.1
LFL
lower flammable limit
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. ISO/IEC 80079-20-1 and IEC 60079-29-1 use the term "flammable limit" whilst all the other standards use the more widely accepted term "explosive limit".

[SOURCE: IEC 60079-10-1:2015, 3.6.12, modified – The word "mist" has been deleted from the term, and the note to entry has been added.]

3.7.2
relative density
relative density of a gas or a vapour
density of a gas or a vapour relative to the density of air at the same pressure and temperature

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

[SOURCE: IEC 60079-10-1:2015, 3.6.7, modified – The term "relative density" has been added, and the text in parenthesis in the definition has been moved to a note to entry.]

3.7.3
flammable substance
substance which is itself flammable, or is capable of producing a flammable gas, vapour or mist

[SOURCE: IEC 60079-10-1:2015, 3.6.1]

3.7.4
flammable liquid
liquid capable of producing a flammable vapour under any foreseeable operating conditions

Note 1 to entry: An example of foreseeable operating condition is one in which the flammable liquid is handled at temperatures close to or above its flashpoint.

[SOURCE: IEC 60079-10-1:2015, 3.6.2, modified as follows – Note 2 to entry has been deleted.]

3.7.5
flammable gas or vapour
gas or vapour which, when mixed with air in certain proportions, will form an explosive gas atmosphere

[SOURCE: IEC 60079-10-1:2015, 3.6.4]

3.7.6
flashpoint
lowest liquid temperature at which, under certain standardized conditions, a liquid gives off vapours in quantity such as to be capable of forming an ignitable vapour/air mixture

[SOURCE: IEC 60079-10-1:2015, 3.6.8]

3.7.7
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 60079-10-1:2015, 3.6.9]

3.7.8
vapour pressure
pressure exerted when a solid or liquid is in equilibrium with its own vapour

Note 1 to entry: This is also the partial pressure of the substance in the atmosphere above the liquid. It is a function of the substance and of the temperature.

[SOURCE: IEC 60079-10-1:2015, 3.6.10]

3.7.9
ignition temperature
<explosive gas atmosphere> lowest temperature of a heated surface which, under specified conditions, will ignite a flammable substance in the form of a gas or vapour mixture with air

Note 1 to entry: ISO/IEC 80079-20-1 standardizes a method for the determination of this temperature.

[SOURCE: IEC 60079-10-1:2015, 3.6.11, modified – The words "of an explosive gas atmosphere" have been moved from the term to the domain, the parenthesis has been deleted from the definition, and the note to entry has been added.]

3.8
terms related to equipment

3.8.1
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, is not capable of causing ignition of a given explosive gas atmosphere

Note 1 to entry: The circuit may also contain associated apparatus.

[SOURCE: IEC 60079-14:2013, 3.5.6, modified – The word "gas" has been added to the definition.]

3.8.2
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]

3.8.3
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 60079-0:2017, 3.33, modified – The note to entry has been added.]

3.9
terms related to area and ventilation

3.9.1
enclosed area
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

3.9.2
enclosure
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

3.9.3
air lock
compartment connecting two different environments, usually at different pressures, that enables personnel to transfer from one environment to the other

3.9.4
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)

[SOURCE: IEC 60079-10-1:2015, 3.5.1]

3.9.5
gas-tight door
solid, close fitting door designed to resist the passage of gas under normal atmospheric conditions

3.9.6
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]

3.9.7
opening
aperture, for example door, window or non-gas-tight fixed panel, including those for ventilation

3.9.8
purging
operation, in a pressurized enclosure, 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]

3.9.9
room
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

3.9.10
semi-enclosed location
location 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

3.9.11
sheltered area
obstructed 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 hazardous zone

3.10
well test facility
systems and equipment used for testing of a well in order to obtain data for flow rate and pressure

4 Area classification

4.1 General

Area classification is a method of analysing and classifying the environment where explosive gas atmospheres can occur, so as to facilitate the proper selection, installation and operation of equipment to be used safely in that environment.