

# 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**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

# 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**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 47.020.60

ISBN 978-2-8322-6672-4

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	9
3 Terms and definitions .....	9
4 Area classification .....	15
4.1 General.....	15
4.2 Safety principles .....	17
4.3 Sources of release.....	17
4.4 Type of zone.....	18
4.5 Relative density of the gas or vapour when it is released .....	18
4.6 Mobile offshore units.....	19
4.6.1 General .....	19
4.6.2 Zone 0.....	19
4.6.3 Zone 1.....	19
4.6.4 Zone 2.....	19
4.6.5 Well test facilities .....	20
4.7 Fixed offshore units .....	20
4.7.1 General .....	20
4.7.2 Zone 0.....	20
4.7.3 Zone 1.....	20
4.7.4 Zone 2.....	21
4.7.5 Drilling facilities .....	21
4.8 Buoyant production and storage units .....	21
4.9 Provisions regarding all types of offshore units (fixed and mobile offshore units) .....	21
4.10 Openings, access and ventilation conditions affecting the extent of hazardous areas .....	21
4.10.1 General .....	21
4.10.2 Enclosed space with direct access to any zone 1 location.....	21
4.10.3 Enclosed space with direct access to any zone 2 location.....	22
4.10.4 Warning notices.....	22
5 Electrical systems.....	22
5.1 Sources of electrical power.....	22
5.2 Distribution systems.....	22
5.2.1 General .....	22
5.2.2 Earth fault detection .....	23
5.3 Electrical protection .....	23
5.4 Gas detection .....	23
6 Protection from dangerous (incendive) sparking .....	24
7 Assurance of conformity of equipment .....	24
8 Selection of equipment (excluding cables and conduits) .....	24
9 Cables and wiring system – General.....	24
9.1 Cables .....	24
9.2 Connections.....	24
9.3 Splicing.....	24

9.4	Cable system .....	25
9.4.1	Construction .....	25
9.4.2	Earthing of metallic covering .....	25
9.5	Conduit systems .....	25
9.6	Additional requirements .....	25
9.7	Installation requirements .....	25
9.7.1	Circuits traversing a hazardous area .....	25
9.7.2	Terminations .....	26
9.7.3	Unused cores .....	26
10	Cable entry systems and blanking elements .....	26
10.1	General .....	26
10.2	Use of drain gland/plug .....	26
11	Rotating electrical machines .....	26
11.1	General .....	26
11.2	Ex protected permanent magnet motor .....	26
12	Luminaires .....	27
13	Electric heating systems .....	27
14	Additional requirements for type of protection "d" – Flameproof enclosures .....	27
15	Additional requirements for type of protection "e" – Increased safety .....	27
16	Additional requirements for type of protection "i" – Intrinsic safety .....	27
17	Additional requirements for pressurized enclosures .....	27
18	Pressurized rooms .....	27
19	Analyser houses .....	27
20	Additional requirements for type of protection "n" .....	28
21	Additional requirements for type of protection "o" – Oil immersion .....	28
22	Additional requirements for type of protection "q" – Powder filling .....	28
23	Additional requirements for type of protection "m" – Encapsulation .....	28
24	Additional requirements for type of protection "op" – Optical radiation .....	28
25	Ventilation .....	28
25.1	General .....	28
25.2	Ventilation of spaces containing electrical apparatus .....	28
25.3	Ventilation of other hazardous spaces .....	29
26	Ventilation requirements for battery compartments .....	29
26.1	General .....	29
26.2	Ventilation requirements .....	29
26.3	Natural ventilation .....	30
26.4	Forced ventilation .....	30
26.5	Requirements for battery compartments for zone 2 and zone 1 .....	30
26.6	Fans and ducts .....	30
27	Inspection, maintenance, repair and overhaul .....	31
27.1	Initial inspection .....	31
27.2	Inspection and maintenance .....	31
27.3	Isolation of apparatus .....	31
27.4	Precautions concerning the use of ignition sources .....	31
27.5	Repair and overhaul .....	31
27.6	Personnel qualifications .....	31

28	Documentation .....	32
	Annex A (informative) Examples of sources of release – Process plant.....	34
	A.1 General.....	34
	A.2 Sources giving a continuous grade of release .....	34
	A.3 Sources giving a primary grade of release .....	34
	A.4 Sources giving a secondary grade of release .....	34
	Annex B (informative) Schematic approach to the classification of hazardous areas .....	35
	Annex C (informative) Hazardous area data sheets and symbols .....	39
	C.1 Hazardous area classification data sheet .....	39
	C.2 Symbols for hazardous area zone classification drawings .....	39
	Annex D (informative) Gas detection systems .....	44
	D.1 General.....	44
	D.2 Low gas alarm .....	44
	D.3 High gas alarm.....	45
	Annex E (informative) Ventilation of hazardous areas – Requirements as to .....	46
	Annex F (informative) Electrical installations in extremely low ambient temperatures .....	47
	F.1 General.....	47
	F.2 Explosion protected equipment .....	47
	Annex G (informative) Installation in explosive atmospheres – Safety signs and plates for hazardous areas .....	48
	G.1 Objectives .....	48
	G.2 General.....	48
	Annex H (informative) List of electrical and electronic equipment in hazardous areas (example of data file) – Requirements concerning data file .....	50
	Bibliography.....	51
	Figure B.1 – Schematic approach to area classification .....	35
	Figure B.2 – Schematic approach to area classification for continuous grade release .....	36
	Figure B.3 – Schematic approach to classification for primary release source .....	37
	Figure B.4 – Schematic approach to area classification for secondary grade release .....	38
	Figure C.1 – Preferred symbols for hazardous area zones .....	42
	Figure G.1 – Examples of an "Ex" safety warning sign for hazardous area installation .....	49
	Table 1 – Electrical protection.....	23
	Table C.1 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics .....	40
	Table C.2 – Hazardous area classification data sheet – Part II: List of sources of release .....	41

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## 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, accept IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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 installation 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