

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Mobile and fixed offshore units – Electrical installations –
Part 5: Mobile units**

**Unités mobiles et fixes en mer – Installations électriques –
Partie 5: Unités mobiles**

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Mobile and fixed offshore units – Electrical installations –
Part 5: Mobile units**

**Unités mobiles et fixes en mer – Installations électriques –
Partie 5: Unités mobiles**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MOBILE AND FIXED OFFSHORE UNITS –
ELECTRICAL INSTALLATIONS –****Part 5: Mobile units**

FOREWORD

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International Standard IEC 61892-5 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 2010. This edition constitutes a technical revision.

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

The requirement to protection against flooding has been rewritten.

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

FDIS	Report on voting
18/1424/FDIS	18/1439/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.

The requirements specified in this International Standard are based on the Code for the Construction and Equipment of Mobile Offshore Drilling Units (1989 MODU CODE) published by the International Maritime Organization (IMO), and might include additional provisions.

A list of all the 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 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

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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 used for exploration or exploitation of petroleum resources.

This part of IEC 61892 also incorporates and co-ordinates, as far as possible, existing rules and 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. 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.

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MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 5: Mobile units

1 Scope

This part of IEC 61892 specifies the characteristics for electrical installations in mobile units, for use during transfer from one location to another and for use during the exploration and exploitation of petroleum resources.

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).

NOTE Attention is drawn to further requirements concerning electrical installations on such mobile offshore units contained in the MODU CODE of the International Maritime Organization (IMO).

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 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60076 (all parts), *Power transformers*

IEC 60092-501:2013, *Electrical installations in ships – Part 501: Special features – Electric propulsion plant*

IEC 60092-504, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-3-22, *Tests on electric cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A*

IEC 61000-6-2:2005, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

IEC 61378-1, *Converter transformers – Part 1: Transformers for industrial applications*

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

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

International Convention for the Safety of Life at Sea (SOLAS):1974, Consolidated edition 2009

IALA, *International Association of Marine Aids to Navigation and Lighthouse Authorities, Recommendation O-1239 On The Marking of Man-Made Offshore Structures, 2008*

IMO *Guidelines for vessels with dynamic positioning systems – see IMO/MSC/Circ. 645, Annex, International Maritime Organization*

IMO 904E, *Convention on the International Regulations for Preventing Collisions at Sea, International Maritime Organization (COLREG)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61892-1, IEC 61892-2, IEC 61892-3, IEC 61892-6, as well as the following apply

3.1

auxiliary steering gear

equipment, other than any part of the main steering gear, necessary to steer the unit in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose

3.2

dynamic positioning system

DP system

equipment necessary to provide means of controlling the position and heading of a mobile unit within predetermined limits by means of resultant vectored thrust

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

3.3

electric steering gear

power operated steering gear where an electric motor applies torque to the rudder stock through mechanical means only

3.4

electrohydraulic steering gear

power operated steering gear where a hydraulic pump, driven by an electric motor, applies torque to the rudder stock through hydraulic and mechanical means

3.5

main steering gear

machinery, rudder actuators, steering gear power units and ancillary equipment and the means of applying torque to the rudder stock (for example tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the unit under normal service conditions

3.6

propulsion machine

rotating machine normally intended to provide propulsive power

3.7

redundancy

in an item, existence of more than one means for performing a required function

[SOURCE IEC 60050-191:1990, 191-15-01]

3.8

semiconductor converter

electronic power converter with semiconductor valve devices

Note 1 to entry: Similar terms are used for converters in general or for specific kinds of converters and for converters with other or specific electronic valve devices, e.g. thyristor converter, transistor inverter.

[SOURCE IEC 60050-551:1998, 551-12-42]

3.9

steering gear control system

equipment by which orders are transmitted from the navigating bridge to the steering gear power units

Note 1 to entry: Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables, etc.

3.10

steering gear power unit

electric motor and its associated electrical and/or hydraulic equipment used to operate the steering gear

4 General requirements

4.1 Protection against flooding

In every mobile unit in which electric power is used for the services necessary for the safety of the unit, the generators, switchgear, motors and associated controlgear for such services, with the exception of machinery in the platform of semi-submersibles, shall be so situated or arranged that they continue to operate in the event of partial flooding of the unit, within inclination limits referred in Clause 5.

The essential services for safety of personnel and unit including generators, switchgear, motors and associated controlgear for such services should be located above the worst damage waterline and be readily accessible.

4.2 Rotating machines

Rotating machines shall be installed to minimise the effects of motion. The design of bearings of all machines and the arrangement for their lubrication shall be adequate to withstand the motions encountered in heavy weather and operation for prolonged periods at the list and trim specified in Clause 5 without the spillage of oil.

4.3 Conductors, equipment and apparatus

Conductors, equipment and apparatus shall be placed at such a distance from each magnetic compass or shall be so disposed that the interfering external magnetic field is negligible; that is, the total singular deviation shall not exceed 30 min when any combination of circuits is switched on and off.

4.4 Main switchboards

The main switchboard shall be subdivided into at least two parts. The subdivision may be effected by removable links, circuit-breakers or other suitable means so that the main generators and any supplies to duplicated services which are directly connected to the busbars are, as far as is practicable, equally divided between the sections.

4.5 Axes of rotation

For units where the requirements to dynamic conditions, as specified in 5.5 apply, horizontal rotation machines shall to the extent possible be installed preferably with the shaft in the fore-and-aft direction. Where a machine is installed athwartship, it shall be ensured that the design of the bearings and the arrangements for lubrication are satisfactory to withstand the rolling specified in Clause 5. The manufacturer shall be informed when a machine for installation athwartship is ordered.

5 Limits of inclination of the unit

5.1 Authority requirement

Dependent upon the outcome of all studies relevant to the intact and damaged stability of the unit, the appropriate authority may require or permit deviations from the angles stated in 5.2, 5.3 and 5.4.

5.2 Machines, equipment and apparatus – General

All machines, equipment and apparatus shall operate satisfactorily under all conditions with the unit upright and when inclined up to the following angles from the normal:

- for column stabilized units, 15° in any direction;
- for self-elevating units, 10° in any direction;
- for surface units, 15° either way in list and simultaneously trimmed 5° by the bow or stern.

5.3 Propulsion machinery

Main propulsion machinery and all auxiliary machinery essential to the propulsion and safety of the mobile unit shall be capable of operating under the static conditions specified in 5.2 and the following dynamic conditions:

- for column stabilized units, 22° 30' in any direction;
- for self-elevating units, 15° in any direction;
- for surface units, 22° 30' rolling and simultaneously pitching 7° 30' by the bow or stern.

5.4 Emergency machinery

Emergency machines, equipment and apparatus fitted in accordance with requirements from the appropriate authority for emergency plant shall operate satisfactorily under all conditions with the unit upright and when inclined up to the following maximum angles from the normal:

- for column stabilized units, 25° in any direction;
- for self-elevating units, 15° in any direction;
- for surface units, 22° 30' about the longitudinal axis and/or when inclined 10° about the transverse axis.

5.5 Dynamic condition

Where required by the appropriate authority, dynamic condition limits shall apply as follows:

- rotation about fore-and-aft axis (rolling), $\pm 22^\circ 30'$;
- rotation about athwartship (pitching), $\pm 7^\circ 30'$.

NOTE These motions can occur simultaneously.

6 Bilge pumps

6.1 Power supply

Motors of permanently installed emergency bilge pumps, if any, shall be connected to an emergency switchboard.

6.2 Cables and cable connections

Cables and their connections to submersible pumps shall be capable of operating under a head of water equal to their distance below the worst damaged condition waterline. The cables shall either be armoured or mechanically protected by other means and shall not be installed within the assumed extent of damage. They shall be installed in continuous lengths from above the worst damaged condition waterline to the motor terminals, entering the air-bell from its underside.

6.3 Location of starting arrangement

Under all circumstances it shall be possible to start the motor of a permanently installed bilge pump from a convenient point above the worst damaged condition waterline and in a space not within the assumed extent of damage.

NOTE Information regarding the worst damaged condition waterline and the spaces within the assumed extent of damage is given in IMO requirements, for example in the MODU Code.

7 Navigation lights

7.1 General

Except when a unit is stationary and engaged in operations, IMO 904E applies.

7.2 Navigation lights when in operation

When a unit is stationary and engaged in operations, attention is drawn to the requirements for the safety of navigation of the coastal state in whose territorial sea or on whose continental shelf the unit is operating.

Unless otherwise required for the obstruction lighting by national authorities, the lighting is to be in accordance with IALA Recommendation O-1239.

7.3 Steaming lights

All units shall be provided with "steaming lights" which comprise masthead, side, stern, anchor, not-under-command and, if applicable, special-purpose lights. The construction and installation of navigation lights shall be to the satisfaction of the appropriate authority.

7.4 Collision regulations

Attention is drawn to the collision regulations in relation to the provision of primary and alternative lanterns for each of the navigation lights.

7.5 Power supply and monitoring systems

The following electrical arrangements relate only to the navigation lights referred to in 7.3 and 7.4.

- Each light shall be connected by a separate cable to a distribution board reserved solely for navigation lights, fitted in an accessible place under the control of watchkeeping personnel.

- There shall be two separate power supply systems to the distribution board, one being from the main switchboard and one from the emergency switchboard. Where a transitional source of emergency power is required by the Safety of Life at Sea (SOLAS) Convention, the arrangements shall enable the lights to be supplied from this source in addition to the emergency switchboard. An alarm shall be activated in the event of failure of a power supply to the distribution board.
- As far as practicable, the arrangements should be such that a fire, a fault or mechanical damage at any one point will not render both systems inoperative. It is, however, accepted that the systems must come together at some point where the changeover can be performed. This should, preferably, be at or near to the distribution board.
- Each light shall be controlled and protected in each insulated pole by a switch and fuse or by a circuit-breaker mounted in the distribution board.
- Each light shall be provided with an automatic indicator to give an acoustic and/or optical alarm in the event of complete extinction of the light. If an optical signal is used, which is connected in series with the steaming light, means to prevent failure of the indicator extinguishing the steaming light shall be provided. If an acoustic device alone is used it shall be connected to an independent source of supply, for example a battery, and provision shall be made for testing this supply.

The use of junction boxes in navigation light circuits, other than those provided for connecting the lanterns to the fixed wiring of the electrical installation, should be avoided. Cables for different circuits should not use the same junction box.

7.6 Special requirements for lights using LEDs

The luminous intensity of LEDs gradually decreases while the electricity consumption remains unchanged. The rate of decrease of luminous intensity depends on the output of LEDs and temperatures of LEDs. To prevent shortage of luminous intensity of LEDs, one of the following solutions shall be used:

- An alarm function shall be activated to notify the Officer of the Watch that the luminous intensity of the light reduces below the level required by COLREGs; or
- LEDs shall only be used within the lifespan (practical term of validity) specified by the manufacturer to maintain the necessary luminous intensity of LEDs. The lifespan of LEDs should be determined and clearly notified by the manufacturer based on the appropriate test results on the decrease of luminous intensity of the LEDs under various temperature conditions and on the temperature condition of LEDs in the light during operation, taking the appropriate margin into account.

The manufacturer of the navigation light should give information regarding detection of low illumination intensity.

8 Steering gear

8.1 Power operated steering gear

8.1.1 Electric and/or electrohydraulic steering gear shall be used for the power-operated main and auxiliary steering gear required by the appropriate authorities.

8.1.2 The electrical systems of the main steering gear and auxiliary steering gear shall be so arranged that any failure in one of the steering gears will not render inoperative the electrical systems of the other steering gear.

When an auxiliary steering gear is not required by the appropriate authorities and the main steering gear comprises two or more power units, the electrical system for each power unit shall be so arranged that the failure of one of them will not render the other units inoperative.