

Mobile and fixed offshore units — Electrical installations —

Part 6: Installation

ICS 29.260.99; 47.020.60; 75.180.10

National foreword

This British Standard is the UK implementation of IEC 61892-6:2007. It supersedes BS IEC 61892-6:1999 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee JPEL/18, Electrical installations of ships and of mobile and fixed offshore units.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 February 2008

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ISBN 978 0 580 58163 2

Amendments/corrigenda issued since publication

Date	Comments



BS IEC 61892-6:2007

IEC 61892-6

Edition 2.0 2007-11

INTERNATIONAL STANDARD

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

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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 which are used for the 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.

MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 6: Installation

1 Scope

This part of IEC 61892 contains provisions for electrical installation in mobile and fixed offshore units including pipeline, 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 a.c. installations up to and including 35 000 V and d.c. installations up to and including 750 V (a.c. and d.c. 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 referenced documents are indispensable for the application 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 60079-14:2002, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in hazardous areas (other than mines)*

IEC 60447:2004, *Basic and safety principles for man-machine interface – Actuating principles*

IEC 60502-1:2004, *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) – Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) up to 3 kV ($U_m = 3,6$ kV)*

IEC 60502-2:2005, *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) – Part 2: Cables for rated voltages from 6 kV ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ kV)*

IEC 60623:2001, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 60825 (all parts), *Safety of laser products*

IEC 60896-11:2002, *Stationary lead-acid batteries – Part 11: Vented types – General requirements and methods of test*

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

IEC 61892-7, *Mobile and fixed offshore units – Electrical installations – Part 7: Hazardous areas*

ISO 8468:1990, *Ship's bridge layout and associated equipment – Requirements and guidelines*

3 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 61892-1 through IEC 61892-7 and the following apply.

3.1

appropriate authority

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

3.2

bonding

connection of non-current-carrying parts to ensure continuity of electrical connection, or to equalize the potential between parts

3.3

electric surface heating

heat generated in the surface layer of a body to be heated by electrical means in order to raise or maintain its temperature

3.4

electric surface heating system

system of electric surface heating devices together with any controls, thermal insulation and protective cladding designed to meet a specified electric surface heating requirement

3.5

emergency switchboard

switchgear and controlgear assembly which is normally supplied by the main switchboard but, in the event of failure of the main electrical power supply system, is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute and control electrical energy to the emergency services for all electrical consumers essential for the safety of the crew and the unit under emergency conditions

3.6

equipotential bonding

electrical connection putting various exposed conductive parts and extraneous conductive parts at a substantially equal potential

3.7

exposed conductive part

conductive part which can readily be touched and which is not normally alive, but which may become alive under fault conditions

NOTE Typical exposed conductive parts are walls of enclosures, operating handles, etc.

3.8

extraneous conductive part

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

3.9**main switchboard**

switchgear and controlgear assembly which is directly supplied by the main source of electrical power and is intended to distribute and control electrical energy to the unit's services

3.10**primary structural damage**

damage which can result from lightning strike to units which do not provide a path of low resistance to earth for the passage of lightning currents, for example units of non-metallic construction or those having substantial non-metallic members

3.11**safety voltage (extra low voltage)**

voltage which does not exceed 50 V a.c. r.m.s. between conductors, or between any conductor and earth, in a circuit isolated from the supply by means such as a safety isolating transformer, or converter with separate windings; a voltage which does not exceed 50 V d.c. between conductors, or between any conductor and earth, in a circuit which is isolated from higher voltage circuits

NOTE 1 Consideration should be given to the use of equipment operating at less than 50 V under certain conditions, such as wet surroundings, exposure to heavy seas or powerful water jets where direct contact with live parts is involved.

NOTE 2 The voltage limit should not be exceeded either at full load or no-load but it is assumed, for the purpose of this definition, that any transformer or converter is operated at its rated supply voltage.

3.12**secondary damage**

damage to units or to their electrical installations, which can result as an indirect consequence of a lightning strike to a unit or to its immediate vicinity. A path to earth of low resistance may not prevent secondary damage, which may occur as a result of high values of induced, or resistance drop voltages produced by the passage of lightning currents

3.13**valve-regulated battery cell**

a secondary cell which is closed under normal conditions but which has an arrangement which allows the escape of gas if the internal pressure exceeds a predetermined value. The cell cannot normally receive addition to the electrolyte

3.14**vented (secondary) battery cell** (*Syn.* open (secondary) cell)

a secondary cell having a cover provided with an opening through which gaseous products may escape

NOTE The opening may be fitted with a venting system.

3.15**gastight sealed (secondary) cell**

a secondary cell which remains closed and does not release either gas or liquid when operated within the limits and temperature specified by the manufacturer. The cell may be equipped with a safety device to prevent dangerously high internal pressure. The cell does not require addition to the electrolyte and is designed to operate during its life in its original sealed state

4 Equipment earthing and bonding**4.1 General**

4.1.1 This clause contains mainly provisions for earthing of exposed conductive parts and bonding of extraneous conductive parts, various other bonding connections and a table for sizes of earth-continuity conductors and earthing connections.

4.1.2 All metallic parts of a unit, that are not normally current-carrying parts, shall be designated as either an exposed conductive part or an extraneous conductive part.

- a) Exposed conductive parts shall be connected to earth under the specific conditions for each type of system earthing:
- for TT- and IT-systems, the exposed conductive parts shall be connected directly to earth;
 - for TN-S systems, the exposed conductive parts shall be connected to the protective conductor, which is connected to earth at the neutral point of the distribution system.

NOTE 1 For the definition of TT-, IT- and TN-S-systems, see IEC 61892-2.

NOTE 2 Earth or an equipotential bonding system may be the steel structure or the hull of a unit.

- b) Extraneous conductive parts shall be connected to an equipotential bonding system.

For units that have separate modules and/or concrete structures, equipotential bonding shall be installed between extraneous conductive parts.

It shall be ensured that there is no detrimental mutual influence between the different protective measures applied in the same installation or in part of an installation.

NOTE 1 For earthing requirements of system neutral points, see IEC 61892-2.

NOTE 2 For earthing and bonding requirements in hazardous areas, see IEC 61892-7.

4.1.3 Earth bars, when provided, shall be located in front of equipment and junction boxes to allow for easy access for usage, inspection and maintenance. All earthing bars and terminals shall be visible and possible to be checked also after termination of cables. Separate connections shall be used for each individual earth conductor.

4.2 Earthing of exposed conductive parts

4.2.1 Unless specifically included in the following exemptions, all exposed conductive parts shall be earthed.

Exemption:

- lamp caps;
- shades, reflectors and guards, supported on lampholders or luminaires constructed of, or shrouded in, non-conducting material;
- metal parts on, or screws in or through, non-conducting material, which are separated by such material from current-carrying parts, and from earthed non-current-carrying parts in such a way that in normal use they cannot become live or come into contact with earthed parts;
- portable appliances which have a double and/or reinforced insulation (see IEC 61892-1) provided that the appliances conform with recognized safety requirements;
- bearing housings which are insulated in order to prevent the circulation of current in the bearings;
- clips for fluorescent lighting tubes;
- equipment supplied at extra-low voltage (safety voltage);
- cable clips;
- equipment of "all-insulated" construction in which the insulation enclosing the equipment is durable and continuous;
- fixed equipment or parts of equipment which, although not shrouded in insulation material, are nevertheless protected in such a way that they cannot be touched and cannot come into contact with exposed metal;
- equipment located in special earth-free rooms.

4.2.2 Metal parts of portable appliances, other than current-carrying parts and parts exempted in 4.2.1, shall be connected to earth by means of a conductor in the flexible cable or cord, which complies with Table 1 and which is connected, for example, through the associated plug and socket-outlet.

4.2.3 Secondary windings of instrument transformers shall be earthed.

4.2.4 The bonding shall be such as to give a substantially equal potential and a sufficiently low earth-fault loop impedance to ensure correct operation of protective devices.

4.3 Equipotential bonding

4.3.1 Extraneous conductive parts shall be connected to the equipotential bonding system as described in 4.4.

4.3.2 Metal frames or enclosures of equipment mounted in direct metallic contact with the unit structure need no supplementary bonding, provided that the surfaces in contact are clean and free from rust, scale or paint when installed and are firmly bolted together. Alternatively, they may be connected to the unit structure by a connection complying with 4.4.

4.3.3 Removable gland plates shall be separately bonded to the parent equipment, unless the connection between the gland plate and the parent equipment complies with the requirement of 4.3.2.

Enclosures of high-voltage equipment located in hazardous areas shall be connected to PE and bonded to the main structure.

4.4 Bonding connections

4.4.1 Every bonding connection to earth shall be of copper or other corrosion-resistant material and shall be securely installed and protected where necessary against damage and also against galvanic corrosion. Connections shall be secured against becoming loose due to vibration.

4.4.2 The nominal cross-sectional area of every copper bonding connection shall be not less than required in Table 1. Every other bonding connection shall have a conductance not less than that specified for a copper bonding connection.

4.4.3 Equipotential bonding connections for extraneous conductive parts shall have a cross-sectional area of at least 6 mm².

4.5 Connections to the unit structure

4.5.1 The bonding shall be achieved by means of a separate bonding conductor unless the parts under consideration are installed in accordance with 4.3.2.

4.5.2 Every connection of an earth conductor or a bonding conductor to the unit structure or hull shall be made in an accessible position, and shall be secured by a screw of brass or other corrosion resistant material, which shall be used for this purpose only. In all cases, care shall be taken to ensure clean metallic surfaces free from rust at the contact areas immediately before the screw is tightened.

4.5.3 Any electrical or instrumentation equipment attached, but not welded, to the structure steelwork, for example to hand rails, ladders and stairways, shall be bonded to the nearest structural steelwork.

4.5.4 To minimize shock from high-frequency voltage induced by the radio transmitter, handles, handrails, etc., made of metal shall be in good electrical connection with the hull or superstructure.