

INTERNATIONAL STANDARD

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61892-4

First edition
2007-06

Mobile and fixed offshore units – Electrical installations –

Part 4: Cables

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MOBILE AND FIXED OFFSHORE UNITS –
ELECTRICAL INSTALLATIONS –**

Part 4: Cables

FOREWORD

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International Standard IEC 61892-4 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units, in cooperation with SC 18A: Cables and cable installations.

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

FDIS	Report on voting
18/1052/FDIS	18/1058/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, 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 maintenance result 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- withdrawn;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.

A bilingual version of this publication may be issued at a later date.

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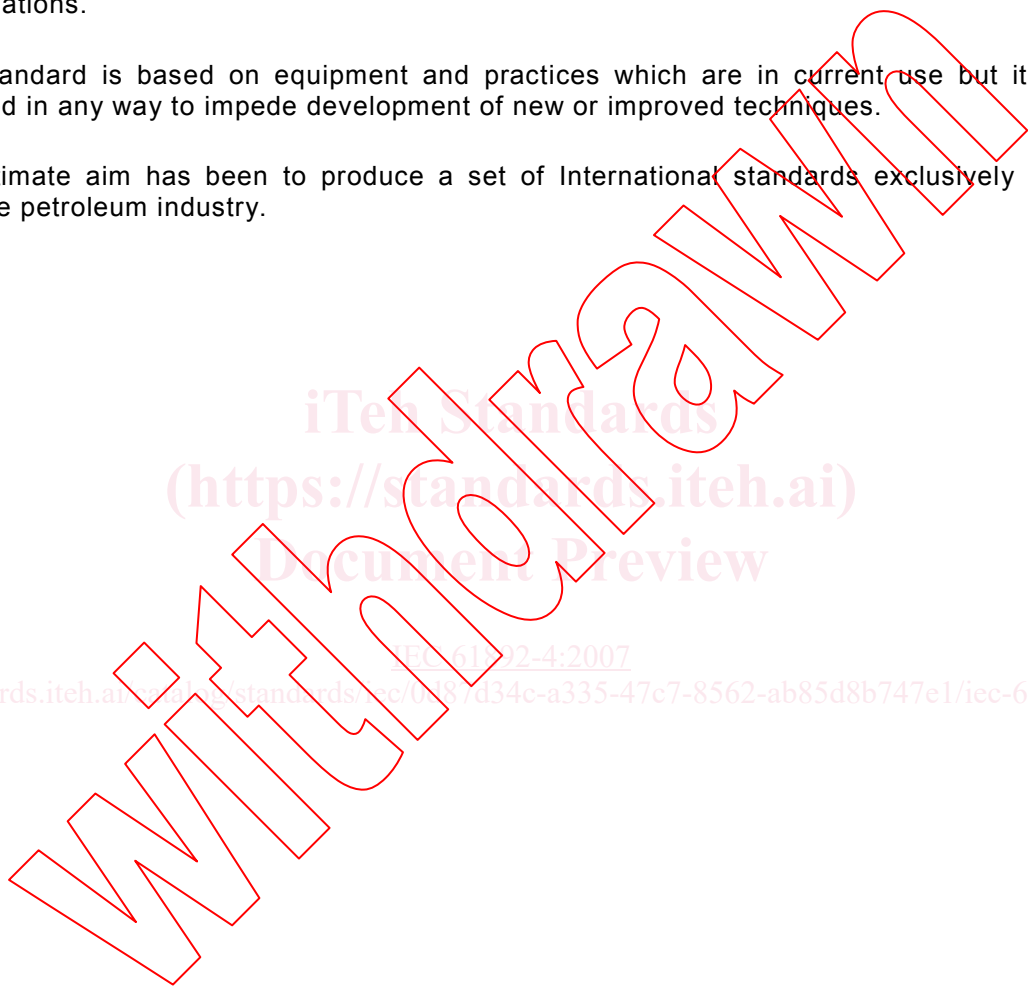
INTRODUCTION

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

This part of IEC 61892 also incorporates and coordinates, as far as possible, existing rules and forms a code of interpretation, where applicable, of the requirements of the International Maritime Organisation. It also constitutes a guide for future regulations which may be prepared and a statement of practice for offshore unit owners, constructors and appropriate organisations.

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 4: Cables

1 Scope

This part of IEC 61892 specifies requirements for the choice and installation of electrical cables intended for fixed electrical systems in mobile and fixed offshore units, including pumping or “pigging” stations, compressor stations and exposed location single buoy moorings, used in the offshore petroleum industry for drilling, production, processing and for storage purposes.

The reference to fixed electrical systems includes those that are subjected to vibration due to the movement of the unit, e.g. cables installed on a drag chain, and not those that are intended for repeated flexing. Cables suitable for repeated flexing use are detailed in other IEC specifications, e.g. IEC 60227 and IEC 60245, and their uses on board offshore units are restricted to those situations which do not directly involve exposure to a marine environment, e.g. portable tools, domestic appliances, etc.

The following types and applications of cables are not included:

- optical fibre cables;
- sub-sea and umbilical cables;
- cables supplying downhole pumps;
- data, telecommunication and radio frequency cables.

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 60038:1983, *IEC standard voltages*¹⁾
Amendment 1 (1994)
Amendment 2 (1997)

IEC 60092-350:2001, *Electrical installations in ships – Part 350: Shipboard power cables - General construction and test requirements*

IEC 60092-351, *Electrical installations in ships – Part 351: Insulating materials for shipboard and offshore units, power, control, instrumentation, telecommunication and data cables*

IEC 60092-353, *Electrical installations in ships – Part 353: Single and multicore non-radial field power cables with extruded solid insulation for rated voltages 1 kV and 3 kV*

IEC 60092-354, *Electrical installations in ships – Part 354: Single and three-core power cables with extruded solid insulation for rated voltages 6 kV ($U_m=7,2$ kV); up to 30 kV ($U_m=36$ kV)*

¹⁾ There exists a consolidated edition 6.2 (2002) including IEC 60038:1983 and its Amendments 1 and 2.

IEC 60092-359, *Electrical installations in ships – Part 359: Sheathing materials for shipboard power and telecommunication cables*

IEC 60092-376, *Electrical installations in ships – Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)*

IEC 60228:2004, *Conductors of insulated cables*

IEC 60331-21:1999, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

IEC 60331-31:2002, *Tests for electric cables under fire conditions – Circuit integrity – Part 31: Procedures and requirements for fire with shock – Cables of rated voltage up to and including 0,6/1 kV*

IEC 60332-1-2:2004, *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 60332-3-22:2000, *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 60754-1:1994, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the amount of halogen acid gas*

IEC 60754-2:1991, *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*
Amendment 1 (1997)

IEC 61034-2:2005, *Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements*

IEC 61892-1:2001, *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 61892-6, *Mobile and fixed offshore units – Electrical installations – Part 6: Installation*

3 Terms and definitions

3.1

appropriate authority

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

3.2

braid armour

covering formed from braided metal wires used to protect the cable from external mechanical effects

3.3

braid

covering made of plaited metallic or non-metallic material

3.4**core insulated conductor**

assembly comprising a conductor and its own insulation (and screens, if any)

3.5**core screen**

electric screen of non-metallic and/or metallic materials covering the insulation

3.6**insulated cable**

an assembly consisting of:

- one or more cores,
- their individual covering(s) (if any)
- assembly protection (if any)
- protective coverings (if any)

NOTE Additional uninsulated conductor(s) may be included in the cable.

3.7**conductor screen**

non-metallic conducting layer applied between the conductor and insulation to equalise the electrical stress between these components. It may also provide smooth surfaces as the boundaries of the insulation and assist in the elimination of spaces at these boundaries

3.8**inner sheath**

inner jacket (North America) non-metallic extruded sheath applied under a metallic sheath, reinforcement, or armour

NOTE

It must be extruded.

It can be used to fill the interstices.

It must be a material listed in IEC 60092-359.

It has a defined nominal thickness (value).

3.9**outer sheath****jacket (North America)**

non-metallic extruded sheath applied over a metallic sheath, reinforcement, or armour It must be extruded.

NOTE 1

It can be used to fill the interstices.

It must be a material listed in IEC 60092-359.

It has a defined nominal thickness (value).

NOTE 2 The term sheath is only used for metallic coverings in North America, where the term jacket is used for non-metallic coverings.

3.10**electrostatic screen****electrostatic shield** (North America)

surrounding earthed metallic layer to confine the electric field within the cable cores, pair(s), triples(s), or quad(s), and to protect the pair(s), triad(s), or quad(s) from external influence

4 Types, installation and operating conditions of cables

4.1 Types of cables

Cables constructed in accordance with IEC 60092-350, IEC 60092-353, IEC 60092-354 and IEC 60092-376 are recommended for use on mobile and fixed offshore units.

4.2 Voltage rating

4.2.1 Power frequency cables

The maximum rated voltage (U) considered in this standard for power frequency cables is 30 kV.

In the voltage designation of cables $U_0 / U / (U_m)$:

- U_0 is the rated power frequency voltage between conductor and earth or metallic screen for which the cable is designed;
- U is the rated power frequency voltage between conductors for which the cable is designed;
- U_m is the maximum value of the highest system voltage which may be sustained under normal operating conditions at anytime and at any point in the system. It excludes transient voltage conditions and rapid disconnection of loads.

U_m is chosen to be equal to or greater than the highest voltage of the three-phase system. Where cables are permitted for use on circuits where the nominal system voltage exceeds the rated voltage of the cables, the nominal system voltage shall not exceed the highest system voltage (U_m) of the cable.

Careful consideration shall be given to cables subjected to voltage surges associated with highly inductive circuits to ensure that they are of a suitable voltage rating.

The choice of standard cables of appropriate voltage designations for particular systems depends upon the system voltage and the system earthing arrangements

The rated voltage of any cable shall not be lower than the nominal voltage of the circuit for which it is used. To facilitate the choice of the cable, the values of U recommended for cables to be used in three-phase systems are listed in Table 1 in which systems are divided into the following three categories.

- **Category A**

This category comprises those systems in which any phase conductor that comes in contact with earth or an earth conductor is automatically disconnected from the system.

- **Category B**

This category comprises those systems that, under fault conditions are operated for a short time, not exceeding 8 h on any occasion, with one phase earthed.

For example, for a 13,8 kV system of Category A or B, the cable should have a rated voltage not less than 8,7/15 kV.

NOTE In a system where an earth fault is not automatically and promptly eliminated, the increased stresses on the insulation of cables during the earth fault are likely to affect the life of the cables to a certain degree. If the system is expected to be operated fairly often with a sustained earth fault, it may be preferable to use cables suitable for Category C. In any case, for classification as Category B the expected total duration of earth faults in any year should not exceed 125 h.

- **Category C**