



**RULES
FOR THE CLASSIFICATION AND CONSTRUCTION
OF MOBILE OFFSHORE DRILLING UNITS**

**PART VI
ELECTRICAL INSTALLATIONS**

January
2024

GDAŃSK

A decorative graphic at the bottom of the page consists of several overlapping, wavy blue lines that create a sense of movement and depth, extending across the width of the page.

RULES FOR CLASSIFICATION AND CONSTRUCTION OF MOBILE OFFSHORE DRILLING UNITS

developed and edited by Polski Rejestr Statków S.A., hereinafter referred to as PRS, consist of the following Parts:

- Part I – CLASSIFICATION REGULATIONS
- Part II – CONSTRUCTION, STRENGTH AND MATERIALS – under development
- Part III – SUBDIVISION, STABILITY AND FREEBOARD – under development
- Part IV – MACHINERY INSTALLATIONS
- Part V – FIRE SAFETY
- Part VI – ELECTRICAL INSTALLATIONS
- Part VII – HELICOPTER FACILITIES – under development

whereas the materials and welding shall comply with the applicable requirements specified in *Part IX – Materials and Welding* of the *Rules for the Classification and Construction of Sea-going Ships*.

Part VI – Electrical Installations – January 2024 was approved by the PRS Board on 21 December 2023 and enters into force on 1 January 2024.

Part VI – Electrical Installations is extended and supplemented by the following Publications:

Publication 11/P–Environmental Tests on Marine Equipment.

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1 GENERAL REQUIREMENTS

1.1 Introduction

This *Part VI* has been developed in the editorial layout reflecting the layout of technical requirements contained in Chapters 1, 5 and 6 of the *Code for the construction and equipment of mobile offshore drilling units (MODU Code, the “Code” in short)* and *IACS Unified Requirements – UR*, cited in the original version, treated as a source documents, marked in the text with the appropriate colour of the font. At the end of the section/ paragraph there is the name and number of the paragraph/ section of the source document.

The text of this *Part VI* contains additional and specific PRS requirements/ recommendations/ interpretations, which are marked in black.

The purpose of such an editorial layout is an easy verification of the implementation of all applicable requirements and in the future to simplify procedure of implementing into *Rules* subsequent changes of the source documents.

At the end, there is a summary of currently applicable IMO documents and IACS Resolutions related to this *Part VI*.

1.2 Application

1.2.1 This *Part VI* applies to electrical installations, machinery and electrical equipment used on mobile offshore drilling units, of all types, as defined in section 1.3, hereinafter referred to as units, which receives a class mark in accordance with par. 3.2 of *Part I* of the *Rules*. (*MODU Code*, 1.2.1)

1.2.2 Unless detailed requirements for individual electrical equipment and installations are specified in the text of this *Part VI*, then the *Rules for the Classification and Construction of Seagoing Ships, Part VIII, Electrical Installations and Control Systems*, containing such requirements, shall be applied.

1.2.3 Whenever this *Part VI* leaves certain technical solutions to the discretion of the Administration, then PRS, acting as Recognized Organisation (RO), will make relevant decisions in cooperation with the Administration, in accordance with the provisions of the relevant Agreement with the Administration.

1.3 Definitions

Definitions of the general terminology used in this *Part VI* are given in *Part I – Classification Regulations*.

For the purposes of this *Part VI*, unless expressly provided otherwise, the terms used therein have the meanings defined in this section.

1.3.1 *Administration* means the Government of the State whose flag the unit is entitled to fly. (*MODU Code*, 1.3.4)

1.3.2 *Column-stabilized unit* is a unit with the main deck connected to the underwater hull or footings by columns or caissons. (*MODU Code*, 1.3.11)

1.3.3 *Control stations* are those spaces in which the unit’s radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment or the dynamic positioning control system is centralized or where a fire-extinguishing system serving various locations is situated. In the case of column-stabilized units, a centralized ballast control station is a “control station”. (...) (*MODU Code*, 1.3.13)

1.3.4 Dead ship condition is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power. (*MODU Code*, 1.3.15)

1.3.5 Emergency source of electrical power is a source of electrical power intended to supply the necessary services in the event of failure of the main source of electrical power. (*MODU Code*, 1.3.19)

1.3.6 Emergency switchboard is a switchboard which, in the event of failure of the main system of electrical power supply, is directly supplied by the emergency source of electrical power and/or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services. (*MODU Code*, 1.3.20)

1.3.7 Enclosed spaces are spaces delineated by floors, bulkheads and/or decks which may have doors or windows, or other similar openings. (*MODU Code*, 1.3.21) (IACS UR D8.1.5/Rev.3)

1.3.8 Gastight door is a solid, close-fitting door designed to resist the passage of gas under normal atmospheric conditions. (*MODU Code*, 1.3.25)

1.3.9 Hazardous areas are all those areas where, due to the possible presence of a flammable atmosphere arising from the drilling operations, the use without proper consideration of machinery or electrical equipment may lead to fire hazard or explosion. (*MODU Code*, 1.3.27) (IACS UR D8.1.2/Rev.3)

1.3.10 Machinery spaces are all machinery spaces of category A and all other spaces containing propelling machinery, boilers and other fired processes, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery and similar spaces; and trunks to such spaces. (*MODU Code*, 1.3.34)

1.3.11 Machinery spaces of category A are all spaces which contain internal combustion-type machinery used either:

- .1 for main propulsion; or
- .2 for other purposes where such machinery has in the aggregate a total power of not less than 375 kW;

or which contain any oil-fired boiler or oil fuel unit; and trunks to such spaces. (*MODU Code*, 1.3.35)

1.3.12 Main source of electrical power is a source intended to supply electrical power for all services necessary for maintaining the unit in normal operational and habitable conditions. (*MODU Code*, 1.3.36)

1.3.13 Main switchboard is a switchboard directly supplied by the main source of electrical power and intended to distribute electrical energy to the unit's services. (*MODU Code*, 1.3.38)

1.3.14 Mobile offshore drilling unit (MODU) or unit is a vessel capable of engaging in drilling operations for the exploration or exploitation of resources beneath the seabed such as liquid or gaseous hydrocarbons, sulphur or salt. (*MODU Code*, 1.3.41)

1.3.15 Oil fuel unit is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure more than 0.18 N/mm². Oil transfer pumps are not considered oil fuel units. (*MODU Code*, 1.3.45)

1.3.16 *Semi-enclosed locations* are locations 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 dispersion of gas may not occur. (MODU Code, 1.3.49) (IACS UR D8.1.5/Rev.3)

1.3.17 *Surface unit* is a unit with a ship- or barge-type displacement hull of single or multiple hull construction intended for operation in the floating condition. (MODU Code, 1.3.55)

1.4 Exemptions

An Administration may exempt any unit which embodies features of a novel kind from any of the requirements of this *Part VI (the Code)* the application of which might impede research into the development of such features. Any such unit shall, however, comply with safety requirements which, in the opinion of that Administration, are adequate for the service intended and are such as to ensure the overall safety of the unit. The Administration which allows any such exemption shall list such exemptions on the certificate and communicate to IMO the particulars, together with the reasons therefor, so that IMO may circulate the same to other Governments for the information of their officers. (MODU Code, 1.4)

1.5 Equivalent

1.5.1 Where this *Part VI (the Code)* provides that a particular detail of design or construction, fitting, material, appliance or apparatus, or type thereof, shall be fitted or carried in a unit, or that any particular provision shall be made, the Administration may allow any other detail of design or construction, fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that unit, if it is satisfied by trial thereof or otherwise that such detail of design or construction, fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that provided for in this *Part VI (the Code)*. (MODU Code, 1.5.1)

1.5.2 When an Administration so allows any fitting, material, appliance, apparatus, item of equipment or type thereof, or provision, procedure, arrangement, novel design or application to be substituted, it shall communicate to IMO the particulars thereof, together with a report on the evidence submitted, so that IMO may circulate the same to other Governments for the information of their officers. (MODU Code, 1.5.2)

1.6 Classification documentation

Prior to the commencement of the unit construction, the below listed documentation shall be submitted to PRS Head Office for consideration and approval. In the case of units, which undergo modifications, the below listed documentation is subject to consideration and approval in the scope which covers the modifications.

1.6.1 Technical documentation

Documentation of electrical installations should contain descriptions/plans/diagrams/lists covering:

- .1 arrangement of essential electrical equipment such as main and emergency generators, switchboards, batteries, etc.;
- .2 diagrams of electric power generation and distribution from the main and emergency sources of electric power;
- .3 specification of the electric circuits used, specifying the current values, applied protection devices, as well as cable types and cross-sections;
- .4 diagrams of the main and emergency switchboard, control and monitoring consoles and other non-standard devices;

- .5 calculations of the power selection of the main and emergency sources of electric power necessary to ensure the unit operation in all operating conditions;
- .6 calculations of short-circuit currents on the busbars of the main switchboard and in other points of the power system, including the selection of protection devices (for units with generators with a total rated current higher than 1000 A);
- .7 diagrams of internal communication and alarm signalling of emergency conditions of the unit;
- .8 diagrams of the unit main and emergency lighting systems;
- .9 diagrams of essential electric drives: steering gear, fire pumps, bilge and ballast pumps;
- .10 diagram of protective earthing, drawings and, if necessary, calculations of the lightning protection system;
- .11 plans of cable routes, specifying the spaces through which they pass;
- .12 division of craft into hazardous zones with a list of electrical and mechanical equipment installed in each zone;
- .13 diagrams of emergency shutdown of unit devices;
- .14 calculation of accumulator capacity;
- .15 circuits of automatic systems in unattended machinery spaces (if provided);
- .16 program of tests of electrical devices and installations.

Classification documentation shall contain material specifications, a list of devices and equipment, components of the electrical installations and necessary information to assess whether the devices/ installations meet the requirements of the *Rules*.

1.6.2 Operation documentation and emergency procedures

1.6.2.1 Operating manuals containing guidance for the safe operation of the unit for both normal and envisaged emergency conditions, approved by the Administration, shall be provided on board and be readily available to all concerned. The manuals shall, in addition to providing the necessary general information about the unit, contain guidance on and procedures for the operations that are vital to the safety of personnel and the unit. The manuals shall be concise and be compiled in such a manner that they are easily understood. Each manual shall be provided with a contents list, an index and wherever possible be cross-referenced to additional detailed information which shall be readily available on board. (*MODU Code*, 14.1.1)

1.6.2.2 The operating manual for normal operation shall contain general descriptive information of electrical systems and appliances, as well as guidelines for their use and periodical inspection, tests and maintenance. (*MODU Code*, 14.1.2)

1.6.2.3 The operating manual for emergency operations shall contain guidelines and procedures for the conduct of the crew in foreseeable emergency situations. (*MODU Code*, 14.1.4)

1.6.2.4 The information provided in the operating manuals shall, where necessary, be supported by additional material provided in the form of plans, manufacturers' manuals and other data necessary for the efficient operation and maintenance of the unit. Detailed information provided in manufacturers' manuals need not be repeated in the operating manuals. The information shall be referenced in the operating manual, readily identified, located in an easily accessible place on the unit and be available at all times. (*MODU Code*, 14.1.5)

1.6.2.5 Operating and maintenance instructions and engineering drawings for electrical installations essential to the safe operation of the unit shall be written in a language understandable by those officers and crew members who are required to understand such information in the performance of their duties. (*MODU Code*, 14.1.6)

1.7 Scope of supervision

1.7.1 The general survey regulations for classification, construction surveys and surveys of ships during service within the scope of electrical installations are given in *Part I – Classification Regulations*.

1.7.2 Electrical equipment and components, the documentation of which is subject to consideration and approval, are subject to Administration or Recognized Organization (RO) survey during construction or alteration of the unit.

1.7.3 Electrical equipment and components shall be delivered with a *Type Approval Certificate* or other certificate of a recognized institution for use in marine conditions/ hazardous areas, for acceptance by the Administration or RO.

1.8 Onboard final acceptance and tests

After installation on the unit, electrical devices and installations subject to final acceptance and tests according to agreed test program.

2 ELECTRICAL INSTALLATIONS FOR ALL TYPES OF UNITS

2.1 General

2.1.1 Electrical installations shall be such that:

- .1 all electrical services necessary for maintaining the unit in normal operational and habitable conditions will be assured without recourse to the emergency source of power;
- .2 electrical services essential for safety will be assured in case of failure of the main source of electrical power;
- .3 electromagnetic compatibility of electrical and electronic equipment is assured*; and

* Refer to *General requirements for electromagnetic compatibility for all electrical and electronic equipment, adopted by the Organization by resolution A.813(19)*.
See –*Publication 11/P – Environmental Tests on Marine Equipment*.

- .4 the safety of personnel and unit from electrical hazards will be assured.

2.1.2 Administrations shall take appropriate steps to ensure uniformity in the implementation and application of these provisions in respect of electrical installations.* (*MODU Code, 5.1*)

* Refer to the recommendations published by the International Electrotechnical Commission.

2.2 Alternative design and arrangements

When alternative design or arrangements deviate from the prescriptive provisions of this Part VI (*the Code*), an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with *SOLAS* regulation II-1/55 based on the guidelines developed by IMO.* (*MODU Code, 5.2*)

* Refer to *Revised Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/ Circ.1212/ Rev.1)*.

2.3 Main source of electrical power

2.3.1 Every unit shall be provided with a main source of electrical power which shall include at least two generating sets.

2.3.2 The power of these sets shall be such that it is still possible to ensure the functioning of the services referred to in par. 2.1.1.1 (5.1.1.1 of *the Code*), except for power servicing drilling operations, in the event of any one of these generating sets being stopped.

2.3.3 Where transformers or converters constitute an essential part of the supply system, the system shall be so arranged as to ensure the same continuity of the supply as stated in par. 2.3.2 (5.3.2 of *the Code*).

2.3.4 A main electrical lighting system which shall provide illumination throughout those parts of the unit normally accessible to and used by personnel shall be supplied from the main source of power.

2.3.5 The arrangement of the main lighting system shall be such that a fire or other casualty in the space or spaces containing the main source of power, including transformers or converters, if any, will not render the emergency lighting system under sec. 2.4 (5.4 of *the Code*) inoperative.

2.3.6 The arrangement of the emergency lighting system shall be such that a fire or other casualty in the space or spaces containing the emergency source of power, including transformers or converters, if any, will not render the main lighting system required by this section inoperative.

2.3.7 The main source of electrical power shall comply with the following:

- .1 where the electrical power can normally be supplied by one generator, suitable load-shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the unit.

In the case of loss of the generator in operation, adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to ensure safe navigation when underway and to ensure the safety of the unit with automatic restarting of the essential auxiliaries including, where necessary, sequential operations. The Administration may dispense with these provisions where the power necessary to ensure the functioning of the service referred to in par. 2.1.1.1 (5.1.1.1 of *the Code*), except for power servicing drilling operations, is 250 kW or less;

- .2 if the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision shall be made, for instance, by load shedding of less essential consumers to ensure that, in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to ensure safe navigation when underway and to ensure the safety of the unit;
- .3 where the main source of electrical power is necessary for propulsion of the unit, the main busbar shall be subdivided into at least two parts which shall normally be connected by circuit breakers or other approved means; so far as is practicable, the connection of generating sets and other duplicated equipment shall be equally divided between the parts. (*MODU Code*, 5.3)

2.4 Emergency source of electrical power

2.4.1 Every unit shall be provided with a self-contained emergency source of electrical power.

2.4.2 The emergency source of power, the transitional source of emergency power and the emergency switchboard shall be located above the worst damage waterline and in a space not within the assumed extent of damage referred to in chapter 3 of *MODU Code*, and be readily accessible. They shall not be forward of the collision bulkhead, if any.

2.4.3 The location of the emergency source of power, the transitional source of emergency power and emergency switchboard in relation to the main source of electrical power shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in the space containing the main source of electrical power or in any machinery space of category A will not interfere with the supply or distribution of emergency power. As far as practical, the space containing the emergency source of power, the transitional source of emergency power and the emergency switchboard shall not be contiguous to boundaries of machinery spaces of category A or of those spaces containing the main source of electrical power. Where the emergency source of power, the transitional source of emergency power, and the emergency switchboard are contiguous to the boundaries of machinery spaces of category A or to those spaces containing the main source of electrical power, or to spaces of zone 1 or zone 2, the contiguous boundaries shall be in compliance with chapter 2 of Part V (sec. 9.2 of MODU Code).

2.4.4 Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency switchboard may be used to supply non-emergency circuits, and the emergency generator may be used exceptionally and for short periods to supply non-emergency circuits – see applicable requirements of par. 9.4.3 of Part VIII of the Rules for the Classification and Construction of Sea-going Ships.

2.4.5 For units where the main source of electrical power is located in two or more spaces which have their own systems, including power distribution and control systems, completely independent of the systems in the other spaces and such that a fire or other casualty in any one of the spaces will not affect the power distribution from the others, or to the services under par. 2.4.6 (5.4.6 of the Code), the requirements of par. 2.4.1 (5.4.1 of the Code) may be considered satisfied without an additional emergency source of electrical power, provided that the Administration is satisfied that:

- .1 there are at least two generating sets, meeting the provisions of par. 2.4.15 (5.4.15 of the Code) and each of sufficient capacity to meet the provisions of par. 2.4.6 (5.4.6 of the Code), in each of at least two spaces;
- .2 the arrangements under par. 2.4.5.1 (5.4.5.1 of the Code) in each such space are equivalent to those under par. 2.4.8 and 2.4.11 to 2.4.14 and sec. 2.5 (5.4.8 and 5.4.11 to 5.4.14 and sec. 5.5 of the Code) so that a source of electrical power is available at all times to the services under par. 2.4.6 (5.4.6 of the Code);
- .3 the location of each of the spaces referred to in par. 2.4.5.1 (5.4.5.1 of the Code) is in compliance with par. 2.4.2 (5.4.2 of the Code) and the boundaries meet the requirements of par. 2.4.3 (5.4.3 of the Code) except that contiguous boundaries shall consist of an “A-60” bulkhead and a cofferdam, or a steel bulkhead insulated to class “A-60” on both sides.

2.4.6 The power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

- .1 for a period of 18 h, emergency lighting:
 - .1.1 at every embarkation station on deck and over sides;
 - .1.2 in all service and accommodation alleyways, stairways and exits, personnel lift cars, and personnel lift trunks;
 - .1.3 in the machinery spaces and main generating stations including their control positions;
 - .1.4 in all control stations and in all machinery control rooms;

- .1.5 in all spaces from which control of the drilling process is performed and where controls of machinery essential for the performance of this process, or devices for emergency switching-off of the power plant are located;
- .1.6 at the stowage position or positions for fire-fighters' outfits;
- .1.7 at the sprinkler pump, if any, at the fire pump referred to in par. 2.4.6.5 (5.4.6.5 of *the Code*), at the emergency bilge pump, if any, and at their starting positions;
- .1.8 on helidecks, to include perimeter and helideck status lights, wind direction indicator illumination, and related obstruction lights, if any;
- .2 for a period of 18 h, the navigation lights, other lights and sound signals, required by the *International Regulations for the Prevention of Collisions at Sea*, in force;
- .3 for a period of four days signalling lights and sound signals required for marking of offshore structures;
- .4 for a period of 18 h:
 - .4.1 all internal communication equipment that is required in an emergency;
 - .4.2 fire and gas detection and their alarm systems;
 - .4.3 intermittent operation of the manual fire alarms and all internal signals that are required in an emergency; and
 - .4.4 the capability of closing the blow-out preventer and of disconnecting the unit from the well-head arrangement, if electrically controlled;

unless they have an independent supply from an accumulator battery suitably located for use in an emergency and sufficient for the period of 18 h;
- .5 for a period of 18 h, one of the fire pumps, if dependent upon the emergency generator for its source of power;
- .6 for a period of at least 18 h, permanently installed diving equipment, if dependent upon the unit's electrical power;
- .7 on column-stabilized units, for a period of 18 h:
 - .7.1 ballast control and indicating systems under par. 2.10.10 of *Part IV* (4.10.10 of *the Code*); and
 - .7.2 any of the ballast pumps under par. 2.10.4 of *Part IV* (4.10.3 of *the Code*); only one of the connected pumps need be considered to be in operation at any time;
- .8 for a period of half an hour:
 - .8.1 the watertight doors as provided under par. 3.6.5.1 of *MODU Code*, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided; and
 - .8.2 the controls and indicators provided under par. 3.6.5.1 of *MODU Code*.
- 2.4.7 The emergency source of power may be either a generator or an accumulator battery.
- 2.4.8 Where the emergency source of power is a generator, it shall be:
 - .1 driven by a suitable prime mover with an independent supply of fuel, having a flashpoint of not less than 43°C;
 - .2 started automatically upon failure of the normal electrical supply unless a transitional source of emergency power in accordance with par. 2.4.8.3 (5.4.8.3 of *the Code*) is provided; where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in par. 2.4.10 (5.4.10 of *the Code*) shall then be connected automatically to the emergency generator; and unless a second independent means of starting the emergency generator is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

- .3 provided with a transitional source of emergency power, as specified in par. 2.4.10 (5.4.10 of *the Code*), unless the emergency generator is capable of supplying the services mentioned in par. 2.4.10 (5.4.10 of *the Code*) and of being automatically started and supplying the required load as quickly as is safe and practicable but in not more than 45 s.

2.4.9 Where the emergency source of power is an accumulator battery it shall be capable of:

- .1 carrying the emergency load without recharging while maintaining the voltage of the battery throughout the discharge period within plus or minus 12% of its nominal voltage;
- .2 automatically connecting to the emergency switchboard in the event of failure of the main power supply; and
- .3 immediately supplying at least those services specified in par. 2.4.10 (5.4.10 of *the Code*).

2.4.10 The transitional source or sources of emergency power, under par. 2.4.8.3 (5.4.8.3 of *the Code*), shall consist of an accumulator battery suitably located for use in an emergency, which shall operate without recharging whilst maintaining the voltage of the battery throughout the discharge period within plus or minus 12% of its nominal voltage, and be of sufficient capacity and so arranged as to supply automatically, in the event of failure of either the main or the emergency source of power, the following services for half an hour at least if they depend upon an electrical source for their operation:

- .1 the lighting under par. 2.4.6.1 and 2.4.6.2 (5.4.6.1 and 5.4.6.2 of *the Code*). For this transitional phase, the required emergency lighting, in respect of the machinery space and accommodation and service areas, may be provided by permanently fixed, individual accumulator lamps which are automatically charged and operated;
- .2 all essential internal communication equipment under par. 2.4.6.4.1 and 2.4.6.4.2 (5.4.6.4.1 and 5.4.6.4.2 of *the Code*); and
- .3 intermittent operation of the services referred to in par. 2.4.6.4.3 and 2.4.6.4.4 (5.4.6.4.3 and 5.4.6.4.4 of *the Code*),

unless, in the case of par. 2.4.10.2 and 2.4.10.3 (5.4.10.2 and 5.4.10.3 of *the Code*), they have an independent supply from an accumulator battery suitably located for use in an emergency and sufficient for the period specified.

2.4.11 The emergency switchboard shall be installed as near as is practicable to the emergency source of power and, where the emergency source of power is a generator, the emergency switchboard shall preferably be located in the same space.

2.4.12 No accumulator battery fitted to meet the provisions for emergency or transitional power supply shall be installed in the same space as the emergency switchboard, unless appropriate measures to the satisfaction of the Administration are taken to extract the gases discharged from the said batteries. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of power or the transitional source of power, referred to in par. 2.4.9 and 2.4.10 (5.4.9 or 5.4.10 of *the Code*), are being discharged.

2.4.13 The emergency switchboard shall be supplied in normal operation from the main switchboard by an interconnector feeder which shall be adequately protected at the main switchboard against overload and short circuit. The arrangement at the emergency switchboard shall be such that the interconnector feeder is disconnected automatically at the emergency switchboard upon failure of the main power supply. Where the system is arranged for feedback operation, the interconnector feeder shall also be protected at the emergency switchboard at least against short circuit.

2.4.14 In order to ensure ready availability of emergency supplies, arrangements shall be made where necessary to disconnect non-emergency circuits automatically from the emergency switchboard to ensure that power is available automatically to the emergency circuits.

2.4.15 The emergency generator and its prime mover and any emergency accumulator battery shall be designed to function at full rated power when upright and when inclined up to the maximum angle of heel in the intact and damaged condition, as determined in accordance with chapter 3 of *the Code*. In no case need the equipment be designed to operate when inclined more than:

- .1 25° in any direction on a column-stabilized unit;
- .2 15° in any direction on a self-elevating unit; and
- .3 22.5° about the longitudinal axis and/or when inclined 10° about the transverse axis on a surface unit. (IACS UR D9.1.3.3/Rev.4)

2.4.16 Provision shall be made for the periodic testing of the complete emergency system. This shall include the testing of transitional sources and automatic starting arrangements. (*MODU Code*, 5.4)

2.5 Starting arrangements for emergency generators

2.5.1 Emergency generators shall be capable of being readily started in their cold condition down to a temperature of 0°C. If this is impracticable, or if lower temperatures are likely to be encountered, consideration shall be given to the provision and maintenance of heating arrangements, acceptable to the Administration, so that ready starting will be assured.

2.5.2 Each emergency generator which is arranged to be automatically started shall be equipped with starting arrangements acceptable to the Administration with a storage energy capability of at least three consecutive starts. A second source of energy shall be provided for an additional three starts within 30 min unless hand (manual) starting can be demonstrated to be effective.

2.5.3 Provision shall be made to maintain the stored energy at all times.

2.5.4 Electrical and hydraulic starting systems shall be maintained from the emergency switchboard.

2.5.5 Compressed air starting systems may be maintained by the main or auxiliary compressed air receivers, through a suitable non-return valve or by an emergency air compressor energized by the emergency switchboard.

2.5.6 All of these starting, charging and energy storing devices shall be located in the emergency generator room; these devices shall not be used for any purpose other than the operation of the emergency generator set. This does not preclude the supply to the air receiver of the emergency generator set from the main or auxiliary compressed air system through a non-return valve fitted in the emergency generator room.

2.5.7 When automatic starting is not required by these provisions and where it can be demonstrated as being effective, hand (manual) starting is permissible, such as manual cranking, inertia starters, manual hydraulic accumulators, or powder cartridges.

2.5.8 When hand (manual) starting is not practicable, the provisions in par. 2.5.2 and 2.5.3 to 2.5.6 (5.5.2 and 5.5.3 to 5.5.6 of *the Code*), shall be complied with, except that starting may be manually initiated. (*MODU Code*, 5.5)

2.6 Precautions against shock, fire and other hazards of electrical origin

2.6.1 Exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed (grounded) unless the machines or equipment are:

- .1 supplied at a voltage not exceeding 55 V direct current or 55 V, root mean square between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or
- .2 supplied at a voltage not exceeding 250 V by safety isolating transformers supplying only one consuming device; or
- .3 constructed in accordance with the principle of double insulation.

2.6.2 The Administration may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.

2.6.3 All electrical apparatus shall be so constructed and so installed that it does not cause injury when handled or touched in the normal manner.

2.6.4 Where not obtained through normal construction, arrangements shall be provided to effectively earth (ground) all permanently installed machinery, metal structures of derricks, masts and helicopter decks.

2.6.5 Switchboards shall be so arranged as to give easy access, where needed, to apparatus and equipment, in order to minimize danger to personnel. The sides and backs and, where necessary, the fronts of switchboards shall be suitably guarded. Exposed live parts having voltages to earth (ground) exceeding a voltage to be specified by the Administration shall not be installed on the front of such switchboards. There shall be non-conducting mats or gratings at the front and rear, where necessary.

2.6.6 Distribution systems with hull return shall not be installed, but this does not preclude, under conditions approved by the Administration, the installation of:

- .1 impressed current cathodic protective systems;
- .2 limited and locally earthed systems (e.g. engine starting systems);
- .3 limited and locally earthed welding systems; where the Administration is satisfied that the equipotential of the structure is assured in a satisfactory manner, welding systems with hull return may be installed without this restriction; and
- .4 insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.

2.6.7 When a distribution system, whether primary or secondary, for power, heating or lighting, with no connection to earth is used, a device capable of continuously monitoring the insulation level to earth and of giving an audible or visual indication of abnormally low insulation values shall be provided.

2.6.8 Except as permitted by the Administration in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed (grounded).

2.6.9 All electric cables and wiring external to equipment shall be at least of a flame-retardant type and shall be so installed as not to impair their original flame-retarding properties.* Where necessary for particular applications, the Administration may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.

* *Refer to the recommendations published by the International Electrotechnical Commission concerning flame-retarding properties of bunched cables and characteristics of cables of a fire-resistant type.*

2.6.10 Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall, so far as practicable, be routed clear of galleys, machinery spaces of category A and their casings and other high fire risk areas. Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables shall be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.*

* *Refer to the recommendations published by the International Electrotechnical Commission concerning flame-retarding properties of bunched cables and characteristics of cables of a fire-resistant type.*

2.6.11 Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage.

2.6.12 Terminations and joints in all conductors shall be so made that they retain the original electrical, mechanical, flame-retarding and, where necessary, fire-resisting properties of the cable.

2.6.13 Each separate circuit shall be protected against short circuit and against overload, except as permitted in section 3.6 of *Part IV* (7.6 of the Code), or where the Administration may exceptionally otherwise permit.

2.6.14 The rating or appropriate setting of the overload protection device for each circuit shall be permanently indicated at the location of the protection device.

2.6.15 Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

2.6.16 Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

2.6.17 Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments except as permitted in par. 2.6.19 (5.6.19 of the Code).

2.6.18 Accumulator batteries, except for batteries of self-contained battery-operated lights, shall not be located in sleeping quarters. Administrations may grant exemptions from or equivalencies to this provision where hermetically sealed batteries are installed.

2.6.19 In paint lockers, acetylene stores, and similar spaces where flammable mixtures are liable to collect as well as any compartment assigned principally to accumulator batteries, no electrical equipment shall be installed unless the Administration is satisfied that such equipment is:

- .1 essential for operational purposes;
- .2 of a type which will not ignite the mixture concerned;
- .3 appropriate to the space concerned; and
- .4 appropriately certified for safe usage in the vapours or gases likely to be encountered.

2.6.20 Electrical apparatus and cables shall, where practicable, be excluded from any compartment in which explosives are stored. Where lighting is required, the light shall come from outside, through the boundaries of the compartment. If electrical equipment cannot be excluded from such a compartment it shall be so designed and used as to minimize the risk of fire or explosion.

2.6.21 Where spilling or impingement of liquids could occur upon any electrical control or alarm console, or similar electrical enclosure essential to the safety of the unit, such equipment shall have suitable protection against the ingress of liquids.*(MODU Code, 5.6)

* Refer to IEC 60529 - Degrees of protection provided by enclosures (IP Code). Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved.

2.7 Alarms and internal communication

2.7.1 Alarms and indicators shall be installed in accordance with the recommendations of IMO. [6]

* Refer to the Code on Alerts and Indicators, 2009, adopted by IMO by resolution A.1021(26).

2.7.2 Each unit shall be provided with a general alarm system so installed as to be clearly perceptible in all normally accessible parts of the unit, including open decks. Control stations for activating the alarm shall be installed to the satisfaction of the Administration. The signals used shall be limited to: general emergency, toxic gas (hydrogen sulphide), combustible gas, fire alarm, and abandon unit signals. These signals shall be described in the muster list and operations manual.

2.7.3 A public address system shall be provided. The system shall be clearly audible in all spaces that are normally accessible to personnel during routine operations. It shall be possible to make announcements at the following locations (if provided): Emergency response centre, navigation bridge, engine control room, ballast control station, jacking control station, and a location near the drilling console.

2.7.4 The signals given over the general alarm system shall be supplemented by instructions over the public address system.

2.7.5 Internal means of communication shall be available for transfer of information between all spaces where action may be necessary in case of an emergency. Such spaces shall include: engineers' accommodations, the unit control stations, drilling operation control stations, the unit propulsion control stations, steering gear compartment, emergency switchboard room and other compartments/places essential for the unit safety.

2.7.6 Audible signals in high noise areas shall be supplemented with visual signals. (MODU Code, 5.7)

3 MACHINERY AND ELECTRICAL INSTALLATIONS IN HAZARDOUS AREAS FOR ALL TYPES OF UNITS

3.1 Zones of hazardous areas*

* Refer to standard PN-EN IEC 60079-10-1:2021-09, Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas.

Hazardous areas are divided into zones as follows:

- Zone 0:** in which ignitable concentrations of flammable gases or vapours are continuously present or present for long periods.
- Zone 1:** in which ignitable concentrations of flammable gases or vapours are likely to occur in normal operation.
- 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. (*MODU Code*, 6.1) (IACS UR D8.1.3/Rev.3)

3.2 Classification of hazardous areas*

* *The identification and extent of hazardous areas in this chapter have been determined taking into account current practice.*

The hazardous areas defined in par. 3.2.2 to 3.2.4 are those which normally apply to offshore drilling units for oil and gas exploration. Equipment for well testing is to be specially considered, if present.

The hazardous areas as specified may be extended or reduced depending on the actual arrangements in each case, by use of windshields, special ventilation arrangements, structural arrangements (e.g., low deck head), etc. (IACS UR D8.1.4/Rev.3)

3.2.1 For the purpose of machinery and electrical installations, hazardous areas are classified as in par. 3.2.2 to 3.2.4 (6.2.2 to 6.2.4 of the Code). Hazardous areas not covered (such as, but not limited to, well test equipment areas, helicopter fuel storage areas, acetylene cylinder storage areas, battery rooms, paint lockers, flammable gas or vapour vents and diverter line outlets) in this section shall be classified in accordance with sec. 3.1 (6.1 of the Code). (IACS UR D8.1.1/Rev.3)

3.2.2 Hazardous areas zone 0 include:

The internal spaces of closed tanks and piping for containing active non-degassed drilling mud, oil that has a closed-cup flashpoint below 60°C or flammable gas and vapour, as well as produced oil and gas in which an oil/gas/air mixture is continuously present or present for long periods.

3.2.3 Hazardous areas zone 1 include:

- .1 Enclosed spaces containing any part of the mud circulating system that has an opening into the spaces and is between the well and the final degassing discharge.
- .2 Enclosed spaces or semi-enclosed locations that are below the drill floor and contain a possible source of release such as the top of a drilling nipple.
- .3 Outdoor locations below the drill floor and within a radius of 1.5 m from a possible source of release such as the top of a drilling nipple.
- .4 Enclosed spaces that are on the drill floor and which are not separated by a solid floor from the spaces in par.3.2.3.2 (6.2.3.2 of the Code).
- .5 In outdoor or semi-enclosed locations, except as provided for in par. 3.2.3.2 (6.2.3.2 of the Code), the area within 1.5 m from the boundaries of any openings to equipment which is part of the mud system as specified in par. 3.2.3.1 (6.2.3.1 of the Code), any ventilation outlets of zone 1 spaces, or any access to zone 1 spaces.
- .6 Pits, ducts or similar structures in locations which would otherwise be zone 2 but which are so arranged that dispersion of gas may not occur.

3.2.4 Hazardous areas zone 2 include:

- .1 Enclosed spaces which contain open sections of the mud circulating system from the final degassing discharge to the mud pump suction connection at the mud pit.
- .2 Outdoor locations within the boundaries of the drilling derrick up to a height of 3 m above the drill floor.
- .3 Semi-enclosed locations below and contiguous to the drill floor and to the boundaries of the derrick or to the extent of any enclosure which is liable to trap gases.
- .4 In outdoor locations below the drill floor, within a radius of 1.5 m area beyond the zone 1 area as specified in par. 3.2.3.3 (6.2.3.3 of the Code).
- .5 The areas 1.5 m beyond the zone 1 areas specified in par. 3.2.3.5 (6.2.3.5 of the Code) and beyond the semi-enclosed locations specified in par. 3.2.3.2 (6.2.3.2 of the Code).
- .6 Outdoor areas within 1.5 m of the boundaries of any ventilation outlet from or access to a zone 2 space.
- .7 Semi-enclosed derricks to the extent of their enclosure above the drill floor or to a height of 3 m above the drill floor, whichever is greater.
- .8 Air locks between a zone 1 and a non-hazardous area. (MODU Code, 6.2) (IACS UR D8.1.2/Rev.3)

3.3 Openings, access and ventilation conditions affecting the extent of hazardous areas

3.3.1 Except for operational reasons, access doors or other openings shall not be provided:

- between a non-hazardous space and a hazardous area; or
- between a zone 2 space and a zone 1 space.

Where such access doors or other openings are provided, any enclosed space not referred to under par. 3.2.3 or 3.2.4 (6.2.3 or 6.2.4 of the Code) and having a direct access to any zone 1 location or zone 2 location becomes the same zone as the location except that:

- .1 an enclosed space with direct access to any zone 1 location can be considered as zone 2 if:
 - .1.1 the access is fitted with a self-closing gastight door opening into the zone 2 space,
 - .1.2 ventilation is such that the air flow with the door open is from the zone 2 space into the zone 1 location, and
 - .1.3 loss of ventilation is alarmed at a manned station;
- .2 an enclosed space with direct access to any zone 2 location is not considered hazardous if:
 - .2.1 the access is fitted with a self-closing gastight door that opens into the non-hazardous location,
 - .2.2 ventilation is such that the air flow with the door open is from the non-hazardous space into the zone 2 location, and
 - .2.3 loss of ventilation is alarmed at a manned station;
- .3 an enclosed space with direct access to any zone 1 location is not considered hazardous if:
 - .3.1 the access is fitted with two self-closing gastight doors forming an airlock,
 - .3.2 the space has ventilation overpressure in relation to the hazardous space, and
 - .3.3 loss of ventilation overpressure is alarmed at a manned station.

Where ventilation arrangements of the intended safe space are considered sufficient by the Administration to prevent any ingress of gas from the zone 1 location, the two self-closing doors forming an airlock may be replaced by a single self-closing gastight door which opens into the non-hazardous location and has no hold-back device.

3.3.2 Piping systems shall be designed to preclude direct communication between hazardous areas of different classifications and between hazardous and non-hazardous areas.

3.3.3 Hold-back devices shall not be used on self-closing gastight doors forming hazardous area boundaries. (MODU Code, 6.3) (IACS UR D8.2.4/Rev.3)

3.4 Ventilation

3.4.1 General

Attention is to be given to ventilation inlet and outlet location and airflow in order to minimize the possibility of cross contamination. Inlets are to be located in non-hazardous areas as high and as far away from any hazardous area as practicable. Each air outlet is to be located in an outdoor area which, in the absence of the considered outlet, is of the same or lesser hazard than the ventilated space. Ventilation for hazardous areas is to be completely separate from that used for non-hazardous areas. Where passing through hazardous areas, the inlet ducts are also to have overpressure in relation to this area; where the ventilation duct passes through a hazardous area of a lower level, the ventilation duct is to have under pressure in relation to this area. (IACS UR D8.3.1/Rev.3)

3.4.2 Ventilation of hazardous spaces

3.4.2.1 Hazardous enclosed spaces shall be adequately ventilated. Hazardous enclosed mud processing spaces shall be ventilated at a minimum rate of 12 air changes per hour. Where mechanical ventilation is applied it shall be such that the hazardous enclosed spaces are maintained with under pressure in relation to the less hazardous spaces or areas and non-hazardous enclosed spaces are maintained in overpressure in relation to adjacent hazardous locations.

3.4.2.2 All air inlets for hazardous enclosed spaces shall be located in non-hazardous areas.

3.4.2.3 Each air outlet shall be located in an outdoor area which, in the absence of the considered outlet, is of the same or lesser hazard than the ventilated space.

3.4.2.4 Where the ventilation duct passes through a hazardous area of a higher level, the ventilation duct shall have overpressure in relation to this area; where the ventilation duct passes through a hazardous area of a lower level, the ventilation duct shall have under pressure in relation to this area.

3.4.2.5 Ventilation systems for hazardous spaces shall be independent from those for non-hazardous spaces. (*MODU Code*, 6.4)

3.4.3 Ventilation of hazardous areas

3.4.3.1 Enclosed hazardous spaces shall be provided with adequate ventilation with under-pressure in relation to the less hazardous space or zone. The arrangement of ventilation inlet and outlet openings in the space shall be such that the entire space is efficiently ventilated, giving special consideration to location of equipment which may release gas, and to spaces where gas may accumulate. . (IACS UR D8.3.2/Rev.3)

3.4.3.2 The outlet air from Zone 1 and Zone 2 spaces shall be led in separate ducts to outdoor locations. The internal spaces of such ducts belong to the same Zone as the inlet space. Air inlet ducts designed for constant relative under pressures shall be rigidly constructed to avoid air leaks. Fans shall be designed so as to reduce the risk that sparks may occur. Hazardous enclosed mud processing spaces shall be ventilated at a minimum rate of 12 air changes per hour. (IACS UR D8.3.2/Rev.3)

3.5 Emergency conditions due to drilling operations

3.5.1 In view of exceptional conditions in which the explosion hazard may extend outside the above-mentioned zones, special arrangements shall be provided to facilitate the selective disconnection or shutdown of:

- .1 ventilation systems, except fans necessary for supplying combustion air to prime movers for the production of electrical power;
- .2 main generator prime movers, including the ventilation systems for these;
- .3 emergency generator prime movers.

3.5.2 In the case of units using dynamic positioning systems disconnection or shutdown of machinery and equipment necessary for maintaining the operability of the dynamic positioning system shall be based on a shutdown logic system designed to preserve the capability to maintain operational control over the integrity of the well and station keeping capability. Shutdown of generators and related power supply equipment needed for the operation of the dynamic positioning system shall be divided into independent groups to allow response to gas detection alarms while maintaining position keeping.

3.5.3 Disconnection or shutdown shall be possible from at least two strategic locations, one of which shall be outside hazardous areas.

3.5.4 Shutdown systems that are provided to comply with par. 3.5.1 (6.5.1 of *the Code*) shall be so designed that the risk of unintentional stoppages caused by malfunction in a shutdown system and the risk of inadvertent operation of a shutdown are minimized.

3.5.5 Equipment which is located in spaces other than enclosed spaces and which is capable of operation after shutdown as given in par. 3.5.1 (6.5.1 of *the Code*) shall be suitable for installation in zone 2 locations. Such equipment which is located in enclosed spaces shall be suitable for its intended application to the satisfaction of the Administration. At least the following facilities shall be operable after an emergency shutdown:

- .1 emergency lighting under par. 2.4.6.1.1 do 2.4.6.1.4 (5.4.6.1.1 to 5.4.6.1.4 of *the Code*) for half an hour;
- .2 blow-out preventer control system;
- .3 general alarm system;
- .4 public address system; and
- .5 battery-supplied radiocommunication installations. (*MODU Code*, 6.5)

3.6 Electrical installations in hazardous areas

3.6.1 Electrical equipment and wiring installed in hazardous areas shall be limited to that necessary for operational purposes. Only the cables and types of equipment described in this chapter may be installed. Selection and installation of equipment and cables in hazardous areas shall be in accordance with international standards. *

* Refer to the following recommendations published by the International Electrotechnical Commission:

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 61892-3: 2019 Mobile and fixed offshore units - Electrical installations - Part 3: Equipment.

IEC 61892-4: 2019 Mobile and fixed offshore units - Electrical installations - Part 4: Cables.

IEC 61892-5: 2019 Mobile and fixed offshore units - Electrical Installations - Part 5: Mobile units.

IEC 61892-6: 2019 Mobile and fixed offshore units - Electrical installations - Part 6: Installation.

IEC 61892-7: 2019 Mobile and fixed offshore units - Electrical installations - Part 7: Hazardous areas.

- 3.6.2** In selection of electrical apparatus for use in hazardous areas, consideration shall be given to:
- .1 the zone in which the apparatus will be used;
 - .2 the sensitivity to ignition of the gases or vapours likely to be present, expressed as a gas group; and
 - .3 the sensitivity of the gases or vapours likely to be present to ignition by hot surfaces, expressed as a temperature classification.

3.6.3 Electrical apparatus used in hazardous areas shall be manufactured, tested, marked and installed in accordance with international standards* and certified by an independent testing laboratory recognized by the Administration. Equipment classified in accordance with the following protection classes may be used:

* Refer to the following recommendations published by the International Electrotechnical Commission:

IEC 60079-10-1: 2020 Explosive atmospheres - Part 10-1: Classification of hazardous areas--Gaseous explosive atmospheres.

IEC 60079-11: 2023 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i".

IEC/TR 60079-13: 2017 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/TR 60079-16: 1990 Electrical apparatus for explosive gas atmospheres - Part 16: Artificial ventilation for the protection of analyser(s) houses.

IEC 60079-17: 2013 Explosive atmospheres - Part 17: Electrical installations inspection and maintenance.

IEC 60079-19: 2019 Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation.

ISO/IEC 60079-20-1: 2017 Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification – Test methods and data.

IEC 60079-25: 2020 Explosive atmospheres - Part 25: Intrinsically safe systems.

IEC 60079-28: 2015 Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation.

IEC 60079-29-1: 2016 Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases.

IEC 60079-29-2: 2015 Explosive atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen.

IEC 60079-30-1: 2015 Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements.

IEC 60079-30-2: 2015 Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Application guide for design, installation and maintenance.

Table 6-1 - Electrical protection type

Type	Protection method
ia and ib	Intrinsic safety
d	Flameproof enclosures
e	Increased safety
m	Encapsulation
n	Non incendive
o	Oil immersion
p	Pressurized enclosures
q	Powder filling
s	Special*

*Equipment specially approved for use in this zone by an organization recognized by the Administration.

Repairs, maintenance and overhaul of hazardous area certified equipment shall be performed by suitably qualified personnel in accordance with appropriate international standards.**

** Refer to the following International Electrotechnical Commission publications or equivalent for reference to appropriate personnel qualification criteria:

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

IEC 60079-17:2013 Explosive atmospheres – Part 17: Electrical installations inspection and maintenance.

IEC 60079-19: 2019 Explosive atmospheres – Part 19: Equipment repair, overhaul and reclamation.

There shall be maintained a register of electrical equipment installed in the designated hazardous areas, including a description of the equipment, applicable degree of protection and ratings.

3.6.4 Types of electrical equipment permitted shall be determined according to the electrical hazardous area classification of the location in which the equipment is to be installed. Permissible equipment is shown by an “x” in table 6-2. The use of type “o” (oil immersion) shall be limited. For transportable apparatus, protection type “o” shall not be used.

Table 6-2 - Type of electrical apparatus used in hazardous zones

Protection Type	ia	ib	g	e	m	n	o	p	q	s
Zone 0	X									
Zone 1	X	X	X	X	X		X	X	X	
Zone 2	X	X	X	X	X	X	X	X	X	X

3.6.5 Group selection for electrical equipment shall be as follows:

- .1 group II shall be selected for types “e”, “m”, “n”, “o”, “p”, “q” and “s” apparatus;
- .2 group IIA, IIB or IIC shall be selected for types “i”, “d”, and certain types of “n” apparatus according to table 6-3.

Table 6-3 - Relationship between gas/vapour group and permitted equipment group

Gas/vapour group	Electrical equipment group
IIC	IIC
IIB	IIB or IIC
IIA	IIA, IIB or IIC

3.6.6 Electrical apparatus shall be so selected that its maximum surface temperature will not reach ignition temperature of any gas/vapour possibly presenting in the hazardous areas in which the electrical apparatus is located. The relationship among equipment temperature class, equipment maximum surface temperature, gas/vapour ignition temperature is shown in table 6-4.

Table 6-4 - Relationship among temperature class, maximum surface temperature and ignition temperature

Electrical apparatus Temperature class	Electrical apparatus maximum surface temperature (°C)	Gas/vapour ignition temperature (°C)
T1	450	>450
T2	300	>300
T3	200	>200
T4	135	>135
T5	100	>100
T6	85	>85

3.6.7 Electrical apparatus located in hazardous drilling well and mud processing areas shall meet at least Group IIA and temperature class T3.

3.6.8 Electrical cables shall meet the following:

- .1 only cables associated with type “ia” equipment shall be permitted in zone 0 areas.
- .2 thermoplastic sheathed cables, thermosetting sheathed cables or elastomeric sheathed cables shall be used for fixed wiring in zone 2 areas.
- .3 flexible and portable cables, where necessary, used in zone 1 and zone 2 areas shall be to the satisfaction of the Administration.
- .4 permanently installed, fixed cable passing through zone 1 hazardous areas shall be fitted with conductive covering, braiding or sheathed for earth detection. (*MODU Code, 6.6*)

3.7 Machinery installations in hazardous areas

3.7.1 Mechanical equipment shall be limited to that necessary for operational purposes.

3.7.2 Mechanical equipment and machinery in hazardous areas shall be so constructed and installed as to reduce the risk of ignition from sparking due to the formation of static electricity or friction between moving parts and from high temperatures of exposed parts due to exhausts or other emissions.

3.7.3 The installation of internal combustion machinery may be permitted in zone 1 and zone 2 hazardous areas, provided that the Administration is satisfied that sufficient precautions have been taken against the risk of dangerous ignition.

3.7.4 The installation of fired equipment may be permitted in zone 2 hazardous areas, provided that the Administration is satisfied that sufficient precaution has been taken against the risk of dangerous ignition. (*MODU Code, 6.7*)

4 ELECTRICAL INSTALLATIONS FOR SELF-PROPELLED UNITS

4.1 Main source of electrical power

4.1.1 In addition to complying with sec. 2.3 (5.3 of *the Code*), the main source of electrical power shall comply with the following:

- .1 the arrangement of the unit’s main source of power shall be such that the services referred to in par. 2.1.1.1 (5.1.1.1 of *the Code*) can be maintained regardless of the speed and direction of the main propelling engines or shafting;
- .2 the generating plant shall be such as to ensure that with any one generator or its primary source of power out of operation, the remaining generator or generators will be capable of providing the electrical services necessary to start the main propulsion plant from a dead ship condition. The emergency generator may be used for the purpose of starting from a dead ship condition if its capability either alone or combined with that of any generator is sufficient to provide at the same time those services required by par. 2.4.6.1 to 2.4.6.4 (5.4.6.1 to 5.4.6.4 of *the Code*);
- .3 for electrically self-propelled units the application of par. 2.3.2 (5.3.2 of *the Code*) need only include for propulsion sufficient power to ensure safe navigation when underway;
- .4 where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore propulsion to the unit in conjunction with other machinery, as appropriate, from a “dead ship condition” within 30 min after blackout.

4.1.2 The main switchboard shall be so placed relative to one main generating station that, as far as is practicable, the integrity of the normal supply may be affected only by a fire or other casualty in one space. An environmental enclosure for the main switchboard, such as may be provided by a machinery control room situated within the main boundaries of the space, shall not be considered as separating the switchboards from the generators.

4.1.3 In every unit where the total installed electrical power of the main generators is in excess of 3 MW, the main busbars shall be subdivided into at least two parts which shall normally be connected by removable links or other approved means; so far as is practicable, the connection of generators and any other duplicated equipment shall be equally divided between the parts. Equivalent alternative arrangements shall be permitted. (*MODU Code, 7.9*)

4.2 Emergency source of electrical power

In addition to complying with sec. 2.4 (5.4 of the Code), the emergency source of power shall provide:

- .1 for a period of 18 hours, emergency lighting at the steering gear;
- .2 for a period of 18 hours:
 - .2.1 navigational aids as required by *SOLAS* chapter V;
 - .2.2 intermittent operation of the daylight signalling lamp and the unit's whistle; unless they have an independent supply from an accumulator battery suitably located for use in an emergency and sufficient for the period of 18 hours;
- .3 for the period of 30 min or a lesser period as permitted by *SOLAS* regulation II-1/29.14, the steering gear. (*MODU Code, 7.10*)

List of reference IMO documents in this Part VI of the Rules

IMO Resolutions

1. A.813(19): General requirements for electromagnetic compatibility for all electrical and electronic equipment.
2. A.1021(26): Code on Alerts and Indicators.

MSC Circulars

1. MSC.1/Circ.1212/Rev.1: Revised Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III.

List of IACS resolutions implemented to Part VI:

Unified Requirements (UR)

D8/Rev.3 Hazardous areas