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1 SCOPE

This document establishes mandatory requirements for totally enclosed fireproof lifeboats and davits systems specification, to be installed in offshore units for oil drilling and production.

Basic and/or detailing design shall be developed in accordance with the requirements herein established.

2 ABBREVIATIONS AND DEFINITIONS

2.1 Abbreviations

- **ABNT** *Associação Brasileira de Normas Técnicas* - Brazilian Association of Technical Rules
- **AICS:** American Institute of Steel Construction;
- **AISI:** American Iron and Steel Institute
- **ASTM:** American Society for Testing Materials
- **DPC:** *Diretoria de Portos e Costas* - Brazilian Ports and Coasts Directory
- **FSS:** Fire Safety Systems
- **FPSO:** Floating Production Storage and Offloading
- **FPU:** Floating Production Unit
- **FSO:** Floating Storage and Offloading
- **IEC:** International Electrotechnical Commission
- **IP:** International Protection
- **LSA:** Life-Saving Appliances
- **IMO:** International Maritime Organization
- **MSC:** Maritime Safety Committee

- **MODU:** Mobile Offshore Drilling Units
- **NBR:** *Normas Brasileiras* – Brazilian Standards
- **NORMAM:** *Normas da Autoridade Marítima* - Brazilian Maritime Authority Standards
- **NR:** *Normas Regulamentadoras* – Regulatory Standards
- **POB:** People on Board
- **PVC:** Polyvinyl chloride
- **SAE:** Society of Automotive Engineers
- **SOLAS:** Safety of Life at Sea
- **VDC:** Voltage Direct Current

2.2 Definitions

For the purposes of this specification, the definitions indicated below are adopted.

- **Composite Material:** A product comprised of two (2) or more distinct materials, which is different from the parts that form it.
- **Davit:** Steel structural device that is used to allow the stowage, people boarding, launching and recovery of lifeboats.
- **Embarkation Stations:** Free area next to each lifeboat to accommodate its full load;
- **Full Load:** Weight corresponding to the full capacity, based on an average of 90 kg of mass per passenger, plus all equipment, accessories, fuel, water and lubricant oil carried by the lifeboat and which are required by this guideline;
- **Lifeboat:** Totally enclosed vessel, fire resistant and with motor, for the abandonment of the Maritime Unit of people in emergency situations;
- **Stowage Weight:** Total weight, less the weight corresponding to the capacity;
- **Total Weight:** Weight of the empty lifeboat, plus full load;

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3 APPLICABLE STANDARDS AND RECOMMENDATIONS

Basic and/or detailing designs shall be developed in accordance with the requirements herein established. It must always be considered publications in course. Lifeboat suppliers shall either consider these standards and recommendations.

- IMO - International Life-Saving Appliances LSA CODE - 2017 Edition.
- IMO – SOLAS - International Convention for the Safety of Life at Sea - 1974, and Amendments in Force.
- IMO - MODU CODE - Code for the Construction and Equipment of Mobile Offshore Drilling Units - 2009, and Amendments in Force.
- IMO Resolution MSC 81(70): Testing of Life-Saving Appliances.
- NORMAM 01: *Normas da Autoridade Marítima para Embarcações em Mar Aberto – Ministério da Marinha – DPC* (meaning: Maritime Authority Standards for Vessels Employed in Open Sea Navigation – Ministry of the Marine).
- NORMAM 05: *Normas da Autoridade Marítima para Homologação de Material e Autorização de Estações de Manutenção - Ministério da Marinha - DPC* (meaning: Maritime Authority Standards for Approval of Material and Authorization of Maintenance Stations - Ministry of the Marine).
- ABNT NBR IEC 60529 – *Graus de Proteção para Invólucros de Equipamentos Elétricos (código IP)* (meaning: Degrees of Protection Provided by Enclosures (IP Code)).
- ABNT NBR IEC 60079-10-1 *Atmosferas Explosivas – Classificação de áreas - Atmosferas explosivas de gás.* (meaning: Explosive Atmospheres - Classification of areas – Explosive gas atmospheres).
- Requirements of the Classification Society of the Unit.
- I-ET-3010.00-5140-712-P4X-001 - LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS
- I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS
- I-ET-3010.00-1200-800-P4X-002 - AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGED UNITS

4 TECHNICAL REQUIREMENTS

4.1 General

- 4.1.1 All the equipment and fittings of the lifeboats and corresponding davit assembly shall be in accordance with standards and recommendations listed on item 3 above and, with technical requirements described herein.
- 4.1.2 Lifeboats shall be installed as close as possible to sea level at the same level to minimize downstream flow on the ladders during preparation for abandonment.
- 4.1.3 The installation of free-fall vessels is not allowed.
- 4.1.4 No lifeboat shall be approved to accommodate more than 150 people.
- 4.1.5 Fixed Units shall be equipped with sufficient number of lifeboats to meet the POB plus a reservation vessel. They must be distributed in embarkation stations so that the same fire scenario does not reach a number of embarkation stations needed to meet 100% of the POB.
- 4.1.6 Semisubmersible Units shall be equipped with sufficient number of lifeboats to meet the following condition: if one (1) lifeboat is lost, the others must be enough to guarantee the abandonment of 100% of the POB.
- 4.1.7 FPSO, FSO or FPU, shall be equipped with lifeboats in sufficient quantity for abandonment of 100% of the POB on each board of the Unit.

4.2 Material

- 4.2.1 The metal parts located externally to the hull and rigid covers shall be made of AISI-316 stainless steel in case of plates, screws, nuts and washers that fasten metal structures to the hull, or other type of stainless steel, marine bronze or admiralty brass, for the remaining cases, including the supporting hooks.
- 4.2.2 The propeller shall be made of admiralty brass or a similar material with the same or higher mechanical resistance and have corrosion resistance.
- 4.2.3 The minimum rudder angle shall be 35° to each side.
- 4.2.4 The rudder, rudder stock, rudder tiller, propeller protection grid, stern tube and the propeller shaft shall be made of AISI-316 stainless steel or a similar material with the same or higher mechanical and corrosion resistance properties.

4.2.5 All drive rods for the rudder, for hooks release, and other rods shall be made of AISI-316 stainless steel or a similar material with the same or higher mechanical resistance and have corrosion resistance.

4.2.6 All electrical material shall be:

4.2.6.1 Approved to operate in hazardous area, at least, as zone 2, group IIA, in accordance with standard ABNT NBR IEC-60079-10-1;

4.2.6.2 Approved to IP55 level of degree of protection, in accordance with standard ABNT NBR IEC 60529 – Graus de Proteção para Invólucros de Equipamentos Elétricos, unless a higher level of IP protection is required by Classification Society.

4.3 Rigid Covers

4.3.1 Each lifeboat shall be provided with a rigid and watertight cover, designed so as to have hatches on them, one located forward, the other located aft, arranged in a way to enable free access to the hooks and allow their handling without any occupant having to get out of the lifeboat. The lifeboat shall also be provided with a hatch to allow access to the top of the rigid cover.

4.3.2 Hulls and rigid covers shall be of fire resistant material. Requirements of the Classification Society of the Unit shall be followed.

4.3.3 The windows glasses shall be fire-resistant and protected against impact of the supporting, launching and hoisting system.

4.4 Capacity

4.4.1 Seats shall be padded with material dense enough to bear the drop of 100 kg from 3 m height, and the position of each occupant shall be clearly determined and identified. The minimum dimension between the center of the seats shall be of 500 mm.

4.4.2 The command post shall be equipped with 2 seats with foot rests, for helmsmen and shall be accessible to people weighing up to 100 kg and shall allow them safe access to the controls.

4.5 Accesses

- 4.5.1 Embarkation stations and the accesses to lifeboats shall be free of obstacles and tubing containing hydrocarbons. Areas should have sufficient space to mobilize people dressed in life jackets.
- 4.5.2 Accesses to lifeboats that are located in areas that may be exposed to radiation or explosion loads must have adequate fire and explosion protection.
- 4.5.3 Lifeboats shall be designed so that all its occupants, already dressed with their lifejackets, can go on board, take their seats and have their safety belts fastened within a maximum time of three (03) minutes after the boarding order has been given.
- 4.5.4 There shall have, at least, four (04) doors to access the lifeboat, being two (02) doors aft and one (1) at each side of the lifeboat, with 610 mm x 1 260 mm minimum dimensions, watertight, and provided with devices to enable opening or closing them from inside or outside, and keep them firmly in the open position.

Note: Sliding doors are not acceptable.

4.6 Propulsion and Fittings

- 4.6.1 Compression ignition engine: the fuel used shall have a flashpoint equal to or higher than 60°C;
- 4.6.2 The engine starting system shall have 2 independent starts: one electrical and the other mechanical; the electrical system shall be powered by a 12 VDC battery;
- 4.6.3 The fuel tank shall be made of AISI-316 stainless steel or a similar material with the same properties or higher mechanical resistance and corrosion resistance, and shall be provided with a manhole door for cleaning, with 200 mm x 300 mm minimum dimensions and a drainage valve;

- 4.6.4 The batteries shall be of the sealed type;
- 4.6.5 In order to recharge the batteries, a marine socket, using energy from a source at the offshore unit, with 12 VDC voltage; this socket shall allow the plugs release, in the case of lifeboat lowering, without causing damage to the electrical cables of the system;
- 4.6.6 The socket charging system shall have a device that allows de-energizing the lifeboat socket when it is disconnected from the installation. The sockets shall preferably be disconnected only by pulling out.

4.7 Fittings and Equipment

- 4.7.1 The hook release systems, with or without load shall be installed in such a way that the helmsman seated and with belt fastened, is able to operate it safely.
- 4.7.2 The hook locking and launching system shall ensure that the hook is kept in the closed position, independent of the actuating cable failure.
- 4.7.3 The hook's tongue shall be spring-type, in order to prevent accidental release of ring.
- 4.7.4 In addition to the LSA code, the safety belts shall be provided with a buckle, which allows fast closing and opening, without springs or similar devices and made of stainless material.

4.8 Fire Protection

- 4.8.1 The actuation of the valve sprinkler system shall be installed at the lifeboat master control panel and shall be safe and effective in offshore environment.
- 4.8.2 The water spray nozzles and piping system shall be made of stainless steel, marine bronze, admiralty brass or a similar material with the same or higher mechanical resistance and have corrosion resistance.

4.9 Lowering Control System

- 4.9.1 In addition to the LSA code, the helmsman shall operate the lowering system from the inside of the lifeboat, with the lifeboat completely closed. This system shall also be capable to stop the lifeboat at any point during lowering.
- 4.9.2 The cable that starts lifeboat lowering shall be provided with a device that prevents direct contact of the helmsman's hand with the cable.

- 4.9.3 This device, when released by the helmsman, shall allow spontaneous cable release, without damages to the lifeboat and its occupants.

4.10 Additional Requirements

- 4.10.1 The control panel shall be installed in front of the helmsman's seat and shall comprise all instruments and commands required for the lifeboat operation, with clear indications of its functions and positioning. The instruments shall be of analog type (ammeter, voltmeter, hour meter, oil pressure gauge, temperature and speed indicators of the engine). The main electrical power supply switch shall also be installed on the helmsman's panel.
- 4.10.2 For design, manufacture and supply of control panel in the package, refer to I-ET-3010.00-1200-800-P4X-002 - AUTOMATION, CONTROL AND INSTRUMENTATION ON PACKAGED UNITS
- 4.10.3 The outside of the lifeboat shall not have protrusions or bulges in places that might accidentally snag the supporting cables, nor any sharp-edges that might cause injuries.
- 4.10.4 Pad eyes shall be foreseen to permit installation of maintenance slings, in order to release hooks during maintenance works. These pad eyes shall be strong enough to hold the lifeboat with total weight plus 10 % overload.
- 4.10.5 The hook structures shall be provided with side pad eyes in order to use cable loops and to make easier the lifeboat rescue operation.
- 4.10.6 The lifeboat lifelines shall be of stainless steel coated in PVC and provided with devices that ensure floating (pulleys). Fiber cables are not acceptable.
- 4.10.7 Lifeboats shall be provided with external access at both sides and on the rigid cover to enable people to move in the fore-aft direction, with non-slip surface coating.
- 4.10.8 All operation instructions shall be illustrated and translated into Portuguese language.
- 4.10.9 Mechanically fixed fenders shall be provided around the lifeboat for impact absorption, assembled externally and with dimensions compatible with it.

4.11 Davit / Winch System

- 4.11.1 All davits for lifeboats are considered essential for the safety on Fixed or Floating Units. Therefore, they shall remain energized while operating the emergency generator.
- 4.11.2 All davits for lifeboats shall comply with LSA code applicable requirements and

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with the present specifications.

- 4.11.3 The winch motor shall be able to hoist the lifeboat with its total weight, plus a 10 % overload up to its stowage position.
- 4.11.4 The manufacture and assembly of the davit metallic structure shall comply with the requirements of the AISC standard, considering the metallic structure as a primary conventional element.
- 4.11.5 The instructions for lowering and hoisting operation of the davit/winch shall be clearly fixed to their actuation system, in the Portuguese language, illustrated and in indelible material.
- 4.11.6 The davit components shall be standardized, in order to allow interchangeability of the parts for each model from the same manufacturer.
- 4.11.7 The use of devices that avoid lifeboat lowering is not permitted in the davit/winch assembly, when the lowering control system is actuated. However, the assembly shall be able to avoid lifeboat accidental launching. The presence of cables or any other items under the lifeboat is not allowed.
- 4.11.8 The davit shall be provided with ladders and platforms for access to the cables and pulleys for inspection and maintenance.
- 4.11.9 The supporting system shall be designed so that, after the initial adjustments, no further regulation is necessary.
- 4.11.10 Sufficient structural pad eyes shall be provided on the davit, in order to allow the attachment of maintenance slings, allowing the release of the lifeboat hooks with total weight plus 10 % overload.
- 4.11.11 The maintenance slings length shall not have a slack higher than 100 mm, when the lifeboat is in the stowage position.
- 4.11.12 Bushings in general shall be specified in accordance with SAE 65, marine bronze (ASTM B 62) or similar material with the same or higher mechanical properties and corrosion resistance.
- 4.11.13 Winch gears lubrication shall be ensured in any operational condition.
- 4.11.14 The pulley axles and all parts that have a tight-fitting sliding assembly shall be made of AISI-316 stainless steel or a similar material with the same or higher mechanical properties and corrosion resistance.
- 4.11.15 All parts that have a tight-fitting sliding assembly shall allow easy inspection, disassembly, maintenance and assembly.
- 4.11.16 The lowering/hoisting cable rewinding system shall ensure the correct winding of the various layers of the cable during lifeboat hoisting, specially to prevent voids between the loops and kinks in the cable.
- 4.11.17 The davit shall be supplied with a single fall without pulley blocks, and provided

with ring grips with handles and secured to cable by a shackle or reinforced link.

- 4.11.18 Box type pulleys (similar to a pulley block) shall guide the release cable of the davit static brake. This cable shall be AISI-316 stainless steel or a similar material with it or higher mechanical properties and corrosion resistance, and shall be kept undamaged, under normal operational conditions, for a period not lower than two (02) years.
- 4.11.19 The braking system shall be designed to operate for one (01) year without requiring replacement of any part, for a minimum operation rate of five (05) times per year and with a minimum lowering height of 25 m.
- 4.11.20 The braking system design shall also take into account, in its dimensions, the dissipated power (proportional to the weight and speed) at 1.5 times the real lowering time.
- 4.11.21 In case of centrifugal brakes, facilities shall be foreseen in order to allow an easy inspection of the wear of the brake linings.
- 4.11.22 The travel of the centrifugal brakes lining shall not be in contact with any oil or grease leakage.
- 4.11.23 The davit winch shall be installed at the lifeboat deck. The winch located over the lifeboat is not acceptable (over the davit arm).
- 4.11.24 The start push-button shall be of pulsed button type.
- 4.11.25 The emergency push-button shall be located next to the start push-button.
- 4.11.26 The socket for the winch manual drive lever shall have a sensor to switch off the electrical power supply to the motor.
- 4.11.27 For davits of the pivoting type, the davit shall be provided with an impact dampener system for pivoting, by means of a hydraulic system or equivalent.
- 4.11.28 For design, manufacture and supply of low-voltage induction motors in the package, refer to I-ET-3010.00-5140-712-P4X-001 - LOW-VOLTAGE INDUCTION MOTORS FOR OFFSHORE UNITS.
- 4.11.29 For the design, supply, manufacturing of the electrical components in this package, refer to I-ET-3010.00-5140-700-P4X-003 - ELECTRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE UNITS.

4.12 Tests

- 4.12.1 The prototype shall be manufactured, tested and certified in accordance with the LSA code requirements. Equipment when received shall be tested in accordance with IMO resolution MSC.81 (70) and its attachments, as well as standard NORMAM 05.



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4.13 Minimum Documents Required

4.13.1 The Equipment's Certificates of Approval issued by *Ministério da Marinha* (Ministry of the Marine) – DPC.

PRELIMINARY