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## 1 SCOPE

This specification defines the minimum requirements for life-saving equipment to be installed in an Offshore Unit.

## 2 DEFINITIONS

The following definitions are applicable:

- **Self-Contained Breathing Apparatus:** device to be used by someone that needs to enter in places where the air is contaminated.
- **Main Escape Route:** a demarcated route to conduct people to an Embarkation Station.
- **Secondary Escape Route:** a demarcated route to conduct people from a certain place to a main escape route.
- **Portable O2/ Gas detector:** device to measure the concentration of oxygen in confined atmospheres as well as in areas exposed to the presence of explosive atmosphere (combustible gas). The combination oxygen and combustible gas monitor will be used to test atmospheres for sufficient content for life support and/or the presence of combustible gases or vapor posing a potential flammability explosion hazard.
- **Emergency Shower:** unit designed to wash an individual's head and body, which has come into contact with hazardous chemicals.
- **Eye Wash Unit:** unit for washing chemicals or substances that might splash into an individual's eyes before he or she can seek further medical attention.
- **Stretcher:** apparatus used to transport wounded or unconscious people by a helicopter or crane.
- **Emergency Escape Breathing Device (EEBD):** supplied air device to be used by someone that needs to escape from a compartment that has a hazardous atmosphere to an area of safety.

## 3 APPLICABLE STANDARDS AND RECOMMENDATIONS

Regulations to be followed in the design, manufacture, installation and testing of the Life Saving Equipment are stated below. SUPPLIER shall produce evidence of



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having complied with all regulations, always in their latest editions, as well as with the requirements defined in this specification. In case of any disagreement, it shall be submitted to PETROBRAS for approval.

- NFPA 1981: Standard on open-circuit self-contained breathing apparatus for fire and emergency services;
- ABNT-NBR 13716: Equipamento de proteção respiratória - máscara autônoma de ar comprimido com circuito aberto (meaning: Open-circuit self-contained breathing apparatus);
- IMO - SOLAS: International convention for the safety of life at sea - 1974, and amendments in force;
- IMO - international life-saving appliance code (LSA Code);
- NORMAM 01: Normas da autoridade marítima para embarcações empregadas na navegação em mar aberto - Ministério da Marinha - DPC (meaning: Brazilian Maritime authority standard for offshore navigation);
- NORMAM 05: Normas da autoridade marítima para homologação de material e autorização de estações de manutenção - Ministério da Marinha - DPC (meaning: Brazilian Maritime authority standard for material certification and maintenance stations);
- Normas Regulamentadoras (meaning: Brazilian Regulating Norms);
- ABNT-NBR 8447: Equipamentos elétricos para atmosferas explosivas de segurança intrínseca - Tipo de proteção "I" (meaning: Brazilian Technical Standard Association - Equipment for explosive atmospheres - Intrinsic safety - Type of protection "I");
- IEC 60079-11: Explosive atmospheres - PART 11: Equipment protection by intrinsic safety "I";
- International code for fire safety systems - FSS Code Chapter 3 Section 2;
- Classification society requirements;
- IMO-MODU Code: Code for the construction and equipment of mobile offshore drilling units -1989 edition, and amendments in force.

## 4 TECHNICAL REQUIREMENTS

### 4.1 Requirements for Breathing Device/ Box

4.1.1 Breathing Device shall be provided with a compressed air cylinder, check valve, automatic supply valve, safety valve, protecting mask, windpipe connecting cylinder with mask and parts to attach to the body of the user.

4.1.2 Compressed air cylinder shall hold at least 1.2 m<sup>3</sup> at 25 °C.

4.1.3 A pressure gauge shall be provided.

4.1.4 Breathing apparatus shall be of the open system (without air recirculation).

4.1.5 Face mask shall be only one piece with a wide peripheric vision and the following characteristics:

- Made of silicon with wide surface;
- Silicon stripes fixed in the lens frame and adjusted by metallic buckle;
- Easy to put it in and off;
- Lenses fixed in the mask by a strong frame, treated against abrasion;
- The mouthpiece houses: a removable nasal "Cuba", a commutating diaphragm (communication membrane) and a breathe valve attached to the second stage regulator by a quick connection in order to receive a positive pressure demand valve;
- Adequate place for visualization of the electronic display.

4.1.6 It shall be furnished with a positive pressure valve inside the face mask.

4.1.7 Breathing apparatus shall be provided with two different and independent sound and visual alarms indicating to the user low air pressure, as required by NFPA 1981. A visual alarm shall be provided in the face mask indicating by LED the amount of air in the cylinder (100%, 75%, 50%, 25% and empty) additionally an external red LED alarm actuating when cylinder capacity reaches 25%.

4.1.8 It shall be furnished with a device in order to automatically control the air supply, according to user breathing capacity, whenever user is breathing at a rate of up to 85 L/min, the cylinder supply pressure shall stand above 1080 kPa.

4.1.9 It shall be supplied with a by-pass of the automatic air supply valve.

4.1.10 Equipment shall be made of materials that are suitably stout, durable and able to withstand deterioration caused by heat or wet, and also it shall not allow admission of smoke into breathing air stream.

4.1.11 It shall be complete and ready for use the arrangement shall not be heavier than 12 kg.

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- 4.1.12 Cylinders shall be painted in gray color with photo luminescent yellow stripes for better visualization in the dark.
- 4.1.13 Cylinders shall be of total composite material (carbon fiber) with at least a lifetime of 15 years, provided with fluorescent pressure gauge installed.
- 4.1.14 It shall be supplied with cylinder hydrostatic test certificate.
- 4.1.15 It shall be supplied with an additional outlet connection for an external user.
- 4.1.16 It shall be supplied with quick recharge system.
- 4.1.17 It shall be supplied with second stage regulator of quick connection type.
- 4.1.18 The electric charges of pressure transmitter and display shall be done by lithium battery, suitable for Group IIA, Zone 1, T3.
- 4.1.19 Breathing Apparatus not stowed in normal Fireman's Outfit Lockers shall be kept in separate boxes.
- 4.1.20 SUPPLIER shall provide Boxes made of fiberglass, painted in safety green color (Munsell notation 2.5 G 5/10).
- 4.1.21 The boxes lids shall be easy to open in case of emergency and should not be transparent, in way to protect the equipment from solar rays.
- 4.1.22 The following legend shall be written on the front of the Boxes: "EQUIPAMENTO AUTÔNOMO DE RESPIRAÇÃO" (Breathing Apparatus). Letters shall be in white and stand 70 mm high, 40 mm in width, 10 mm thick and 5 mm apart.

## 4.2 Requirements for Portable O<sub>2</sub>/ Gas Detector

- 4.2.1 Detectors shall be high impact and flameproof, resistant to impact and fall.
- 4.2.2 It shall be provided with static armored protection against radio frequency (RFI) and electromagnetic compatibility (EMC).
- 4.2.3 Detectors shall be microprocessor controlled with computer interface for data-logging.
- 4.2.4 Detectors shall be digital meter, Liquid crystal display type, with digits of at least 10 mm size.
- 4.2.5 Detectors shall have a minimum of 8 hours in continuous operation, at 25 °C.
- 4.2.6 Detectors shall have alkaline replaceable 1.5 V batteries.
- 4.2.7 Detectors shall be intrinsically safe, certified for operation in hazardous areas (Group IIA, Zone 1, T3).
- 4.2.8 Remote sampling equipment (probe, sampling line and pump) shall be supplied. Minimum sampling line shall be 1.5 m.

- 4.2.9 Leather case with holder for transport action shall be supplied.
- 4.2.10 Kit for calibration with all necessary accessories shall be supplied.
- 4.2.11 Audible and visual alarm indicating a representative of % LEL (adjustable petting) shall be available.
- 4.2.12 Audible and visual alarm to indicate low level battery shall be available.
- 4.2.13 Backlit LCD Display shall have a device that facilitates the reading in places with low visibility.
- 4.2.14 Compacting lightweight unit, the complete device with all accessories for operation shall not exceed 0.90 kg.
- 4.2.15 Audible and visual alarm indicating low oxygen concentration shall be available.
- 4.2.16 Portable oxygen and combustible gas monitors shall be approved by the Classification Society.

### 4.3 Requirements for Eye-washing Unit

- 4.3.1 Basin shall be in stainless steel.
- 4.3.2 Unit shall have valve worked by lever or through the base of the Emergency Shower and Eye-Washing Units.
- 4.3.3 When walk on platform is used, spiral spring under the base of the unit shall be made in stainless steel.
- 4.3.4 Unit shall have aerated stainless steel sprays, with spray strength governor.
- 4.3.5 Unit shall be "Y" type by-pass filter.
- 4.3.6 Anti-corrosion painting shall be used. Eye-washing unit piping shall be in green (Munsell 10 GY 6/6) and have adhesive strips in bright yellow (Munsell 2.5 Y 8/12) colors.
- 4.3.7 Only potable water shall be used.
- 4.3.8 Unit shall be installed close to places where handling and storing of chemicals will take place, and where there is a risk of skin and/or eyes injuries due to such materials.

### 4.4 Requirements for Emergency Shower

- 4.4.1 Emergency Shower shall be made of stainless steel.
- 4.4.2 Shower shall be worked by handle and/or walk on a platform type.
- 4.4.3 Shower shall be able to be taken down to allow maintenance.
- 4.4.4 Shower shall have 300 mm diameter.

4.4.5 Anti-corrosion painting shall be used. Emergency Shower piping shall be in green (Munsell 10 GY 6/6) and have adhesive strips in bright yellow (Munsell 2.5 Y 8/12) colors.

4.4.6 Only potable water shall be used.

#### **4.5 Requirements for Stretcher**

4.5.1 Stretchers shall be of fold type.

4.5.2 Stretchers shall support an unconscious person, which weights up to 160 kg, in the vertical or horizontal position by a helicopter or crane.

4.5.3 The tubes of the Stretcher structure shall be resistant to the marine atmosphere, made of a rigid material and it shall provide devices for shipment.

4.5.4 Stretchers shall be supplied with dimensions of 0.6 m and height adjustable for wounded people from 1.6 m to 1.9 m, however not exceed 2.0 m in length.

4.5.5 Stretchers shall have 4 (four) fastening ribbons along its length.

4.5.6 Ribbons shall be made of a resistant fabric, properly fixed to the Stretcher structure.

4.5.7 Fastening the ribbons shall be of an engage and uncouple fast type.

4.5.8 In case of fall in the sea, the Stretcher shall float maintaining the victim's face entirely off the water.

4.5.9 It shall be conditioned in a protect packing, in nylon resinous or similar material, with loop for fixation.

4.5.10 Stretchers shall have head protection and feet support.

#### **4.6 Requirements for Emergency Escape Breathing Device (EEBD)**

4.6.1 EEBD shall be provided with a hood or full face piece, as appropriate, to protect eyes, nose and mouth during escape. Hood and face pieces shall be constructed of flame-resistant materials and include a clear window for viewing.

4.6.2 EEBD shall be complete and ready for use, the arrangement shall not be heavier than 5 kg.

4.6.3 Face mask shall be only one piece with a wide peripheral vision and easy to put it in and off.

4.6.4 Reservoir shall have service duration of 10 min.

4.6.5 Reservoir shall be rechargeable by existing Unit Air Breathing System.

4.6.6 An inactivated EEBD shall be capable of being carried hands-free.

4.6.7 An EEBD, when stored, shall be suitably protected from the environment.



- 4.6.8 Brief instructions or diagrams clearly illustrating the use shall be clearly printed on the EEBD. The donning procedures shall be quick and easy to allow for situations where there is a little time to seek safety from a hazardous atmosphere.
- 4.6.9 Maintenance requirements, manufacturer's trade mark and serial number, shelf life with accompanying manufacture date and name of approving authority shall be printed on each EEBD.
- 4.6.10 Cylinders shall have at least a lifetime of 15 years and shall be of aluminum, carbon steel material or similar in weight and resistance, provided that it shall be an approved type.
- 4.6.11 It shall be supplied with a cylinder content indicator.
- 4.6.12 It shall be supplied with shoulder trap.
- 4.6.13 It shall be supplied with a storage cabinet and means to support it on the wall.
- 4.6.14 It shall be supplied in orange safety color.
- 4.6.15 It shall be supplied with cylinder hydrostatic test certificate.

## **5 SCOPE OF SUPPLY**

### **5.1 Breathing Apparatus**

#### **5.1.1 Documents**

a) SUPPLIER shall provide equipment full specifications such as:

- Dimensions;
- Weight;
- Materials.

b) SUPPLIER shall provide Box drawings, showing:

- Dimensions;
- Weight;
- Attachment details;
- Materials.

#### **5.1.2 Equipment**

a) SUPPLIER shall also provide all attachment devices.

### 5.1.3 Certificates

- a) SUPPLIER shall provide Certificates of Approval issued by MINISTÉRIO DO TRABALHO (meaning: Brazilian Labor Authority) or Certificates recognized by the origin country responsible institution.

## 5.2 Portable O<sub>2</sub>/Gas Detector

### 5.2.1 Documents to be presented at BID Phase

- Data sheet and catalog in Portuguese language describing the technical characteristics of the monitor;
- Dimensional drawings with operating procedures and instructions;
- The manufacturer shall present a conformity certificate of the equipment for explosive atmospheres;
- The manufacturer shall present a certificate of conformity issued by a recognized entity in accordance with INMETRO rules;
- List of firms for Technical Assistance in Brazil.

### 5.2.2 Documents to be presented for Purchase

- Maintenance and operation manual, in Portuguese language;
- Spare parts list;
- Document, including drawings, detailing all monitor's components;
- Certificate of Approval issued by INMETRO;
- Certificate of conformity of the monitor for explosive atmospheres applications.

## 5.3 Emergency Shower and Eye-washing Unit

### 5.3.1 Documents

- a) SUPPLIER shall provide unit drawings showing:
- Dimensions;
  - Weight;
  - Required potable water flow.

### 5.3.2 Equipment

- a) SUPPLIER shall provide unit according to specification herein.

### 5.3.3 Inspection

- a) Emergency shower and eye-washing unit shall be inspected before its delivery.

## 5.4 Stretcher

5.4.1 SUPPLIER shall fully comply with requirements in this specification and documents listed in item 2.

5.4.2 Stretchers shall be provided, along with all accessories requested for proper support to be fixed to the wall.

5.4.3 Documents for BID Phase:

- a) SUPPLIER shall provide a drawings containing the following information:

- Dimensions;
- Weight.

- b) SUPPLIER shall also provide a descriptive of the components materials.

5.4.4 Documents for Delivery Phase

- Instructions how to use shall be in Brazilian Portuguese Language;
- Test Certificates.

5.4.5 Certificates

- a) SUPPLIER shall provide Certificates of Approval issued by MINISTÉRIO DA MARINHA - DPC (meaning: Brazilian Maritime Authority) or Certificates recognized by the origin country responsible institution.

## 5.5 Emergency Escape Breathing Device (EEBD)

5.5.1 Documents

- a) SUPPLIER shall provide equipment full specifications such as:

- Dimensions;
- Weight;
- Materials;
- Training and Maintenance Program.

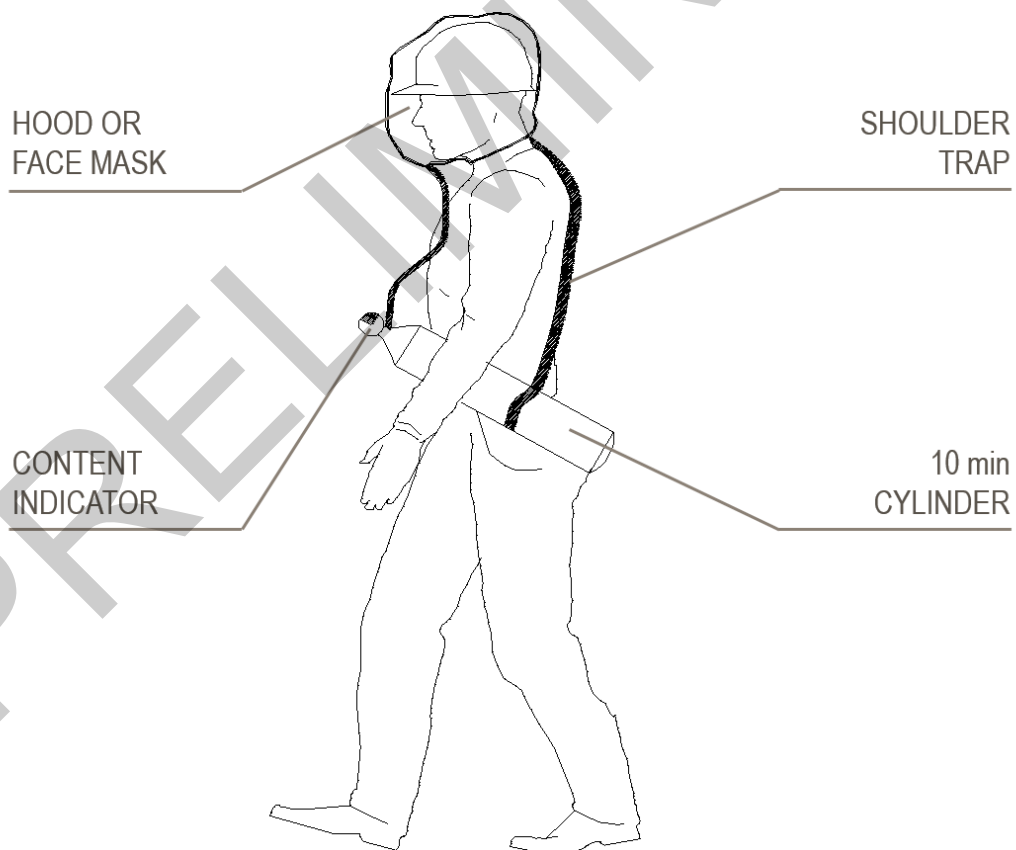
### 5.5.2 Certificates

- a) EEBD shall be an approved type. SUPPLIER shall provide Certificates of Approval issued by MINISTÉRIO DO TRABALHO (meaning: Brazilian Labor Authority) or Certificates recognized by the origin country responsible institution.

## 6 ANNEX

The following annex is an example of an EEBD type.

Dimensions are suggestive. SUPPLIER may propose alternative dimension and design in order to guarantee the proper functioning)



EXAMPLE OF AN EEBD TYPE



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