PART II RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF MOBILE OFFSHORE DRILLING UNITS

TITLE MOBILE OFFSHORE DRILLING UNITS

SECTION 3 HULL EQUIPMENT

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B2. REGULATIONS AND STANDARDS

100. Application

101. The Regulations applicable to this Chapter are in Part I, Title 01, Section 2, Chapter B of the Rules.

B3. STANDARDS

100. National and International Standards

101. Whenever there are not specific requirements in the Rules related to any system, the National and International standards are to be researched and applied.

B4. REFERENCES

100. References

101. References for this Section are:

- IMO CODE FOR THE CONSTRUCTION AND EQUIPMENT OF MOBILE OFFSHORE DRILLING UNITS (MODU CODE)
- IACS UR D – REQUIREMENTS CONCERNING MOBILE OFFSHORE DRILLING UNITS
- API SPECIFICATION 2C – SPECIFICATION FOR OFFSHORE PEDESTAL MOUNTED CRANES
- RBNA GUIDE FOR SHIPBOARD LIFTING APPLIANCES
- RBNA GUIDE FOR ENTRANCE INTO CONFINED SPACES
- RBNA GUIDE FOR TOWING
- RBNA SHIP RULES
- BRAZILIAN DPC (MARITIME AUTHORITY) REGULATIONS NORMAM 01 Chapter 9 Section I
- BRAZILIAN MINISTRY OF LABOUR NR29
- IMO RESOLUTION MSC.133(76), TECHNICAL PROVISIONS FOR MEANS OF ACCESS FOR INSPECTIONS
- IMO RESOLUTIONA.864(20).RECOMMENDATIONS FOR ENTERING ENCLOSED SPACES ABOARD SHIPS.
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CHAPTER C
MATERIALS AND WORKMANSHIP

CHAPTER CONTENTS

C1. MATERIALS

100. Material

101. Unless otherwise specified, the Requirements are intended for units to be constructed of hull structural steel, manufactured and having the properties as specified in the Ship Rules Part III Title 61 Section 3.

C2. WORKMANSHIP

100. Application

101. The application of the Rules takes for granted the adequate qualification and expertise of the manlabour to carry out the operation of the systems herein described.

CHAPTER D
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CHAPTER CONTENTS

D1. LIFTING APPLIANCES AND PERSONNEL AND PILOT TRANSFER

100. Cranes

101. Each crane, including its supporting structure, which is used for the transfer of material, equipment or personnel between the unit and attending vessels shall be of a design and construction to the satisfaction of the RBNA and adequate for the service intended in accordance with the requirements of the RBNA Guide for Shipboard Lifting Appliancesand with National or International Standards or Codes, in particular the API Specification 2C – Specification for Offshore Pedestal Mounted Cranes.

102. Cranes shall be so located and protected as to reduce to a minimum any danger to personnel, due regard being paid to moving parts or other hazards. Their design shall have regard to the materials used in construction, the working conditions to which they will be subjected and the environmental conditions. Adequate provisions shall be made to facilitate cleaning, inspection and maintenance.

103. Consideration shall be given to the failure mode for each crane in the event of extreme overload so that the crane operator is exposed to minimum danger.

104. ARBNA surveyorshall survey the installation of each crane, with particular regard to its supporting structure.

105. After each crane has been erected on board, and before it is placed in service, operational and load tests shall be conducted. These tests shall be witnessed and verified by aRBNAsurveyor. A record of these tests and other information concerning initial certification shall be readily available.

106. Each crane shall be examined at intervals not exceeding 12 months. It shall be further tested and recertified, at intervals not exceeding five years, or after substantial alteration or repairs. These tests shall be witnessed and verified by an officer of the RBNA or a duly authorized person or organization. A record of these examinations, tests and certifications shall be readily available.

Guidance

For Brazilian Flag units, see NR29.

Reference is made to the RBNA Guide for Lifting Appliances and the API Specification 2C.

Reference is made to ILO C32 *and ILO C152 – Occupational safety and health (Dock workers), Recomendation 160 (Cargo Gear Register Book).*

End of guidance

107. Cranes used for loading and discharging of offshore supply vessels shall be furnished with rating tables or curves which take into account the dynamics associated with the unit's and vessel's motions.

108. Except when loads are determined and marked prior to lifting, each crane shall be fitted, to the satisfaction of the RBNA, with a safety device to give the crane operator a continuous indication of hook load and rated load for each radius. The indicator shall give a clear and continuous warning when approaching the rated capacity of the crane.

109. The RBNAshall give consideration to the installation of limit switches to provide for the safe operation of the crane.

110. A crane manual shall be provided for each crane and shall be readily available. This manual shall contain full information concerning:

a. design standard, operation, erection, dismantling and transportation;

b. all limitations during normal and emergency operations with respect to safe working load, safe working moment, maximum wind, maximum heel and trim, design temperatures and braking systems;

c. all safety devices;

d. testing of the emergency lowering system for personnel transfer, if fitted;

e. diagrams for electrical, hydraulic and pneumatic systems and equipment;

f. materials used in construction, welding procedures and extent of non-destructive testing; and

g. guidance on maintenance and periodic inspection.

200. Lifting and hoisting equipment

201. All lifting and hoisting equipment, including its supporting structure, shall be of a design and construction to the satisfaction of the RBNA and adequate for the service intended in accordance with the requirements of the Rules and the RBNA Guide for Shipboard Lifting Appliancesand with national or international standards or codes.

202. Information on the rated capacity of all lifting and hoisting equipment, developed in accordance with national or international standards or codes, shall be available on the unit.

300. Personnel lifts

301. Personnel lifts shall be of a design acceptable to the RBNA and adequate for the service intended.

302. The construction and installation shall be surveyed by aRBNA surveyor. The inspections shall be carried out on installation and at intervals not exceeding 12 months and certificates or reports shall be readily available, in compliance with the RBNA Guide for Shipboard Lifting Appliances and Natinal Regulations. See also the references in B4 above.

303. Each lift car in a column of a column-stabilized unit shall provide for an emergency exit with an escape ladder in the hoistway.

400. Personnel and pilot transfer

401. All personnel transfer nets or platforms shall be designed and constructed to the satisfaction of the RBNA.

402. A personnel transfer net or platform may be used to satisfy the pilot transfer arrangement required by SOLAS regulation V/23.

500. Drilling derricks

501. The design of each drilling derrick and its supporting structure shall be to the satisfaction of the RBNA. The rated capacity for each reeving shall be included in the operating manual.

600. Elevating systems for self-elevating units
Machinery

601. Jacking mechanisms should be:

a. arranged so that a single failure of any component does not cause an uncontrolled descent of the unit;

b. designed and constructed for the maximum lowering and lifting loads of the unit as specified in the unit's operation manual;

c. able to withstand the forces imposed on the unit from the maximum environmental criteria for the unit; and

d. constructed such that the elevation of the leg relative to the unit can be safely maintained in case of loss of power (e.g., electric, hydraulic, or pneumatic power).

e. Control, communication and alarms

602. The elevating system should be operable from a central jacking control station.

603. The jacking control station should have the following:

a. audible and visual alarms for jacking system overload and out-of-level. Units whose jacking systems are subject to rack phase differential should also have audible and visual alarms for rack phase differential; and

b. i nstrumentation to indicate:

i. the inclination of the unit on two horizontal perpendicular axes;

ii. power consumption or other indicators for lifting or lowering the legs, as applicable; and

brake release status.

604. A communication system should be provided between the central jacking control and a location at each leg.

D2. ANCHORING, MOORING AND TOWING

100. Definitions

101. **FOS:** means factors of safety

102. **Quasi Static Method:** Quasi-static load means the load is applied so slowly that the structure deforms also very slowly (very low strain rate) and therefore the inertia force is very small and can be ignored. A dynamic load, on the other hand, casues a structure to vibrate and the inertia force is big enough and must be considered. To be sure that is really quasi static problem you shall compare eigenfrequency of you structure with frequency of loading. If eigenfrequency about ten times grate of loading frequency it may be a quasi static problem. In another way it is a dynamic problem.

103. **Eigenfrequency**:means a system's "own" frequency ("eigen" means "own" in German), resonant frequency of a system.

104. **Dynamic analysis:** A dynamic load causes a structure to vibrate and the inertia force is big enough and must be considered.

105. **Impact:**involves a load quickly applied over a short time duration.

200. Anchoring Systems

201. Plans showing the arrangement and complete details of the anchoring system, including anchors, shackles, anchor lines consisting of chain, wire or rope, together with details of fairleads, windlasses, winches, and any other components of the anchoring system and their foundations are to be submitted to the RBNA, in accordance with Part I, Title 02, Section 2 Chapter C, Subchapter C1 of the Rules.

202. An analysis of the anchoring arrangements expected to be utilized in the unit's operation is to be submitted to the RBNA.Among the items to be addressed are:

a. Design environmental conditions of waves, winds, currents, tides and ranges of water depth.

b. Air and sea temperature.

c. Ice conditions (if applicable).

d. Description of analysis methodology.

203. The anchoring system shall be designed so that a sudden failure of any single anchor line will not cause progressive failure of remaining lines in the anchoring arrangement.

204. Anchoring system components shall be designed utilizing adequate factors of safety (FOS) and a design methodology suitable to identify the most severe loading condition for each component. In particular, sufficient numbers of heading angles together with themost severe combination of wind, current and wave are to be considered, usually from the same direction, to determine the maximum tension in each mooring line. When a particular site is being considered, any applicable cross sea conditions are also to be considered in the event that they might induce higher mooring loads.

205. When the Quasi Static Method is applied, the tension in each anchor line is to be calculated at the maximum excursion for each design condition defined in D2.207, combining the following steady state and dynamic responses of the Unit:

a. steady mean offset due to the defined wind, current, and steady wave forces;

b. most probable maximum wave induced motions of the moored unit due to wave excitation.

206. For relatively deep water, the effect from damping and inertia forces in the anchor lines is to be considered in the analysis. The effects of slowly varying

motions are to be included for MODUs when the magnitudes of such motions are considered to be significant.

207. When the Quasi Static Method outlined in D2.205 is applied, thefollowing minimum factors of safety at the maximum excursion of the unit for a range ofheadings shall be considered:

TABLE T. D2.207.1 – FACTORS OF SAFETY

DESIGN CONDITION	FOS
Operating	2,7
Severe storm	1,8
Operating – one line failed	1,8
Severe storm – one line failed	1,25

where:

FOS = PB/Tmax

Tmax = characteristic tension in the anchor line, equal to the maximum value obtainedaccording to D2.205

PB = minimum rated breaking strength of the anchor line

Operating: the most severe design environmental condition for normal operations asdefined by the owner or designer

Severe storm: the most severe design environmental condition for severe storm as definedby the owner or designer

Operating –one line failed: following the failure of any one mooring line in the operating condition

Severe storm –one line failed: following the failure of any one mooring line in the severe storm condition.

208. When a dynamic analysis is employed, other safety factors may be considered to thesatisfaction of the RBNA.

209. The defined Operating and Severe Storm are to be the same as those identified for thedesign of the unit, unless the RBNA is satisfied that lesser conditions may be applicable tospecific sites.

210. In general, the maximum wave induced motions of the moored unit about thesteady mean offset shall be obtained by means of model tests. The RBNA may acceptanalytical calculations provided that the proposed method is based on a sound methodologywhich has been validated by model tests.

211. In the consideration of column stabilized MODUs, the value of CS and CH (as indicated inTables T.H4.103.1 and T.H4.103.2 in Part II 2, Section 1, Chapter H of the Rules) may be introduced in the analysis for position keeping mooring systems. The intent ofwind tunnel tests, and of H6.200 – Other stability requirements, may also beconsidered by the RBNA.

212. The RBNA may accept different analysis methodologies provided that it issatisfied that a level of safety equivalent to the one obtained by D2.205 and D2.207 is ensured.

213. The RBNA may give special consideration to an arrangement where theanchoring systems are used in conjunction with thrusters to maintain the unit on station.

300. Windlasses

Guidance

Reference is made to the Ship Rules, Part II, Title 11, Section 3, D2.600.

Eng of guidance

301. The design of the windlass is to provide for adequate dynamic braking capacityto control normal combinations of loads from the anchor, anchor line and anchor handlingvessel during the deployment of the anchors at the maximum design payout speed of thewindlass. The attachment of the windlass to the hull structure is to be designed to withstandthe breaking strength of the anchor line.

302. Each windlass is to be provided with two independent power operated brakesand each brake is to be capable of holding against a static load in the anchor lines of at least50 percent of its breaking strength. Where the RBNA so allows, one of the brakes may bereplaced by a manually operated brake.

303. On loss of power to the windlasses, the power operated braking system shallbe automatically applied and be capable of holding against 50 percent of the total staticbraking capacity of the windlass.

400. Fairleads and Sheaves

401. Fairleads and sheaves shall be designed to prevent excessive bending andwear of the anchor lines. The attachments to the hull or structure are to be such as towithstand the stresses imposed when an anchor line is loaded to its breaking strength.

500. Anchor line

501. The RBNA is to be ensured that the anchor lines are of a type that will satisfy thedesign conditions of the anchoring system.

502. Means are to be provided to enable the anchor lines to be released from the unitafter loss of main power.

503. Means are to be provided for measuring anchor line tensions.

504. Anchor lines are to be of adequate length to prevent uplift of the anchors under themaximum design condition for the anticipated area(s) of operation.

Guidance

Reference is made to the Ship Rules, Part III, Title 61, Section 3, Chapter B

End of guidance

600. Anchors

601. Type and design of anchors are to be to the satisfaction of the RBNA.

602. All anchors are to be stowed to prevent movement during transit.

Guidance

Reference is made to the Ship Rules, Part III, Title 61, Section 3, Chapter B

End of guidance

700. Quality Control

701. Details of the quality control of the manufacturing process of the individualanchoring system components are to be submitted. Components shall be designed,manufactured and tested in accordance with recognized standards insofar as possible andpractical. Equipment so tested shall, insofar as practical, be legibly and permanentlymarked with the RBNA's stamp and delivered with documentation which records the resultsof the tests.

Guidance

Reference is made to the Ship Rules, Part III, Title 61, Section 3, Chapter B

End of guidance

800. Control Stations

801. A manned control station is to be provided with means to indicate anchor linetensions at the individual windlass control positions and to indicate wind speed and direction.

802. Reliable means are to be provided to communicate between locations critical to theanchoring operation.

803. Means are to be provided at the individual windlass control positions to monitoranchor line tension, windlass power load and to indicate amount of anchor line payed out.

900. Towing arrangement

901. The design and arrangement of towing fittings shall have regard to both normal and emergency conditions.

902. Arrangements, equipment and fittings provided in accordance with paragraph D2.901 shall meet the appropriate requirements of the RBNA (*)

(*) Refer to the Guidelines for safe ocean towing (MSC/Circ.884).

Guidance

Reference is made to the RBNA Guide for Towing.

End of guidance

903. Each fitting or item of equipment provided under this regulation shall be clearly marked with any restrictions associated with its safe operation, taking into account the strength of its attachment to the unit's structure.

D3. MANOEUVERING SYSTEM

100. Manoeuvering system

101. For self-propelled units, see Part II, Title 11, Section 3, Chapter G of the Ship Rules.

D4. LIFE SAVING APPLIANCES (LSA)

100. Application

101. This subchapter is applicable to all Life Saving Appliances.

102. The requirements are to be in accordance with the IMO MODU Code, Chapter 10.

103. For units under the Brazilian Flag, the requirements of NORMAM 01 Chapter 9 Section IV apply.

104. For foreign Flag units, National Regulations, if existing, apply, and in the absecnce of those, the IMO MODU Code applies.

105. In any case, the requirements shall not be less stringent than those of the IMO MODU Code.

D5. FIRE FIGHTING EQUIPMENT

See Chapter E below.

D6. ACCESS

100. Means of access

101. Each space within the unit shall be provided with at least one permanent means of access to enable, throughout the life of a unit, overall and close-up inspections and thickness measurements of the unit's structures to be carried out by the RBNA, the company, and the unit's personnel and others as necessary. Such means of access shall comply with the provisions of D6.400 and with the Technical provisions for means of access for inspections, adopted by the Maritime Safety Committee by resolution MSC.133(76), as may be amended by the Organization.

102. Where a permanent means of access may be susceptible to damage during normal operations or where it is impracticable to fit permanent means of access, the RBNA may allow, in lieu thereof, the provision of movable or portable means of access, as specified in the Technical provisions, provided that the means of attaching, rigging, suspending or supporting the portable means of access forms a permanent part of the unit's structure. All portable equipment shall be capable of being readily erected or deployed by the unit's personnel.

1,3. The construction and materials of all means of access and their attachment to the unit's structure shall be to the satisfaction of the RBNA The means of access shall be subject to inspection prior to, or in conjunction with, its use in carrying out surveys in accordance with Part I Title 02 Section 2 of the Rules.

200. Safe access to holds, tanks, ballast tanks and other spaces

201. Safe access [*] to holds, cofferdams, tanks and other spaces shall be direct from the open deck and such as to ensure their complete inspection. Safe access may be from a machinery space, pumproom, deep cofferdam, pipe tunnel, hold, double hull space or similar compartment not intended for the carriage of oil or hazardous materials where it is impracticable to provide such access from an open deck.

(*) Refer to Recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.864(20).

202. Tanks, and subdivisions of tanks, having a length of 35m or more, shall be fitted with at least two access hatchways and ladders, as far apart as practicable. Tanks less than 35m in length shall be served by at least one access hatchway and ladder. When a tank is subdivided by one or more swash bulkheads or similar obstructions which do not allow ready means of access to the other parts of the tank, at least two hatchways and ladders shall be fitted.

203. Each hold shall be provided with at least two means of access as far apart as practicable. In general, these accesses shall be arranged diagonally, e.g., one access near the forward bulkhead on the port side, the other one near the aft bulkhead on the starboard side.

300. Access manual

301. A unit's means of access to carry out overall and close-up inspections and thickness measurements shall be described in an access manual which may be incorporated in the unit's operating manual. The manual shall be updated as necessary, and an updated copy maintained on board. The structure access manual shall include the following for each space:

a. plans showing the means of access to the space, with appropriate technical specifications and dimensions;

b. plans showing the means of access within each space to enable an overall inspection to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate from where each area in the space can be inspected;

c. plans showing the means of access within the space to enable close-up inspections to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate the positions of critical structural areas, whether the means of access is permanent or portable and from where each area can be inspected;

d. instructions for inspecting and maintaining the structural strength of all means of access and means of attachment, taking into account any corrosive atmosphere that may be within the space;

e. instructions for safety guidance when rafting is used for close-up inspections and thickness measurements;

f. instructions for the rigging and use of any portable means of access in a safe manner;

g. an inventory of all portable means of access; and

h. . records of periodical inspections and maintenance of the unit's means of access.

302. For the purpose of this paragraph "critical structural areas" are locations which have been identified from calculations to require monitoring or from the service history of similar or sister units to be sensitive to cracking, buckling, deformation or corrosion which would impair the structural integrity of the unit.

400. General technical specifications

401. For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also provide a clear opening to facilitate the hoisting of an injured person from the bottom of a confined space.

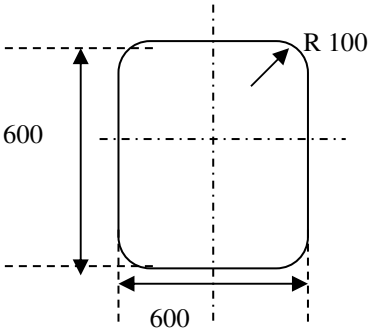
402. The minimum clear opening shall not be less

than 600 mm x 600 mm. When access to a hold is arranged through a flush manhole in the deck or a hatch, the top of the ladder shall be placed as close as possible to the deck or hatch coaming. Access hatch coamings having a height greater than 900mm shall also have steps on the outside in conjunction with the ladder.

403. For access through vertical openings, or manholes, in swash bulkheads, floors, girders and web frames providing passage through the length and breadth of the space, the minimum opening shall be not less than 600mm x 800mm at a height of not more than 600mm from the bottom shell plating unless gratings or other footholds are provided.

Guidance

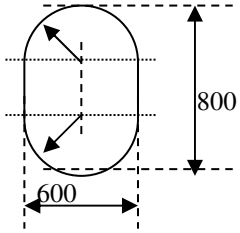
The term"minimum opening larger than600x600mm" means thatsuchopenings are tohave radiiof 100mm at the maximum:



E

The term "minimum opening greater than 600 x 800 mm" also includes openings in dimensions below:

Radius 300



End of guidance

D7. REQUIREMENTS FOR HAZARDOUS AREAS

100. Classification of hazardous areas

101. For the purpose of machinery and electrical installations, hazardous areas are classified as in D7.200 a 400. 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 should be classified in accordance with Subchapter D7..

200. Hazardous areas zone 0

201. 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.

300. Hazardous areas zone 1

301. 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.

302. 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.

303. 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.

304. Enclosed spaces that are on the drill floor and which are not separated by a solid floor from the spaces in D7.302.2.

305. In outdoor or semi-enclosed locations, except as provided for in D7.302, the area within 1.5 m from the boundaries of any openings to equipment which is part of the mud system as specified in D7.301, any ventilation outlets of zone 1 spaces, or any access to zone 1 spaces.

306. 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.

400. Hazardous areas zone 2

401. 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.

402. Outdoor locations within the boundaries of the drilling derrick up to a height of 3 m above the drill floor.

403. 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.

404. In outdoor locations below the drill floor, within a radius of 1.5 m area beyond the zone 1 area as specified in D7.303.

405. The areas 1.5 m beyond the zone 1 areas specified in D7.305 and beyond the semi-enclosed locations specified in D7.302.

406. Outdoor areas within 1.5 m of the boundaries of any ventilation outlet from or access to a zone 2 space.

407. 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.

408. Air locks between a zone 1 and a non-hazardous area.

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

501. Except for operational reasons, access doors or other openings should 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 D7.300 or D7.400 and having a direct access to any zone 1 location or zone 2 location becomes the same zone as the location except that:

a. an enclosed space with direct access to any zone 1 location can be considered as zone 2 if:

   i. the access is fitted with a self-closing gastight door opening into the zone 2 space,

   ii. ventilation is such that the air flow with the door open is from the zone 2 space into the zone 1 location, and

   iii. loss of ventilation is alarmed at a manned station;

b. an enclosed space with direct access to any zone 2 location is not considered hazardous if:

   i. the access is fitted with a self-closing gastight door that opens into the non-hazardous location,

   ii. ventilation is such that the air flow with the door open is from the non-hazardous space into the zone 2 location, and

   iii. loss of ventilation is alarmed at a manned station;

c. an enclosed space with direct access to any zone 1 location is not considered hazardous if:

   i. the access is fitted with two self-closing gastight doors forming an airlock,

   ii. the space has ventilation overpressure in relation to the hazardous space, and

   iii. loss of ventilation overpressure is alarmed at a manned station.

502. Where ventilation arrangements of the intended safe space are considered sufficient by the RBNA 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.

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

504. Hold-back devices should not be used on self-closing gastight doors forming hazardous area boundaries.

600. Ventilation of hazardous spaces

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

602. All air inlets for hazardous enclosed spaces should be located in non-hazardous areas.

603. Each air outlet should 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.

604. Where the ventilation duct passes through a hazardous area of a higher level, the ventilation duct should have overpressure in relation to this area; where the ventilation duct passes through a hazardous area of a lower level, the ventilation duct should have underpressure in relation to this area.

605. Ventilation systems for hazardous spaces should be independent from those for non-hazardous spaces.

D8. EMERGENCY CONDITIONS DUE TO DRILLING OPERATIONS

100. Emergency conditions due to drilling operations

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

a. ventilation systems, except fans necessary for supplying combustion air to prime movers for the production of electrical power;

b. main generator prime movers, including the ventilation systems for these;

c. emergency generator prime movers.

102. In the case of units using dynamic positioning systems as a sole means of position keeping, special consideration may be given to the selective disconnection or shutdown of machinery and equipment associated with maintaining the operability of the dynamic positioning system in order to preserve the integrity of the well.

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

104. Shutdown systems that are provided to comply with D8.101 should 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.

105. Equipment which is located in spaces other than enclosed spaces and which is capable of operation after shutdown as given in D8.101.1 should be suitable for installation in zone 2 locations. Such equipment which is located in enclosed spaces should be suitable for its intended application to the satisfaction of the Administration. At least the following facilities should be operable after an emergency shutdown:

a. . emergency lighting under in Part II, Title MODU, Section 7, F5.306.a.i to F5.306.a.iv for half an hour;

b. blow-out preventer control system;

c. general alarm system;

d. public address system; and

e. battery-supplied radiocommunication installations.

D9. HULL ACCESSORIES AND FITTINGS

100. Handrails

101. All walkways and side throughways of the vessel shall be provided with handrails at least on one side.

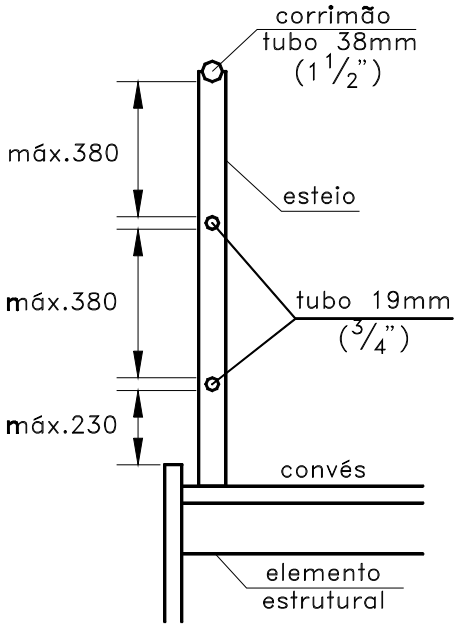
102. The handrails will be built with a pipe at the top, two rods in intermediate lines below, brackets spaced not exceeding three frames apart and an overall height of about 1.05 m.

103. The top tube, the stays and the embedding to the hull are to be aligned with a structural element, and shall withstand a horizontal load on upper edge of 78.5 N/m (80 kgf/m), so that the tensile stress meets the equation:

$$\sigma c = \sqrt{\sigma^2 + 3 \times \tau^2} \quad = 15{,}6 \text{ daN/mm}^2 \quad (16 \text{ kgf/mm}^2)$$

104. The following spaces between elements are required:

FIGURE F.D9.1304.1 – HAND-RAILS



200. Bulwark

201. Efficient bulwarks or guard rails are to be fitted on allexposed parts of the freeboard and superstructure decks.

202. The stresses on the deck connection shall be calculated for the following horizontal forces applied in its upper flange or handrail:

a. for the Mention O2: 200 kgf/m; and

b. for the Mention O1: 100 kgf/m.

203. As a Rule, the spacing of bulwark stanchions is not toexceed 1,8 m or, when the stanchions are close to the gangwayports, 1,2 m. As far as practicable, stanchions are tocoincide with beams.

300. Gangways – Surfaces

301. Satisfactory means are to be providedfor safe move of personnel on board, in particularbetween accommodation and work areas.

302. Gangways, stairs and passages exposed to environment areto be provided with a non-slip surface and fittedwith guard rails.

400. Helideck safety net

401. A 1500 mm wide safety net, with flexible non-combustiblenetting is to be provided around helideck.

500. Freeing ports

501. For surface units, the relevant provisions of Part II, Title 11, Section 3, Chapter D, Subchapter D9 of the Ship Rules are applicableto all types ofunits.

502. Exposed decks: Freeing ports of sufficient section are to be provided for drainage of water from exposed decks.

CHAPTER E
FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

CHAPTER CONTENTS

E1. GENERAL

100. Application

200. Alternative design and arrangements

201. When fire safety design or arrangements deviate from the prescriptive provisions of the Code, alternative design and arrangements shall be carried out in accordance with SOLAS regulation II-2/17.

E2. STRUCTURAL FIRE PROTECTION

100. Application

101. These provisions have been formulated principally for units having their hull superstructure, structural bulkheads, decks and deckhouses constructed of steel.

102. Units constructed of other materials may be accepted, provided that, in the opinion of the RBNA, they provide an equivalent standard of safety.

103. Structural fire protection details, materials and methods of construction shall be in accordance with the FTP Code, as applicable, and SOLAS regulations II-2/5.3 and II-2/6, as applied to cargo ships.

200. Fire integrity of bulkheads and decks

201. In addition to complying with the specific provisions for fire integrity of bulkheads and decks in this subchapter and in subchapterE3, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables T.E2.201.1 and T.E2.201.2.

202. Exterior boundaries of superstructures and deckhouses enclosing accommodation, including any overhanging decks which support such accommodation, shall be constructed to “A-60” standard for the whole of the portion which faces and is within 30 m of the centre of the rotary table.

203. For units that have a movable substructure the 30 m shall be measured with the substructure at its closest drilling position to the accommodation. The RBNA may accept equivalent arrangements.

204. The following provisions shall govern application of the tables:

205. Tables T.E2.201.1 and T.E2.201.2 shall apply respectively to the bulkheads and decks separating adjacent spaces.

206. For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk, as shown in categories (a) to (k) below. The title of each category is intended to be typical rather than

restrictive. The letter preceding each category refers to the applicable column or row in the tables:

a. **Control stations**are spaces as defined in Part I, Title MODU, Section 1, A2.114.

b. **Corridors means** corridors and lobbies.

c. **Accommodation spaces** are spaces as defined in section 1.3, excluding corridors, lavatories and pantries containing no cooking appliances.

d. **Stairways** are interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto. In this connection a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

e. **Service spaces (low risk)** are lockers, store-rooms and working spaces in which flammable materials are not stored, drying rooms and laundries.

f. **Machinery spaces of category A** are spaces as defined in Part I, Title MODU, Section 1, A2.137.

g. **Other machinery space***s* are spaces as defined in Part I, Title MODU, Section 1, A2.136 other than machinery spaces of category A.

h. **Hazardous areas** are areas as defined in Part I, Title MODU, Section 1, A2.129.

i. **Service spaces (high risk**) are lockers, store-rooms and working spaces in which flammable materials are stored, galleys, pantries containing cooking appliances, paint rooms and workshops other than those forming part of the machinery space.

j. **Open decks** are open deck spaces, excluding hazardous areas.

k. **Sanitary and similar sp**aces are communal sanitary facilities such as showers, baths, lavatories, etc., and isolated pantries containing no cooking appliances. Sanitary facilities which serve a space and with access only from that space shall be considered a portionof the space in which they are located.

TABLE E2.201.1 - 9-1 – FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

Spaces		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Control stations	(1)	A-0[(d)]	A-0	A-60	A-0	A-15	A-60	A-15	A-60[(e)]	A-60	*	A-0
Corridors	(2)		C	B-0	B-0 A-0[(b)]	B-0	A-60	A-0	A-0[(e)]	A-0	*	B-0
Accommodation spaces	(3)			C	B-0 A-0[(b)]	B-0	A-60	A-0	A-0[(e)]	A-0	*	C
Stairways	(4)				B-0 A-0[(b)]	B-0 A-0[(b)]	A-60	A-0	A-0[(e)]	A-0	*	B-0 A-0[(b)]
Service spaces (low risk)	(5)					C	A-60	A-0	A-0	A-0	*	B-0
Machinery spaces of category A	(6)						*[(a)]	A-0[(a)]	A-60	A-60	*	A-0
Other machinery spaces	(7)							A-0[(a)(c)]	A-0	A-0	*	A-0
Hazardous areas	(8)									A-0	–	A-0
Service spaces (high risk)	(9)									A-0[(c)]	*	A-0
Open decks	(10)										–	*
Sanitary and similar spaces	(11)											C

Where the space contains an emergency power source or components of an emergency power source adjoining a space containing a ship's service generator or the components of a ship's service generator, the boundary bulkhead or deck between those spaces shall be an "A-60" class division.

For clarification as to which note applies see E3.103 and E3.105.

Where spaces are of the same numerical category and superscript "c" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g., in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

Bulkheads separating the navigating bridge, chartroom and radio room from each other may be "B-0" rating.

An engineering evaluation shall be conducted in accordance with E3.101. In no case shall the bulkhead or deck rating be less than the value indicated in the tables.

Where an asterisk appears in the tables, the division shall be of steel or equivalent material, but need not be of "A" class standard. However, where a deck is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke.

TABLE E2.201.2 - 9-2 – FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0[(e)]	A-0	*	A-0
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0[(e)]	A-0	*	*
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0[(e)]	A-0	*	*
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0[(e)]	A-0	*	A-0
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	*[(a)]	A-60	A-60	A-60	*	A-0
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0[(a)]	*[(a)]	A-0	A-0	*	A-0
Hazardous areas	(8)	A-60[(e)]	A-0[(e)]	A-0[(e)]	A-0[(e)]	A-0	A-60	A-0	–	A-0	*	A-0
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0[(c)]	*	A-0
Open decks	(10)	*	*	*	*	*	*	*	–	*	–	*
Sanitary and similar spaces	(11)	A-0	A-0	*	A-0	*	A-0	A-0	A-0	A-0	*	*

Where the space contains an emergency power source or components of an emergency power source adjoining a space containing a ship's service generator or the components of a ship's service generator, the boundary bulkhead or deck between those spaces shall be an "A-60" class division.

For clarification as to which note applies seeE3.102 and E3.105.

Where spaces are of the same numerical category and superscript "c" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g., in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

Bulkheads separating the navigating bridge, chartroom and radio room from each other may be "B-0" rating.

An engineering evaluation shall be conducted in accordance with E3.101. In no case shall the bulkhead or deck rating be less than the value indicated in the tables.

Where an asterisk appears in the tables, the division shall be of steel or equivalent material, but need not be of "A" class standard. However, where a deck is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke.

207. Continuous "B" class ceilings or linings in association with the relevant decks or bulkheads may be accepted as contributing wholly or in part to the required insulation and integrity of a division.

208. In approving structural fire protection details, the RBNAshall consider the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead shall be carried past the penetration, intersection or terminal point for a distance of at least 450 mm in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of "A" class standard having insulation of different values, the insulation with the higher value shall continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 mm.

209. Windows and sidescuttles, with the exception

of navigating bridge windows, shall be of the non-opening type. Navigating bridge windows may be of the opening type provided the design of such windows permits rapid closure. The RBNA may permit windows and sidescuttles outside hazardous areas to be of the opening type.

210. The fire resistance of doors shall, as far as practicable, be equivalent to that of the division in which they are fitted. External doors in superstructures and deckhouses shall be constructed to at least "A-0" class standard and be self-closing, where practicable.

211. Self-closing doors in fire rated bulkheads shall not be fitted with hold-back hooks. However, hold-back arrangements incorporating remote release fittings of the fail-safe type may be utilized.

E3. PROTECTION OF ACCOMMODATION SPACES, SERVICE SPACES AND CONTROL STATIONS

100. Protection of accommodation spaces, service spaces and control stations

101. In general, accommodation spaces, service spaces and control stations shall not be located adjacent to hazardous areas. However, where this is not practicable, an engineering evaluation shall be performed to ensure that the level of fire protection and blast resistance of the bulkheads and decks separating these spaces from the hazardous areas are adequate for the likely hazard.

Guidance

An A-class bulkhead may be capable of withstanding a blast pressure of about 0,01 N/mm2 (0,1 bar).

Typical explosion pressures expected from the ignition of hydrocarbon vapours during a blowout approach the range of 0,02 to 0,04 N/mm2 (0,2-0,4 bar).

Thus, without further means of blast protection, personnel cannot be effectively shielded from a drill floor expolsion by A-class bulkheads.

(Source: US Coastguard 2011 Report of the Investigation into the Explosion,Fire and Sinking aboard the Moblie Offshore Drilling Unit DEEPWATER HORIZON on April 20, 2010).

End of guidance

102. All bulkheads that are to be "A" class divisions shall extend from deck to deck and to the deckhouse side or other boundaries.

103. All bulkheads forming "B" class divisions shall extend from deck to deck and to the deckhouse side or other boundaries, unless continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining. In corridor bulkheads, ventilation openings may be permitted only in and under the doors of cabins, public spaces, offices and sanitary spaces. The openings shall be provided only in the lower half of the door. Where such an opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m^2. When such an opening is cut in a door it shall be fitted with a grille made of non-combustible material. Such openings shall not be provided in a door in a division forming a stairway enclosure.

104. Stairs shall be constructed of steel or equivalent material.

105. Stairways which penetrate only a single deck shall be protected at least at one level by "A" or "B" class divisions and self-closing doors so as to limit the rapid spread of fire from one deck to another. Personnel lift trunks shall be protected by "A" class divisions. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by "A" class divisions and protected by self-closing doors at all levels.

106. Air spaces enclosed behind ceilings, panellings or linings shall be divided by close fitting draught stops spaced not more than 14 m apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

107. Except for insulation in refrigerated compartments, insulation material, pipe and vent duct lagging, ceilings, linings and bulkheads shall be of non-combustible material. Insulation of pipe fittings for cold service systems and vapour barriers and adhesives used in conjunction with insulation need not be non-combustible but they shall be kept to a minimum and their exposed surfaces shall have low-flame spread characteristics *. In spaces where penetration of oil products is possible, the surfaces of the insulation shall be impervious to oil or oil vapours.

* Refer to Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials, adopted by the Organization by resolution A.653(16), in conjunction with Guidelines on the evaluation of fire hazard properties of materials, adopted by the Organization by resolution A.166(ES.IV) and Annex 1, Part 1 of the International Code for Application of Fire Test Procedures (FTP Code).

108. The framing, including grounds and the joint pieces of bulkheads, linings, ceilings and draught stops, shall be of non-combustible material.

109. All exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces in accommodation and service spaces and control stations shall have low-flame spread characteristics. Exposed surfaces of ceilings in

accommodation and service spaces and control stations shall have low-flame spread characteristics.

110. Bulkheads, linings and ceilings may have combustible veneers provided that the thickness of such veneers shall not exceed 2.5 mm within any space other than corridors, stairway enclosures and control stations where the thickness shall not exceed 1.5 mm. Combustible materials used on these surfaces shall have a calorific value * not exceeding 45 mJ/m^2 of the area for the thickness used.

* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, Reaction to fire tests for building products – Determination of the heat of combustion.

111. Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, this being determined in accordance with the FTP Code.

112. Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the FTP Code.

113. Ventilation ducts shall be of non-combustible material. Short ducts, however, not generally exceeding 2 m in length and with a cross-sectional area not exceeding 0.02 m^2 need not be non-combustible, subject to the following conditions:

a. these ducts shall be of a material which, in the opinion of the RBNA, has a low fire risk;

b. they may only be used at the end of the ventilation device;

c. they shall not be situated less than 600 mm, measured along the duct, from where it penetrates any “A” or “B” class division including continuous “B” class ceilings.

114. Where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m^2 passes through “A” class bulkhead or decks, the opening shall be lined with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the deck pierced. Where ventilation ducts with a cross-sectional area exceeding 0.02 m^2 pass through class “A” bulkheads or decks, the opening shall be lined with a steel sheet sleeve unless the ducts passing through the bulkheads or decks are of steel in the vicinity of penetrations through the deck or bulkhead; the ducts and sleeves at such places shall comply with the following:

a. The ducts or sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes. Equivalent penetration protection may be provided to the satisfaction of the RBNA.

b. Ducts with a cross-sectional area exceeding 0.075 m^2, except those serving hazardous areas, shall be fitted with fire dampers in addition to meeting the provisions of E3.114.a1. The fire damper shall operate automatically but shall also be capable of being closed manually from both sides of the bulkhead or deck.The damper shall be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by “A” class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. The RBNA may, given special considerations, permit operation from one side of a division only.

115. In general, ventilation systems for machinery spaces of category A, galleys and hazardous areas shall be separated from each other and from the ventilation systems serving other spaces. Ducts serving hazardous areas shall not pass through accommodation spaces, service spaces, or control spaces. Ducts provided for the ventilation of machinery spaces of category A and galleys shall not pass through accommodation spaces, control stations or service spaces unless:

a. the ducts are constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm, having a thickness obtained by interpolation;

b. the ducts are suitably supported and stiffened;

c. the ducts are fitted with automatic fire dampers close to the boundaries penetrated; and

d. the ducts are insulated to “A-60” class standard from the machinery spaces or galleys to a point at least 5 m beyond each fire damper;

e. or

f. the ducts are constructed of steel in accordance with E3.115.a and E3.115.b2; and

g. the ducts are insulated to “A-60” class standard throughout the accommodation spaces, service spaces or control stations.

116. Ducts provided for the ventilation of accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys or hazardous areas. However, the RBNA may permit a relaxation from these provisions, except for the ducts passing through hazardous areas, provided that:

a. the ducts where they pass through a machinery space of category A or a galley are constructed of steel in accordance with E3.115.a and E3.115.b;

b. automatic fire dampers are fitted close to the boundaries penetrated; and

c. the integrity of the machinery space or galley boundaries is maintained at the penetrations; or

d. the ducts where they pass through a machinery space of category A or a galley are constructed of steel in accordance with paragraphs E3.115.a and E3.115.b; and

e. are insulated to "A-60" standard within the machinery space or galley.

117. Ventilation ducts with a cross-sectional area exceeding 0.02 m^2 passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 mm in length divided preferably into 450 mm on each side of the bulkhead unless the duct is of steel for this length.

118. Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be of equivalent fire integrity to "A" class divisions.

119. Each galley exhaust duct shall be fitted with:

a. a grease trap readily removable for cleaning;

b. a fire damper located in the galley end of the duct which is automatically and remotely operated and, in addition a remotely operated fire damper located in the exhaust end of the duct;

c. arrangements, operable from within the galley, for shutting off the exhaust fans; and

d. fixed means for extinguishing a fire within the duct.

120. The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated.

121. spaces, control stations, machinery spaces and hazardous areas shall be capable of being stopped from an easily accessible position outside the space being served. The accessibility of this position in the event of a fire in the spaces served shall be specially considered. The means provided for stopping the power ventilation serving machinery spaces or hazardous areas shall be entirely separate from the means provided for stopping ventilation of other spaces.

122. Windows and sidescuttles in boundaries which are required to meet an "A-60" standard which face the drill floor area shall be:

a. constructed to an "A-60" standard; or

b. protected by a water curtain; or

c. fitted with shutters of steel or equivalent material.

123. The ventilation of the accommodation spaces and control stations shall be arranged in such a way as to prevent the ingress of flammable, toxic or noxious gases or smoke from surrounding areas.

E4. MEANS OF ESCAPE

100. Means of escape

101. Within the accommodation spaces, service spaces and control stations the following provisions shall be applied:

a. In every general area which is likely to be regularly manned or in which personnel are accommodated at least two separate escape routes shall be provided, situated as far apart as practicable, to allow ready means of escape to the open decks and embarkation stations. Exceptionally, the RBNA in agreement with the RBNA may permit only one means of escape, due regard being paid to the nature and location of spaces and to the number of persons who might normally be accommodated or employed there.

b. Stairways shall normally be used for means of vertical escape; however, a vertical ladder may be used for one of the means of escape when the installation of a stairway is shown to be impracticable.

c. Every escape route shall be readily accessible and unobstructed and all exit doors along the route shall be readily operable. Dead-end corridors exceeding 7 m in length shall not be permitted.

d. In addition to the emergency lighting, the means of escape in accommodation areas, including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 300 mm above the deck at all points of the escape route, including angles and intersections. The marking shall enable personnel to identify the routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single

light or cut in a lighting strip will not result in the marking being ineffective. Additionally, escape route signs and fire equipment location markings shall be of photoluminescent material or marked by lighting. The RBNAshall ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with the FSS Code.

102. Two means of escape shall be provided from each machinery space of category A. Ladders shall be of steel or other equivalent material. In particular, one of the following provisions shall be complied with:

a. two sets of ladders, as widely separated as possible, leading to doors in the upper part of the space, similarly separated and from which access is provided to the open deck. One of these ladders shall be located within a protected enclosure that satisfies T.E2.201.1 and T.E2.201.2, category (4), from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The enclosure shall have minimum internal dimensions of at least 800 mm by 800 mm, and shall have emergency lighting provisions; or

b. one ladder leading to a door in the upper part of the space from which access is provided to the open deck. Additionally, in the lower part of the space, in a position well separated from the ladder referred to, a steel door capable of being operated from each side shall be provided with access to a safe escape route from the lower part of the space to the open deck.

103. From machinery spaces other than those of category A, escape routes shall be provided to the satisfaction of the RBNA having regard to the nature and location of the space and whether persons are normally employed there.

104. Lifts shall not be considered as forming one of the required means of escape.

105. Consideration shall be given by the RBNA to the siting of superstructures and deckhouses such that in the event of fire at the drill floor at least one escape route to the embarkation position and survival craft is protected against radiation effects of that fire as far as practicable.

106. Stairways and corridors used as a means of escape shall meet the provisions of paragraph 13.3 of the FSS Code.

E5. FIRE SAFETY SYSTEMS

Note:
Fire safety systems shall be in accordance with the FSS Code, as applicable.

E6. EMERGENCY ESCAPE BREATHING DEVICES

100. EEBD

101. Emergency escape breathing devices (EEBDs) shall comply with the FSS Code. Spare emergency escape breathing devices shall be kept on board to the satisfaction of the RBNA.

102. Emergency escape breathing devices shall be provided as follows:

a. In machinery spaces of category A containing internal combustion machinery used for main propulsion, EEBDs shall be positioned as follows:

   i. one (1) EEBD in the engine control room, if located within the machinery space;

   ii. one (1) EEBD in workshop areas. If there is, however, a direct access to an escape way from the workshop, an EEBD is not required; and

   iii. one (1) EEBD on each deck or platform level near the escape ladder constituting the second means of escape from the machinery space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

   iv. Alternatively, a different number or location may be determined by the RBNA taking into consideration the layout and dimensions or the normal manning of the space.

b. For machinery spaces of category A other than those containing internal combustion machinery used for main propulsion, one (1) EEBD shall, as a minimum, be provided on each deck or platform level near the escape ladder constituting the second means of escape from the space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

c. For other machinery spaces, the number and location of EEBDs are to be determined by the RBNA.

E7. FIRE PROTECTIN AND EXTINCTION

100. Fire plan contents

101. Fire protection arrangements and fire extinguishing systems are to be in accordance with theRules as specified herein. Fire control plans are to be submitted for review on which thefollowing, as a minimum, should be clearly shown:

a. Locations of fire control stations;

b. Various fire sections enclosed by various classes of fire divisions;

c. Arrangement of fire detectors and manual fire alarm stations;

d. Arrangement of combustible gas detectors;

e. Arrangement of hydrogen sulphide gas detectors;

f. Locations of respiratory protection equipment for hydrogen sulphide;

g. General alarm actuating positions;

h. Arrangement of various fire-extinguishing appliances;

i. Locations of Fighter's Outfits;

j. Location of Helicopter Crash Kit;

k. Arrangement of water spray nozzles and sprinklers (if fitted);

l. Locations of emergency shutdown (such as oil fuel source shutdown, engine shutdown,
m. etc.) stations;

n. The Ventilating system including Fire dampers positions, Ventilating Fans control
o. positions with indication of identification numbers of Ventilating Fans serving each
p. section;

q. Arrangement of fire/watertight doors and their remote control positions;

r. Blowout preventer control positions;

s. Escape route and means of access to different compartments, decks, etc.;

t. Locations of Emergency Escape Breathing Devices (EEBD); and

u. Arrangement of emergency muster stations and life-saving appliances

E8. FIRE PUMPS, FIRE MAINS, HYDRANTS AND HOSES

100. Water fire fighting system

101. **Fire pumps**

a. At least two independently driven power pumps shall be provided, each arranged to draw directly from the sea and discharge into a fixed fire main. However, in units with high suction lifts, booster pumps and storage tanks may be installed, provided such arrangements will satisfy all the provisions of E7.101 to E7.109.

b. At least one of the required pumps shall be dedicated for fire-fighting duties and be available for such duties at all times.

c. The arrangements of the pumps, sea suctions and sources of power shall be such as to ensure that a fire in any one space would not put both the required pumps out of action.

d. The capacity of the required pumps shall be appropriate to the fire-fighting services supplied from the fire main. Where more pumps than required are installed, their capacity shall be to the satisfaction of the RBNA.

e. Each pump shall be capable of delivering at least one jet simultaneously from each of any two fire hydrants, hoses and 19 mm nozzles while maintaining a minimum pressure of 0.35 N/mm^2 at any hydrant. In addition, where a foam system is provided for protection of the helicopter deck, the pump shall be capable of maintaining a pressure of 0.7 N/mm^2 at the foam installation. If the water consumption for any other fire protection or fire-fighting purpose shall exceed the rate of the helicopter deck foam installation, this consumption shall be the determining factor in calculating the required capacity of the fire pumps.

f. Where either of the required pumps is located in a space not normally manned and, in the opinion of the RBNA, is relatively far removed from working areas, suitable provision shall be made for remote start-up of that pump and remote operation of associated suction and discharge valves.

g. Except as provided E7.102, sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil.

h. Every centrifugal pump which is connected to the fire main shall be fitted with a non-return valve.

i. Relief valves shall be provided in conjunction with all pumps connected to the fire main if the pumps are capable of developing a pressure exceeding the design pressure of the fire main, hydrants and

hoses. Such valves shall be so placed and adjusted as to prevent excessive pressure in the fire main system.

102. **Fixed fire main**

a. A fixed fire main shall be provided and be so equipped and arranged as per the present Subchapter E8.

b. The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from the required fire pumps operating simultaneously.

c. With the required fire pumps operating simultaneously, the pressure maintained in the fire mains shall be to the satisfaction of the RBNA and be adequate for the safe and efficient operation of all equipment supplied therefrom.

d. The fire main shall, where practicable, be routed clear of hazardous areas and be arranged in such a manner as to make maximum use of any thermal shielding or physical protection afforded by the structure of the unit.

e. The fire main shall be provided with isolating valves located so as to permit optimum utilization in the event of physical damage to any part of the main.

f. The fire main shall not have connections other than those necessary for fire-fighting purposes.

g. All practical precautions consistent with having water readily available shall be taken to protect the fire main against freezing.

h. Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them.

i. A cock or valve shall be fitted to serve each fire hose so that any fire hose may be removed while the fire pumps are operating.

103. **Fire hoses, nozzles & hydrants**

a. The number and position of the hydrants shall be such that at least two jets of water, not emanating from the same hydrant, one of which shall be from a single length of fire hose, may reach any part of the unit normally accessible to those on board while the unit is being navigated or is engaged in drilling operations. A hose shall be provided for every hydrant.

b. Fire hoses shall be of material approved by the RBNA and be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Their maximum length shall be to the satisfaction of the RBNA. Every fire hose shall be provided with a dual-purpose nozzle and the necessary couplings. Fire hoses, together with any necessary fittings and tools, shall be ready for use at any time and shall be kept in conspicuous positions near the water service hydrants or connections.

c. Fire hoses shall have a length of at least 10 m, but not more than:

i. 15 m in machinery spaces;

ii. 20 m in other spaces and open decks; and

iii. 25 m for open decks with a maximum breadth in excess of 30 m.

d. Nozzles shall comply with the following:

i. Standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the RBNA.

ii. For accommodation and service spaces, a nozzle size greater than 12 mm need not be used.

iii. For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure specified in E7.105 from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

104. **International shore connection:** The surface unit shall be provided with at least one international shore connection complying with SOLAS regulation II-2/10-2.1.7 and the FSS Code. Facilities shall be available enabling such a connection to be used on any side of the unit.

105. **Water supply**

a. At least two water supply sources (sea chests, valves, strainers and pipes) are to be provided and so arranged that one supply source failure will not put all supply sources out of action.

b. For the self-elevating units, the following additional fire water supply measures are to be provided:

i. Water is to be supplied from sea water main filled by at least two submersible pumping systems. One system failure will not put the other system(s) out of function, and

ii. Water is to be supplied from drill water system while unit lifting or lowering. Water storedin the drill water tank(s) is not less than 40 m3 plus

engine cooling water consumptions before unit lifting or lowering. Alternatively, water may be supplied from buffer tank(s) in which sea water stored is not less the quantity as the above mentioned.

E8. FIRE-EXTINGUISHING SYSTEMS

100. Fire extinguishing arrangement in machinery spaces and in spaces containing fired processes

101. In spaces where main or auxiliary oil-fired boilers and other fired processes of equivalent thermal rating are situated, or in spaces containing oil fuel units or settling tanks, the unit shall be provided with the following:

102**.** One of the following fixed fire-extinguishing systems complying with SOLAS regulation II-2/10.4:

a fixed pressure water-spraying system;

a fixed gas fire-extinguishing system;

a fixed high-expansion foam installation.

103. Where the machinery space and spaces containing fired processes are not entirely separate, or if fuel oil can drain from the latter spaces into the machinery space, the combined machinery space and fired process space shall be considered as one compartment.

104. At least two approved portable foam extinguishers or equivalent in each space containing a fired process and each space in which a part of the oil fuel installation is situated. In addition, at least one extinguisher of the same description with a capacity of 9 l for each burner, whereby the total capacity of the additional extinguisher or extinguishers need not exceed 45 l for any one space.

105. A receptacle containing sand, sawdust impregnated with soda, or other approved dry material in such quantity as may be required by the RBNA. An approved portable extinguisher may be provided as an alternative.

106. Spaces containing internal combustion machinery used either for main propulsion or for other purposes, when such machinery has a total power output of not less than 750 kW, shall be provided with the following arrangements:

one of the fixed arrangements required by E8.102.a; and

one approved foam-type extinguisher of not less than 45 l capacity or equivalent in every engine space and one approved portable foam extinguisher for each 750 kW of engine power output or part thereof. The total number of portable extinguishers so supplied shall be not less than two and need not exceed six.

107. The RBNAshall give special consideration to the fire-extinguishing arrangements to be provided in spaces not fitted with fixed fire-extinguishing installations containing steam turbines which are separated from boiler rooms by watertight bulkheads.

108. Where, in the opinion of the RBNA, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in E7.101 to E7.107, there shall be provided in, or adjacent to, that space a number of approved portable fire extinguishers or other means of fire extinction to the satisfaction of the RBNA.

200. Fixed fire extinguishing systems on drilling and areas

a. A fixed water spray system is to be provided to protect drilling area. The minimum waterapplication rate is not less than 20.4 l/min·m2, or

b. At least two dual-purpose (jet/spray) fire monitors are to be installed to cover drillingand well test areas. The minimum capacity of each monitor is not less than 100m3/h.

c. The monitors may be operated either remotely or locally. Monitor arranged for localoperation shall be sited on an accessible protected position.

300. Fixed fire extinguishing systems on mud processing area

301. A suitable fixed foam system is to be provided.

302. The system is to be capable of deliveringfoam solution at a rate of not less than 6.5 l/min·m2 (4.1 l/min·m2 for Aqueous Film FormingFoam or Film-Forming Fluoroprotein Foam) for 15 minutes.

303. Alternatively, a gas fixed fireextinguishing system may be used for enclosed mud processing spaces.

E9. PORTABLE FIRE EXTINGUISHERS IN ACCOMMODATION, SERVICE AND WORKING SPACES

100. Portable fire extinguishers

101. Except for the supplemental arrangements provided in E9.102, portable fire extinguishers in accommodation spaces, service spaces, control stations, machinery spaces of category A, other machinery spaces, cargo spaces, weather deck and other spaces shall be provided in number and arrangement in accordance with the guidance provided by the Organization * to the satisfaction of the RBNA.

102. Table T.E9.102.1 contains supplemental recommendations for number and distribution of additional portable fire extinguishers on mobile offshore drilling units.Where the recommendations in table T.E9.102.1 differ from the guidance provided by the Organization *, the provisions of table T.E9.102.1shall be followed. In all cases, the selection of the fire extinguishing medium shall be based on the fire hazard for the space protected. ** The classes of portable fire extinguishers in the table are only for reference.

* Refer to the Unified Interpretation of SOLAS chapter II-2 on the Number and Arrangement of Portable Fire Extinguishers on Board Ships (MSC.1/Circ.1275).

** Refer to the Improved Guidelines for Marine Portable Fire Extinguishers, adopted by the Organization by resolution A.951(23).

TABLE T.E9.102.1– RECOMMENDED NUMBER AND DISTRIBUTION OF ADDITIONAL PORTABLE EXTINGUISHERS

Type of Space	**Minimum number of extinguishers** *	**Class(es) of extinguisher(s)**
Space containing the controls for the main source of electrical power	1; and 1 additional extinguisher suitable for electrical fires when main switchboards are arranged in the space	A and/or C
Cranes: With electric motors/hydraulics	0	
Cranes: With internal combustion engine	2 (1 in cab and 1 at exterior of engine compartment)	B
Drill floor	2 (1 at each exit)	C
Helidecks	In accordance with section 9.16	B
Machinery spaces of category A	In accordance with section 9.8	B
Machinery spaces of category A which are periodically unattended	At each entrance in accordance with section 9.8 **	B
Main switchboards	2 in the vicinity	C
Mud pits, Mud processing areas	1 for each enclosed space (Travel distance to an extinguisher not to exceed 10 m for open space)	B

inimum size shall be in accordance with paragraph 3.1.1 of chapter 4 of the FSS Code.

portable extinguisher provided for that space may be located outside near the entrance to that space. A portable fire extinguisher placed outside near the entrance to that space may also be considered as satisfying the provisions for the space in which it is located.

E10. FIRE DETECTION AND ALARM SYSTEM

100. General

101. Spaces having a fire risk shall be provided with an automatic firedetection and alarm system.

102. In selecting the type of detectors, their following features shall be taken intoaccount:

a. Capability to detect fire at the incipient stage;

b. Ability to avoid spurious alarm and trips; and

c. Suitability to the located environment.

103. The fire detection main indicator board is to be at a manned control station and isto be clearly to indicate where fire has been detected.

200. Machinery spaces

201. Fire detectors are to be fitted in normally unattended machinery spaces.

202. Detection systems using only thermal detectors, in general, are not to be permitted.

300. Accommodation and service spaces

301. An automatic fire detection and alarm system is to be provided in all accommodation andservice spaces.

302. Accommodation space is to be fitted with smoke detectors.

303. Thermal detectors are to be fitted in galleys.

400. Electrical rooms and control stations

401. Smoke detectors are to be provided in all electrical rooms and control stations.

500. Drilling and mud processing areas

501. Flame or thermal detectors are to be installed in open drilling and/or mud processing areas.

502. Smoke detectors may be used in enclosed mud processing areas.

600. Manually operated alarm system

601. Sufficient manual fire alarm stations are to be installed throughout the accommodationspaces, service spaces and control stations.

602. One manually operated call point is to belocated at each exit. Manually operated call points are to be readily accessible in the corridorsof each deck such that no part of the corridor is more than 20 m from a manually operatedcall point.

603. Measures are to be taken to prevent inadvertent operation of the manual call alarm system.

700. General alarms

701. A general alarm system is to be provided and so installed as to be clearly perceptible inall parts of the unit. Alarm signal devices are to be provided which will produce adistinctive and strong note.

702. The signals used shall be limited to: general emergency, toxic gas (hydrogen sulphide),combustible gas, fire alarm and abandon unit signals.

703. The signals given over the general alarm system shall be supplemented by instructionsover the public address system.

704. At least in the following spaces general alarm is to be capable of being operated:

a. Main control station;

b. Drilling console;

c. Navigating bridge (if any); and

d. Fire control station (if any).

800. Unnatended machinery spaces and remote control

801. A fixed fire detection and fire alarm system shall be installed in:

a. periodically unattended machinery spaces; and

b. machinery spaces where:

i. the installation of automatic and remote control system and equipments has been approved in lieu of continuous manning of the spaces, and

ii. the main propulsion and associated machinery, including the main sources of electrical power, are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

900. Mud system level alarms

901. A suitable audible and visual alarm to indicate significant increase or decrease in the level ofthe contents of the mud pit is to be provided at the control station for drilling operations and atthe mud pit. Equivalent means to indicate possible abnormal conditions in the drilling systemmay be considered by the RBNA.

E.11 FLAMMABLE GAS DETECTION AND ALARM SYSTEM

100. Fixed automatic gas detection and alarm system

101. A fixed automatic gas detection and alarm system shall be provided to the satisfaction of the RBNA so arranged as to monitor continuously all enclosed areas of the unit in which an accumulation of flammable gas may be expected to occur and capable of indicating at the main control point by aural and visual means the presence and location of an accumulation.

102. At least two portable gas monitoring devices shall be provided, each capable of accurately measuring a concentration of flammable gas.

200. Areas for protection

201. Fixed automatic combustible gas detection and alarm systems are to be provided for thefollowing areas:

a. Cellar deck

b. Drill floor

c. Mud pit area

d. Shale shaker area

e. Enclosed spaces containing the open components of mud circulation system from thebell nipple to the mud pits.

f. Ventilation intakes of enclosed machinery spaces contiguous to hazardous areas andcontaining internal combustion engines and boilers;

g. Ventilation intakes and near other openings of accommodation spaces.

300. Alarms

301. The gas detectors are to be connected to an audible and visual alarm system with indicatorson the drill floor and in the main control station. The alarm system is to clearly indicate thelocation and concentration of the gas hazard. The combustible gas detectors are to alarm atnot more than 25% and at 60% of the lower explosive limit (LEL).

400. Portable combustible gas detectors

401. In addition to the fixed automatic gas detection system, two portable combustible gasdetectors are to be provided on the unit.

E12. HYDROGEN SULPHIDE DETECTION AND ALARM SYSTEM

100. Fixed automatic hydrogen sylphide gas detection system

101. A fixed automatic hydrogen sulphide gas detection and alarm system shall be provided to the satisfaction of the RBNA so arranged as to monitor continuously the drilling area, mud processing area and well fluid test area of the unit and capable of giving audible and visual alarm at the main control points. If the alarm at the main control point is unanswered within 2 min, the toxic gas (hydrogen sulphide) alarm and the helideck status light shall be automatically activated.

102. At least two portable hydrogen sulphide gas monitoring devices shall be provided on the unit.

200. Areas for protection

201. A fixed automatic hydrogen sulphide gas detection and alarm system are to be provided for the following areas:

a. Drill area;

b. Mud processing area; and

c. Well test area.

300. Alarms

301. The detectors are to be connected to an audible and visual alarm system with indicators inmain control room. The system is clearly to indicate where gas has been detected.

302. Low level alarm set at 10 ppm and high level alarm set not higher than 300 ppm are to bedesigned. The high level alarm is to activate an evacuation alarm.

303. If the alarm at the main control point is unanswered within 2 min, the toxic gas (hydrogensulphide) alarm and the helideck status light is to be automatically activated.

400. Portable hydrogen sulphide gas detectors

401. At least two portable hydrogen sulphide gas monitoring devices shall be provided on theunit.

500. Respiratory protection equipment for hydrogen sulphide

501. A self-contained breathing apparatus (SCBA) positive-pressure/pressure-demandbreathing equipment with full-face piece and rated for a minimum of 30 minutes is to beprovided for each person in working areas where hydrogen sulphide may be encountered,and each person in other areas is to be provided with a SCBA rated for a minimum of 15minutes, or

502. A positive-pressure/pressure-demand air line breathing equipment coupled with aSCBA equipped low pressure warning alarm and rated for a minimum of 15 minutes is to beprovided for each person on board the unit.

503. Breathing air supply line stations are to be provided at least in the following areas:

a. Living quarter;

b. Muster/evacuation area;

c. Drilling areas;

d. Mud processing areas;

e. Other working areas.

600. Alarms and public address:general alarms

601. A general alarm system is to be provided and so installed as to be clearly perceptible inall parts of the unit. Alarm signal devices are to be provided which will produce adistinctive and strong note.

602. The signals used shall be limited to: general emergency, toxic gas (hydrogen sulphide),combustible gas, fire alarm and abandon unit signals.

603. The signals given over the general alarm system shall be supplemented by instructionsover the public address system.

604. At least in the following spaces general alarm is to be capable of being operated:

a. Main control station;

b. Drilling console;

c. Navigating bridge (if any); and

d. Fire control station (if any).

700. Alarms and public address: mud system level alarms

701. A suitable audible and visual alarm to indicate significant increase or decrease in the level ofthe contents of the mud pit is to be provided at the control station for drilling operations and atthe mud pit. Equivalent means to indicate possible abnormal conditions in the drilling systemmay be considered by the RBNA.

800. Ventilation system alarm

See F2.300.

900. Public address

901. The public address system is to be a loudspeaker installation enabling thebroadcast of messages into all spaces where personnel are normally present and musterstations.

902. It is to allow for the broadcast of messages from navigation bridge, central controlroom, emergency response centre, engine control room, ballast control station, jackingcontrol station and drilling console.

903. It is to be installed with regard to acoustically marginalconditions and not require any action from the addressee. It is to be protected againstunauthorized use.

904. The minimum sound pressure levels for broadcasting emergency announcementsare to be:

a. In interior spaces 75dB(A) and at least 20dB(A) above the speech interference level;

b. In exterior spaces 80dB(A) and at least 15dB(A) above the speech interference level.

E13. FIRE-FIGHTERS' OUTFITS

100. Fire-fighters outfit

101. At least two fire-fighters' outfits complying with the relevant requirements of the FSS Code shall be provided, each with portable instruments for measuring oxygen and flammable vapour concentrations acceptable to the RBNA.

102. Two spare charges shall be provided for each required breathing apparatus. Units that are equipped with suitably located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus.

103. The fire-fighters' outfits shall be kept ready for use in an easily accessible location that is permanently and clearly marked. They shall be stored in two or more widely separated locations.

E14. RECHARGING OF AIR CYLINDERS

100. Recharging of air cylinders

101. The apparatus for recharging air cylinders, if provided, shall have its power supplied from the emergency supply or be independently diesel-powered, or be so constructed or equipped that the air cylinders may be used immediately after recharging.

102. The apparatus shall be suitably located in a sheltered space above main deck level on the unit.

103. Intakes for air compressors shall draw from a source of clean air.

104. The air shall be filtered after compression to eliminate compressor oil contamination.

105. The recharging capacity shall meet the requirements of SOLAS regulation II-2/10.10.2.6.

106. The equipment and its installation shall be to the satisfaction of the RBNA.

E15. ARRANGEMENTS IN MACHINERY AND WORKING SPACES

100. Arrangements in machinery and working spaces

101. Means shall be provided for stopping ventilating fans serving machinery and working spaces and for closing all doorways, ventilators, annular spaces around funnels and other openings to such spaces. These means shall be capable of being operated from outside such spaces in case of fire.

102. Machinery driving forced and induced draught fans, electric motor pressurization fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps shall be fitted with remote controls situated outside the space concerned so that they may be stopped in the event of a fire arising in the space in which they are located.

103. Every oil fuel suction pipe from a storage, settling or daily service tank situated above the double bottom shall be fitted with a cock or valve capable of being closed from outside the space concerned in the event of a fire arising in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel, valves on the tanks shall be fitted but control in the event of fire may be effected by means of an additional valve on the pipeline or lines outside the tunnel or tunnels.

E16. PROVISIONS FOR HELICOPTER FACILITIES

Note: reference is made to ths Ship Rule, Part II, Title 11, Section 3, Chapter E, Subchatper E.18.

100. Helicopter facilities

101. This section provides additional measures in order to address the fire safety objectives for units fitted with facilities for helicopters and meets the following functional provisions:

a. helideck structure shall be adequate to protect the unit from the fire hazards associated with helicopter operations;

b. fire-fighting appliances shall be provided to adequately protect the unit from the fire hazards associated with helicopter operations;

c. refuelling facilities and operations shall provide the necessary measures to protect the unit from the fire hazards associated with helicopter operations; and

d. helicopter facility operation manuals, which may be included in the operation manual and training shall be provided.

102. The construction of the helidecks shall be of steel or other equivalent materials. If the helideck forms the deckhead of a deckhouse or superstructure, it shall be insulated to “A-60” class standard. If the RBNA permits aluminium or other low melting point metal construction that is not made equivalent to steel, the following provisions shall be satisfied:

a. ifthe helideck is cantilevered over the side of the unit, after each fire that may have an effect on the structural integrity of the helideck or its supporting structures, the helideck shall undergo a structural analysis to determine its suitability for further use; and

b. if the helideck is located above the unit’s deckhouse or similar structure, the following conditions shall be satisfied:

   i. the deckhouse top and bulkheads under the helideck shall have no openings;

   ii. windows under the helideck shall be provided with steel shutters; and

   iii. after each fire on the helideck or supporting structure the helideck shall undergo a structural analysis to determine its suitability for further use.

103. A helideck shall be provided with both a main and an emergency means of escape and access for fire fighting and rescue personnel. These shall be located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

104. In close proximity to the helideck, the following fire-fighting appliances shall be provided and stored near the means of access to that helideck:

a. at least two dry powder extinguishers having a total capacity of not less than 45 kg but not less than 9 kg each;

b. carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;

c. a foam application system consisting of monitors

or foam-making branch pipes capable of delivering foam to all parts of the helideck in all weather conditions in which the helideck is intended to be available for helicopter operations. The minimum capacity of the foam production system will depend upon the size of the area to be protected, the foam application rate, the discharge rates of installed equipment and the expected duration of application:

i. a minimum application rate of 6 *l*/m^2 within a circle having a diameter equal to the *D*-value;

ii. a minimum of 5 min discharge capability shall be provided;

iii. foam delivery at the minimum application rate shall start within 30 s of system activation;

d. the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those acceptable to the Organization;

* Refer to the International Civil Aviation Organization Airport Services Manual, part 1, Rescue and Fire Fighting, chapter 8, Extinguishing Agent Characteristics, paragraph 8.1.5, Foam Specifications table 8-1, level 'B'.

e. at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;

f. in addition to the provisions of section 9.13, two fire-fighter's outfits; and

g. at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements:

i. adjustable wrench;

ii. blanket, fire-resistant;

iii. cutters, bolt, 600 mm;

iv. hook, grab or salving;

v. hacksaw, heavy duty complete with six spare blades;

vi. ladder;

vii. lift line 5 mm diameter and 30 m in length;

viii. pliers, side-cutting;

ix. set of assorted screwdrivers;

x. harness knife complete with sheath; and

xi. crowbar.

105. Drainage facilities in way of helidecks shall be:

a. constructed of steel or other arrangements providing equivalent fire safety;

b. lead directly overboard independent of any other system; and

c. designed so that drainage does not fall onto any part of the unit.

106. Where the unit has helicopter refuelling, the following provisions shall be complied with:

a. a designated area shall be provided for the storage of fuel tanks which shall be:

i. as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and

ii. . isolated from areas containing a source of vapour ignition;

b. the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;

c. tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;

d. where portable fuel storage tanks are used, special attention shall be given to:

i. design of the tank for its intended purpose;

ii. mounting and securing arrangements;

iii. electric bonding; and

iv. inspection procedures;

e. storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire. Where a gravity-fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;

f. the fuel pumping unit shall be connected to one tank at a time. The piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;

g. . electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;

h. fuel pumping units shall incorporate a device

which will prevent over-pressurization of the delivery or filling hose;

i. equipment used in refuelling operations shall be electrically bonded; and

j. "NO SMOKING" signs shall be displayed at appropriate locations.

E17. STORAGE OF GAS CYLINDERS

100. Gas cylinders

101. Where more than one cylinder of oxygen and more than one cylinder of acetylene are carried simultaneously, such cylinders shall be arranged in accordance with the following:

a. **.** Permanent piping systems for oxyacetylene systems are acceptable provided that they are designed having due regard to standards and codes of practice to the satisfaction of the RBNA.

b. Where two or more cylinders of each gas are intended to be carried in enclosed spaces, separate dedicated storage rooms shall be provided for each gas.

c. Storage rooms shall be constructed of steel, and be well ventilated and accessible from the open deck.

d. **.** Provision shall be made for the expeditious removal of cylinders in the event of fire.

e. "NO SMOKING" signs shall be displayed at the gas cylinder storage rooms.

f. Where cylinders are stowed in open locations means shall be provided to:

i. protect cylinders and associated piping from physical damage;

ii. minimize exposure to hydrocarbons; and

iii. ensure suitable drainage.

102. Fire-extinguishing arrangements for the protection of areas or spaces where such cylinders are stored shall be to the satisfaction of the RBNA.

E18. FIRE CONTROL PLAN

100. Fire control plan

101. A fire control plan complying with SOLAS regulation II-2/15.2.4 shall be permanently exhibited.

E19. OPERATIONAL READINESS AND MAINTENANCE

100. Functional provisions

101. The following functional provisions shall be met:

a. gas detection systems, fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and

b. gas detection systems, fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

102. At all times while the unit is in service, the provisions of E19.101shall be complied with. A unit is not in service when:

a. it is in for repairs or lay up (either at anchor or in port) or in dry-dock;

b. it is declared not in service by the owner or the owner's representative.

103. Operational readiness

a. The following gas detection and fire protection systems shall be kept in good order so as to ensure their intended performance if a fire occurs:

i. structural fire protection including fire-resisting divisions and protection of openings and penetrations in these divisions;

ii. fire detection and fire alarm systems;

iii. gas detection and alarm systems; and

iv. means of escape systems and appliances.

b. Fire-fighting systems and appliances and portable gas detection systems shall be kept in good working order and readily available for immediate use. Portable extinguishers which have been discharged shall be immediately recharged or replaced with an equivalent unit.

104. Maintenance, testing and inspections

a. Maintenance, testing and inspections shall be carried out based on the guidelines developed by the Organization * and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances

* Refer to the Guidelines on maintenance and inspection of fire protection systems and appliances (MSC/Circ.850).

b. The maintenance plan shall be kept on board the unit and be available for inspection whenever required by the RBNA.

c. The maintenance plan shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed:

i. fire mains, fire pumps and hydrants including hoses, nozzles and international shore connections;

ii. fixed fire detection and fire alarm systems;

iii. fixed fire-extinguishing systems and other fire-extinguishing appliances;

iv. . automatic sprinkler, fire detection and fire alarm systems;

v. . ventilation systems including fire and smoke dampers, fans and their controls;

vi. emergency shut down of fuel supply;

vii. . fire doors including their controls;

viii. general emergency alarm systems;

ix. emergency escape breathing devices;

x. portable fire extinguishers including spare charges or spare extinguishers;

xi. portable hydrogen sulphide gas detection monitoring devices;

xii. portable flammable gas and oxygen monitoring devices;

xiii. gas detection and alarm systems; and

xiv. fire-fighter's outfits.

d. The maintenance programme may be computer-based.

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