



GUIDE FOR

VESSELS WITH OIL RECOVERY CAPABILITIES

DECEMBER 2013 (Updated September 2014 – see next page)

**American Bureau of Shipping
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Updates

September 2014 consolidation includes:

- December 2013 version plus Corrigenda/Editorials

Foreword (1 December 2013)

ABS has developed this *Guide for Vessels with Oil Recovery Capabilities*, with the aim of promoting the safety of vessels and personnel by providing specific requirements for tugboats, barges, and other vessels which are intended for service in the event of oil spills and are equipped for the storage of recovered oil floating on the sea. Such units may not be equipped with permanent means for recovering spilled oil floating on the sea and typically do not have fixed piping systems for the transfer of recovered oil overboard. Oil is recovered from the sea by portable or fixed equipment such as oil skimmers and is transferred to these vessels by floating suction pumps operating on the sea surface. Recovered oil is subsequently transferred to shore reception facilities or other vessels by portable pumps.

Since 1 January 2013, requirements for offshore support vessels with oil recovery capabilities are being separately addressed in Part 5, Chapter 6 of the *ABS Rules for Building and Classing Offshore Support Vessels*. Consequently, this Guide relates to vessels classified under the *ABS Rules for Building and Classing Steel Vessels Under 90 Meters* and the *ABS Rules for Building and Classing Steel Barges*, as applicable.

The December 2013 revisions of this Guide are adopted directly from, and are congruent with, the requirements of the *ABS Rules for Building and Classing Offshore Support Vessels*.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of this Guide is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.

GUIDE FOR VESSELS WITH OIL RECOVERY CAPABILITIES

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SECTION 1 Introduction (1 December 2013)

1 Application

The requirements contained in this Guide are intended to promote the safety of tugboats, **barges**, and other similar vessels, which are intended for service in the event of oil spills and are equipped for the storage of recovered oil floating on the sea. Application of these requirements is optional and its compliance is at the request of the vessel's Owner. Unless otherwise noted in this Guide, relevant requirements contained in the *ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length (Under 90m Rules)* and the *ABS Rules for Building and Classing Steel Barges (Barge Rules)*, as applicable, are to be complied with.

3 Classification

Where requested by the Owner, vessels **or barges** which are found to be in compliance with the requirements specified in this Guide and which have been constructed under survey by the Surveyors, will be assigned and distinguished in the *Record* with the following class notations:

3.1 Oil Spill Recovery – Capability Class 1

The notation may be assigned to vessels or barges built in compliance with this Guide for recovery of oil of unknown flash points but not outfitted for the same in accordance with Section 4, and other relevant sections of the *Under 90m Rules* or *Barge Rules*, as applicable, and approved for oil recovery service at the assigned freeboard.

Example: **✘ A1 Towing Vessel (OSR-C1)**

3.3 Oil Spill Recovery – Capability Class 2

The notation may be assigned to vessels or barges built in compliance with this Guide for recovery of oil having a flash point exceeding 60°C (140°F) but not outfitted for the same in accordance with Section 5, and other relevant sections of the *Under 90m Rules* or *Barge Rules*, as applicable, and approved for oil recovery service at the assigned freeboard.

Example: **✘ A1 Towing Vessel (OSR-C2)**

5 Plans and Data

In addition to the plans required by Section 1-1-7 of the *ABS Rules for Conditions of Classification (Part 1)*, Section 1-1-4 and 4-1-1/7 of the *Under 90m Rules*, and Section 1-1-4 and 4-1-2/1 of the *Barge Rules*, as applicable, the relevant plans and data in accordance with Subsection 3/5 of this Guide are to be submitted for approval **electronically or** in triplicate.

SECTION 2 Definitions (1 December 2013)

The following definitions of terms are to be understood (in the absence of other specifications) where they appear in this Guide.

1 Accommodation Space

Accommodation Spaces are those spaces used for public spaces, corridors, laboratories, cabins, offices, hospitals, game and hobby rooms, pantries containing no cooking appliances, and similar spaces.

3 Recovered Oil

Spilled oil that has been removed from the marine environment and includes mixtures of oil and water.

5 Cargo Area

The *Cargo Area* is that part of the vessel that contains recovered oil tanks, slop tanks and recovered oil pump rooms including cofferdams, ballast and void spaces adjacent to recovered oil tanks and also deck areas throughout the entire length and breadth of the part of the vessel above the aforementioned spaces.

7 Control Station

Control Stations are those spaces in which the vessel's radio or main navigation equipment or the emergency source of power is located or where the fire recording or fire control equipment is located.

9 Hazardous Areas

Hazardous Areas are areas where flammable or explosive gases or vapors are normally present or likely to be present. The flammable or explosive atmosphere may be expected to exist continuously or intermittently. See Subsection 7/9.

Safe areas are areas that are not hazardous areas.

11 Machinery Space

Machinery Spaces are those spaces and trunks to such spaces which contain propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, thermal oil heaters, refrigerating, stabilizing, ventilation and air conditioning machinery.

13 Machinery Spaces of Category A

Machinery Spaces of Category A are those spaces and trunks to such spaces which contain either:

- i) Internal combustion machinery used for main propulsion
- ii) Internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW (500 hp)
- iii) Any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boiler, such as inert gas generator, incinerator, waste disposal units, etc.

15 Pump Room

Pump Rooms are those spaces that contain recovered oil transfer pumps, manifolds, separators or any other recovered oil handling equipment.

17 Oil

The term *Oil* refers to petroleum or petroleum products having flash points at or below 60°C (140°F), closed cup test, and specific gravity of not over 1.05, except where specifically indicated as oil having a flash point above 60°C (140°F).

19 Oil Recovery Operations

The term *Oil Recovery Operations* refers to the process used to contain and remove spilled oil from the sea to storage onboard the offshore support vessel. The process also includes the removal of the recovered oil from onboard storage to a disposal facility.

21 Service Space

Service Spaces are those spaces used for galleys, pantries containing cooking appliances, lockers, store rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.



SECTION 3 General (1 December 2013)

1 Application

While adapting vessels or barges for the carriage of recovered oil from a spill poses some potential hazards similar to oil tankers, it is recognized that these vessels are not likely to be originally designed to meet all the requirements of oil tankers. In consideration of the intended oil recovery services of these vessels, particular attention has been paid to the stability and floatability of the vessels in all relevant operating conditions including ballasting, safety against potential fire and explosion during handling, storage and transportation of recovered oil from a spill on moderate sea conditions, structural support of oil recovery equipment during oil recovery operations, and available electrical power supply to oil recovery equipment intended to be used during oil recovery operations. The purpose of this Guide is to stipulate the minimum requirements for ABS classification so that such vessels are suitably designed to carry out oil recovery operations. The Owner assumes the responsibility of operating the vessel in a safe manner with suitably trained personnel onboard.

The requirements of this Guide apply to the design, construction, equipment and operation of vessels and barges, that may be employed occasionally to recover oil having any flash point, from a spill in emergency situations. As such, these vessels and barges may be equipped to handle, store and transport recovered oil.

3 Classification

3.1 Selection of Class

The class notation **Oil Spill Recovery – Capability Class 1** or **Oil Spill Recovery – Capability Class 2** are available for assignment to vessels and barges, see Section 4 and Section 5. It is the responsibility of the Owner to select the class most suitable for the intended service and to operate that the vessel or barge in a safe environment with respect to the risk of fire and explosion.

3.5 Administration Requirements

Requirements additional to those given in this Guide may be imposed by the National Administration with which the vessel is registered or by the Administration within whose territorial jurisdiction the vessel is intended to operate.

Approval of structural fire protection, fire extinguishing equipment and/or stability of the vessel by a National Administration, in accordance with requirements equivalent to those by class, may be considered as complying with the class requirements provided such approval can be satisfactorily documented.

5 Submission of Plans

The following additional plans, supporting documents, and calculations are to be submitted for approval electronically or in triplicate.

5.1 Plans

- Plans and particulars of recovered oil tanks indicating access.
- Structural and general arrangement plans indicating the location, support and fastening arrangements of oil recovery and handling equipment.
- Plan showing arrangement of structural fire protection and location, controls and particulars of fire extinguishing systems and fire safety equipment. (See 3/3.5)

- Diagrammatic plans of piping systems for handling recovered oil. These plans are to be accompanied by lists of material giving size, wall thickness, maximum working pressure and material of all pipes and the type, size, pressure rating and material of valves and fittings.
- Diagrammatic plans of recovered oil tank venting arrangements including the position of vent outlets.
- Diagrammatic plans of recovered oil heating systems, if installed.
- Plans showing hazardous locations and electrical equipment in these locations together with a listing of equipment manufacturers and model numbers and evidence of certification for explosion-proof, intrinsically-safe and pressurized equipment. Also, wiring plans, installation instructions and certification agency restrictions for intrinsically-safe systems.
- Plans showing electrical power supply, protection and cabling for oil recovery equipment.
- Plans showing hazardous areas and spaces including the arrangement of ventilating systems for all hazardous areas along with complete particulars of the ventilating system such as capacities of fans, number of complete changes of air per hour, air flows, areas subject to positive or negative pressure, and location and direction of opening of self-closing doors.

5.3 Supporting Documents

- Detailed specifications for gas detection/measuring equipment.
- Detailed Operations and Procedures Manual

5.5 Supporting Calculations

- Load analysis of structural support in way of deck equipment during oil recovery operations in at least moderate sea conditions.
- Electrical load analysis considering the use of oil recovery equipment during oil recovery operations.
- Stability analysis considering all relevant operational conditions including ballasting. (See 3/3.5)

7 Operating Manual

It is incumbent upon the Owner to provide information, instructions, data and crew training for the oil recovery operations of the vessel so that the loadings and operational limits upon which the vessel is designed and classification is based are not exceeded. An approved Operating Manual detailing operational and maintenance procedures, equipment and capacity data, and particulars on operation of the vessel during oil recovery mode of operations is to be placed aboard the vessel for the guidance of the operating personnel. The Operating Manual is to be submitted for review by ABS solely to verify that the information included within is consistent with the design information and limitations considered in the vessel's classification. ABS is not responsible for the operation of the vessel. The vessel is to be operated during oil recovery mode of operation in accordance with this approved Operating Manual.

The Operating Manual is, in general, to give information regarding the following:

- i) Arrangement and equipment
 - Tank arrangement with venting systems
 - Recovered oil transfer system
 - Gas measuring instruments
 - Gas detection systems, if installed
 - List of oil response equipment and supplies

- ii) Oil Recovery Operations and Procedures verifying that all equipment installed in hazardous locations and/or transferred onboard are certified for use in gas-hazardous atmosphere (see 7/3.11)
 - Instructions regarding the use of non-certified electrical equipment (see 7/3.11)
 - Changing-over to low sea suctions for all sea water cooling pumps and fire pumps
 - Hook-up and equipment deployment
 - Tank filling procedures
 - Heating of recovered oil, if applicable
 - Discharging of recovered oil
 - List of spaces and equipment that may be required to be secured
 - List of deadlights that may be required to be secured
 - Recovered oil piping and venting configuration instructions
 - Space specific ventilation requirements
 - Storage location and use of portable gas detection/measuring instruments
 - Installation of spill coamings
- iii) Safety Instructions
 - Fire fighting
 - Guidelines regarding safe distance from an oil spill source including specifying conditions when to withdraw the vessel from oil recovery operations.
 - Gas measurements during operation (on open deck and in spaces where gas might accumulate)
 - Actions to be taken if gases are detected in enclosed spaces (cleaning, ventilation, emptying of adjacent tanks, etc.)
 - Precautions against overfilling of tanks
- iv) Cleaning and gas-freeing of tanks and pipes
- v) Stability in all relevant operational conditions including ballasting guidance.

9 Tests and Trials

9.1 Oil Spill Recovery – Capability

Upon completion of installation, the arrangements and equipment referred to in Section 4 are to be examined and tested to the satisfaction of the attending Surveyor. During sea trials and thereafter annually, the attending Surveyor is to verify the vessel is in compliance with the operation manual and general arrangement plan, and in particular:

- i) Area in which the oil recovery equipment will be installed,
- ii) Tanks to be used for recovered oil,
- iii) Designation of hazardous areas, and
- iv) Oil recovery equipment to be used, its location, and deployment and stowage procedures.

Oil recovery equipment stored ashore is to be examined and tested to the satisfaction of the attending Surveyor annually. Examination and test may occur on board the vessel or at the equipment's place of storage.



SECTION 4 Oil Spill Recovery – Capability Class 1 (1 December 2013)

1 General

Vessels and barges that comply with this Section of the Guide and have been designed for oil recovery operations, but the oil recovery equipment has not been installed on board, are eligible for the class notation **Oil Spill Recovery – Capability Class 1**.

Example: **✘ A1 Towing Vessel (OSR-C1)**.

The requirements of Sections 2, 3, 6 and 7 apply except as modified below.

3 Oil Spill Recovery – Capability

3.1 General

- i) The area in which the oil recovery equipment will be installed and the tanks to be used for recovered oil are to be defined and marked on the general arrangement plan of the vessel.
- ii) Hazardous areas are to be delineated in accordance with Subsection 7/9 based on *i*) above.

3.3 Operating Manual

The operating manual is to reflect the expected list of oil recovery equipment to be used, its location and its deployment and stowage procedures.

3.5 Hull Construction

3.5.1 Recovered Oil Storage Tanks

Tanks primarily used for purposes other than oil recovery (e.g., ballast, fuel oil and fresh water tanks), excluding forepeak tanks, may be used for the storage of recovered oil during oil recovery operations.

3.5.2 Recovered Oil Storage Tank Openings

Suitable openings to facilitate tank cleaning and gas freeing of the recovered oil storage tanks are to be provided. These openings, together with any openings for the deployment of portable pumps and hoses, are to be located on the open deck.

3.7 Machinery Equipment and Systems

- i) Use of movable (non-fixed) pipe sections and flexible hoses is permitted in the recovered oil piping system.
- ii) Oil recovery equipment and independent power-packages may be stored ashore ready to be installed for use.

SECTION 5 Oil Spill Recovery – Capability Class 2 (1 December 2013)

1 General

Vessels and barges that comply with this Section of the Guide and have been designed for the recovery of oil having a flash point, at the time of recovery, exceeding 60°C (140°F) but the oil recovery equipment has not been installed on board, are eligible for the class notation **Oil Spill Recovery – Capability Class 2**, example: **✘ A1 Towing Vessel (OSR-C2)**.

The requirements of Sections 2, 3, 6 and 7 apply except as modified below.

3 Plans and Operating Manual

In Subsections 3/5 and 3/7, provisions dealing with hazardous areas are not applicable.

In addition to the provisions of Subsection 3/5, the area in which the oil recovery equipment will be installed and the tanks to be used for recovered oil are to be defined and marked on the general arrangement plan of the vessel.

The operating manual of Subsection 3/7 is to provide information regarding procedures to monitor and record the flash point of the recovered oil. The procedures are to include guidelines specifying conditions when to withdraw the vessel from oil recovery operations should the flash point of the recovered oil not exceed 60°C (140°F).

The operating manual of Subsection 3/7 is to reflect the expected list of oil recovery equipment to be used, its location and its deployment and stowage procedures.

5 Hull Construction

5.1 Recovered Oil Storage Tanks

Tanks primarily used for purposes other than oil recovery (e.g., ballast, fuel oil and fresh water tanks), excluding forepeak tanks, may be used for the storage of recovered oil during oil recovery operations.

5.3 Separation of Recovered Oil Tanks

In lieu of 6/3.1.2, the vessel is to comply with:

- i) Tanks forward of the collision bulkhead are not to be arranged for the carriage of recovered oil.
- ii) As far as practicable, recovered oil tanks are to be located away from the machinery spaces of category A. However, where it is found necessary to locate the recovered oil tanks adjacent to or inside the machinery spaces of category A, the arrangements are to reduce the area of the tank boundary common with the machinery space of category A to a minimum and comply with the following:
 - a) Recovered oil tanks having boundaries common with machinery spaces of category A are not to contain oils having flash point of 60°C (140°F) or less.
 - b) At least one of their vertical sides is to be contiguous to the machinery space boundary.

- c) The bottom of the recovered oil tank is not to be so exposed that it will be in direct contact with flame should there be a fire in a Category A machinery space. The recovered oil tank is to extend to the double bottom. Alternatively, the bottom of the recovered oil tank is to be fitted with a cofferdam. The cofferdam is to be fitted with suitable drainage arrangements to prevent accumulation of oil in the event of oil leakage from the tank.
- d) Recovered oil tanks are to be located such that no spillage or leakage therefrom can constitute a hazard by falling on heated surfaces or electrical equipment. If this is not practicable, the latter are to be protected from such spillage or leakage by shields, coamings or trays as appropriate.

5.5 Location of Recovered Oil Tank Openings

Where 5/5.1 applies, suitable openings to facilitate tank cleaning and gas freeing of the recovered oil storage tanks are to be provided. These openings, together with any openings for the deployment of portable pumps and hoses, are to be located on the open deck.

5.7 Penetration of Recovered Oil Tanks

In lieu of 6/3.5, the vessel, or barge, is to comply with:

- i) Electrical cables are not to pass through recovered oil tanks unless enclosed within an oil tight trunk or equivalent.
- ii) Pipes passing through recovered oil tanks are to be of steel except that other materials may be considered where it is demonstrated that the material is suitable for the intended service.

5.9 Structural Fire Protection

The provisions of Subsection 6/5 are not applicable.

7 Machinery Equipment and Systems

7.1 Machinery and Equipment Installation

Oil recovery equipment and independent power-packages may be stored ashore ready to be installed for use.

For 7/3, the provisions of 7/3.1, 7/3.7, 7/3.9.1, and 7/3.15 are applicable. For piping or cables which pass through tanks for recovered oil, refer to 5/5.7.

7.3 Recovered Oil Piping Systems

Recovered oil piping systems are to be in accordance with 7/5 except compliance with 7/5.9 and 7/5.15 is not required. Recovered oil piping systems passing through machinery spaces are to be in accordance with the requirements for fuel oil transfer systems. See Section 4-4-4 of the *Under 90m Rules* or 4-1-2/9 of the *Barge Rules*, as applicable.

Use of movable (non-fixed) pipe sections and flexible hoses is permitted in the recovered oil piping system.

7.5 Recovered Oil Tank Venting Systems

A tank venting system complying with 7/7 is to be provided for recovered oil storage tanks. Alternatively, a venting system consisting of individual return-bend vents with corrosion resistant flame screens may be provided. Refer to 4-4-3/9 of the *Under 90m Rules* or 4-1-2/5 of the *Barge Rules*, as applicable. Provisions of 7/7.9 and 7/7.11 are applicable for a venting system consisting of individual return-bend vents.

7.7 Hazardous Areas

The provisions of Subsections 7/9 and 7/11 are not applicable.

7.9 Ventilation Systems

In lieu of Subsection 7/13, recovered oil pump rooms are to have a mechanical ventilating system capable of providing at least eight air changes per hour based on the gross volume of the space. The system is to have a mechanical exhaust, natural or mechanical supply, and ducting as required to effectively purge all areas of the space.

7.11 Machinery Installations in Hazardous Areas

The provisions of Subsection 7/15 are not applicable.

7.13 Fire Extinguishing Systems and Equipment

For Subsection 7/17, the provisions of 7/17.1 and 7/17.5 are applicable. The provisions of 7/17.3 are not applicable.



SECTION 6 Hull Construction (1 December 2013)

1 General

Oil spill recovery vessels and barges are to be constructed of steel.

The vessel/barge is to be provided with safe working areas on deck for handling of hoses and oil recovery equipment during oil recovery operations. Working areas are to be provided with adequate lighting, hand-rails and gratings or other non-slip surfaces.

The vessel/barge is to be provided with storage tanks for recovered oil. Tanks used for the storage of liquid mud may be used for the storage of recovered oil. The coating used in recovered oil storage tanks is to be of an oil and dispersion resistant type.

Bridge visibility is to easily permit the monitoring of the oil recovery operations on deck and in the water. Alternatively, special consideration will be given to systems providing equivalent bridge visibility.

3 Tank Arrangement

3.1 Location and Separation of Recovered Oil Tanks

3.1.1 General

Oil spill recovery vessels and barges are not required to have double hulls.

Where double bottoms are fitted to comply with any applicable regulation or other purposes, they are to be fitted between the peaks or as near thereto as practicable. The double bottom is not to be lower at any point than a plane parallel with the keel line and situated at a height not less than $B/20$ measured from the keel line, but in no case less than 0.76 m (2.5 ft) and need not exceed 2 m (6.6 ft).

Where wing tanks are located at a distance inboard of the molded line of the side shell plating, this distance is to be nowhere less than 600 mm to permit easy access for inspection.

The minimum size of the access openings to the double bottoms and wing tanks, where fitted, is to be at least 380 mm × 585 mm (15 in. × 23 in.) and circular openings to be at least 457 mm (18 in.).

3.1.2 Separation of Recovered Oil Tanks

- i) Tanks for recovered oil are not to be located below machinery spaces, service spaces, control stations and accommodation spaces.
- ii) Tanks for recovered oil may be located forward or aft of machinery spaces, service spaces, control stations and accommodation spaces. Recovered oil tanks are to be isolated from such spaces by means of a cofferdam. For the purposes of this requirement, void spaces, pump rooms, fuel oil tanks and compartments arranged solely for ballast may be considered cofferdams. For easy access, the minimum width of the cofferdam is not to be less than 600 mm.
- iii) Where it is impractical to meet the cofferdam requirement in *ii*) above, considerations may be granted in the case of other machinery spaces (See Note below). A cofferdam will not be required between the recovered oil tanks and other machinery spaces, provided the following items are met:
 - a) The bulkhead plating/tank side wall is to be continuous through all joining structures to the top of the tank. Full penetration welding is required at the top of the tank and the contiguous boundaries.

- b) The common tank bulkhead/tank side wall is to be readily accessible under normal conditions for inspection.
 - c) The machinery space adjacent to the recovered oil tanks is to be provided with forced power ventilation system as follows:
 - At least twenty (20) air changes per hour, based on the gross volume of the space
 - The system is to be operated at all times whenever recovered oil is carried in the tanks. This is to be clearly indicated in the Operating Manual.
 - The ventilation system is to be designed and arranged with redundancy such that at least 100% ventilation system is still available after a single failure in any part of the system.
 - Fitted with alarms to indicate ventilation failure
 - Fitted with non-sparking fans either with the uncertified motor outside of the ventilation duct or with a certified explosion proof motor located within the duct
 - d) No penetrations that create a source of hazardous vapor or oil release are allowed through the common tank boundary bulkhead. Sources of hazardous vapor or oil include any openings, screwed and flanged pipe connections, valves, pumps, stuffing boxes, etc. All welded pipe connections are not considered sources of hazardous vapor or oil.
 - e) The tanks are to be hydrostatically tested at the Special Surveys.
 - f) The common tank bulkhead is to be gauged at Intermediate and Special Surveys.
- Note:* 6/3.1.2iii) above does not apply to Machinery Spaces of Category A, service spaces, control stations or accommodation spaces. Recovered oil tanks are to be isolated from such spaces by means of a cofferdam.

3.3 Location of Recovered Oil Tank Openings

Openings from recovered oil storage tanks including sounding pipes, vents and hatches are not to be located in enclosed spaces. For the purposes of this requirement, spaces open on one side only are to be considered enclosed.

3.5 Penetration of Recovered Oil Tanks

Electrical cables are not to pass through recovered oil tanks unless enclosed within an oil tight trunk or equivalent.

Piping not related to the transfer of recovered oil is not to pass through recovered oil tanks unless the piping is made of steel, Extra-Heavy (see 4-4-1/7.11 of the *Under 90m Rules*) and of all welded construction, without valves, flanges, fittings or take-down joints.

5 Structural Fire Protection

5.1 Fire Integrity of Exterior Bulkheads

For superstructures and deck houses enclosing accommodation and machinery spaces, the exterior bulkheads facing the cargo area and side bulkheads within a distance of 3 m (10 ft) from the end bulkhead facing the cargo area are to be of steel construction and insulated, up to the underside of the deck of the navigation bridge, to “A-60” standard as defined in Chapter II-2/Regulation 3 of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended with the exception of the following:

- i) Insulation to “A-0” standard is acceptable provided the bulkheads are protected by a fixed water-spray system with a minimum water capacity of 10 liters/minute/m² (0.25 gpm/ft²).

- ii)* Insulation to “A-0” standard is acceptable without a water-spray system provided the bulkheads are at least one deck above the cargo area and are at least 10 meters (33 ft) measured horizontally away from a vertical plane of the recovered oil tanks and sources of oil or vapor release (such as tank vents, valves, flanges, and fittings).

Access doors and closing appliances for openings are to meet the same requirements as the bulkhead.

5.3 Openings in Exterior Bulkheads

5.3.1 Accommodation Spaces, Service Spaces, Control Spaces, and Machinery Spaces

- i)* Accesses, including those in the first tier on the main deck, to accommodation spaces, service spaces, control stations and machinery spaces may face the cargo area and/or be located within the above limits provided they are fitted with two doors, such that the door in the exterior bulkhead is weathertight and has a fire rating equivalent to the boundary in which it is installed and the interior door is self-closing, gastight, with no hold-back devices. The doors are to be spaced apart at least a distance that prevents an individual from opening both doors simultaneously. A notice is to be affixed to each side of each door to the effect that only one door is to be open at a time. Where the double door arrangement is located in a hazardous area, the hazardous area and ventilation requirements for an air lock apply. See 7/11.5.
- ii)* Access doors, air inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces may face the cargo area and/or be located within the above limits provided they are located at least one deck above the cargo area and are at least 3 meters (10 feet) measured horizontally away from a vertical plane of the recovered oil tanks and sources of oil or vapor release.
- iii)* Navigation bridge doors and windows may face the cargo area and/or be located within the above limits provided they are capable of rapidly and efficiently being made gas tight.

5.3.2 Accesses and Openings Not Needed During Oil Recovery Operations

Accesses and ventilation openings for spaces containing essential equipment are to be available for use at all times. However, accesses and openings not needed during oil recovery operations may be within the limits of 6/5.3.1 provided the arrangements comply with the following:

- i)* Access doors are self-closing gas-tight, secured (i.e., kept closed), and fitted with signs indicating that the doors are to remain closed during oil recovery operations. In addition, the doors are to have a fire rating equivalent to the boundary in which they are installed.
- ii)* All access and means of escape otherwise required by the Rules are met without the use of the secured access doors.
- iii)* Closing devices for openings other than access doors are gas-tight, secured (i.e., kept closed), and fitted with signs indicating that the openings are to remain closed during oil recovery operations. In addition, the closing devices are to have a fire rating equivalent to the boundary in which they are installed.
- iv)* The oil recovery operating manual is to clearly indicate the procedure necessary to secure the accesses, openings, and/or the space. Also, see 7/3.11.

5.3.3 Other Spaces and Locations

- i)* Portlights and windows fitted in locations other than the navigation bridge may face the cargo area and/or be located within the limits of 6/5.3.1 provided they are of the fixed (non-opening) type. They are to be fitted with deadlights constructed of steel or other equivalent material, which must be secured during oil recovery operations.
- ii)* Bolted plates for the removal of machinery may face the cargo area and/or be fitted within the limits of 6/5.3.1.

5.3.4 Hazardous Areas and Ventilation

See 7/9 and 7/11 for hazardous area requirements and 7/13 for ventilation opening requirements which are to be applied independently of 6/5.3.

7 Spill Coaming

Oil handling areas and equipment on deck are to be provided with a coaming around all pumps, transfer flanges and other connections where leakage may be expected. Each coaming is to be adequately sized to contain deck spills and prevent recovered oil from entering accommodation, machinery, control and service spaces or passing overboard. The coaming is to have a height of at least 150 mm (6 in.).

Where drains are provided for the coaming, closing devices for these drains are to be permanently attached.

Spill coamings may be of the removable type. Removable coamings are to be constructed of rigid, non oil-absorbent material, leak proof, and can be temporarily fixed to the vessel's structure.



SECTION 7 Machinery Equipment and Systems (1 December 2013)

1 General

Machinery, equipment, electrical systems, piping and fire fighting systems for oil spill recovery vessels are to be in accordance with Part 4 of the *Under 90m Rules*, *Barge Rules*, or *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, as applicable, and the following additional requirements.

Oil recovery equipment and independent power-packages are to be permanently installed or stored on board the vessel ready to be installed for use.

3 Machinery and Equipment Installation

3.1 Exhausts and Intakes

For machinery and equipment exhausts and intakes, refer to 7/15.

3.3 Pipes in Hazardous Areas

Exhaust pipes or any other pipes with surface temperatures exceeding 220°C (428°F) are not to pass through gas hazardous areas.

3.5 Pipes and Cables in Recovered Oil Tanks

For piping or cables which pass through tanks for recovered oil, refer to 6/3.5.

3.7 Propulsion Shafting

Where machinery spaces are located forward of recovered oil storage tanks, as permitted by 6/3.1, propulsion shafting is not to be led through the tanks and is to be effectively grounded.

3.9 Non-permanent Equipment

3.9.1 Power Supply

The arrangement of power supply to non-permanent oil skimming and pumping equipment is as far as practicable to be permanently installed. Power outlets are to be arranged from a connection box provided with a means to prevent disconnection of the portable cable unless power has been removed from the cable (i.e., a door with interlock switch). The supply from the main switchboard to the connection box is to be permanently installed and provided with a separate switchgear with short-circuit and overcurrent protection. These boxes are to be located at easily accessible locations outside of hazardous areas and in such a manner that portable cables are not carried through doors or portlights leading from the working deck area to machinery or accommodation spaces.

3.9.2 Oil Recovery Equipment

Non-permanent oil recovery equipment and independent power-packages are to be of the certified safe type and suitable for use in hazardous areas.

3.11 Electrical Equipment not Intended to be Used During Oil Recovery Operations

Electrical equipment located in hazardous locations that is not intended to be used during oil recovery operations and does not meet 4-6-3/11 of the *Under 90m Rules* (for example, equipment not certified intrinsically safe, pressurized enclosure, or explosion proof) may be permitted, provided the location is considered hazardous only during oil recovery operations and the arrangements meet the following requirements.

- i) The electrical equipment is considered nonessential (see 4-6-1/3.7 of the *Under 90m Rules* for primary essential and secondary essential services) and is not to be used during oil recovery operations.
- ii) A detailed list of such equipment in each hazardous area is to be submitted for review.
- iii) The electrical equipment as submitted for review in item ii) above is to be arranged so that it cannot be energized when any oil recovery equipment is energized. Once de-energized, specific action by the crew is required to re-energize the equipment. Instruction plates are to be placed at the respective switches.
- iv) The oil recovery Operating Manual is to clearly indicate the following:
 - a) The systems that are de-energized during oil recovery operations and the procedure to be followed.
 - b) The instructions and procedures to be followed relative to the cleaning and gas freeing of the oil recovery tanks in order to reset the electrical equipment to its original state after oil recovery operations are completed.

3.13 Mechanical Equipment in Hazardous Areas

All mechanical equipment for use in hazardous areas during oil recovery operations is to be certified for operation in gas-hazardous atmosphere (see Subsection 7/15).

3.15 Lifting Appliances on Deck and Supports for Oil Recovery Equipment

Lifting appliances such as masts and cranes intended to be used during oil recovery operations are to be designed and constructed to an acceptable standard, code of practice or satisfy, but need not be certified to, the applicable requirements of the *ABS Lifting Appliances Guide* in addition to the following:

- i) The dynamic loads due to the vessel's motions are to be considered.
- ii) The calculations for the strength of the supporting structures of lifting appliances for oil recovery equipment may be carried out assuming the oil recovery operations are being conducted in moderate sea conditions.

5 Recovered Oil Piping Systems

5.1 General

A fixed recovered oil transfer system is to be provided and arranged to permit simultaneous filling and discharging operations. Piping may consist of movable pipe sections with suitable flanged connections.

Piping connections of systems not related to the oil recovery operations are to be provided with spool piece and blanking arrangements. The blanking devices are to be fitted to the nearest detachable pipe connections at the tank.

5.3 Recovered Oil Pumps

Recovered oil pumps are to be so designed as to minimize the danger of sparking. Care is to be taken in installation of the pumps to prevent leaks at the stuffing box. Where the shafts pass through gastight bulkheads, flexible couplings are to be provided in shafts between pumps and prime movers, and stuffing boxes which can be lubricated from outside the pump room are to be fitted at the bulkheads. The seal parts of the glands are to be of non-sparking construction.

5.5 Relief Valves

A relief valve of suitable type is to be installed in the discharge of each recovered oil pump and piped back to the suction. Such valves need not be fitted when the system is served only by centrifugal pumps so designed that the pressure delivered cannot exceed that for which the piping is designed.

5.7 Pressure Gauges

One pressure gauge for each recovered oil transfer pump is to be located at the pump discharge and, where the pumps are operated by engines external to the pump room, additional gauges are to be provided which are to be visible from the operating station.

5.9 Piping in Machinery Spaces

Recovered oil transfer systems are not to pass through machinery spaces except for runs of steel, Extra-Heavy (see 4-4-1/7.11 of the *Under 90m Rules*), all welded pipe which are to be provided with a positive closing valve, located outside the machinery space and operable from an accessible location on the open deck, to stop the flow of oil in the event of a fire or leak.

Recovered oil piping system components, such as pumps, manifolds, valves, flanges, slip-joints and other sources of vapor leakage are not to be located within machinery spaces.

5.11 Piping in Fuel Oil Tanks

Recovered oil piping is not to pass through fuel oil tanks unless it is steel, Extra-Heavy (see 4-4-1/7.11 of the *Under 90m Rules*), all welded pipe without valves, flanges, fittings, or take-down joints.

5.13 Piping in Ballast Tanks

Recovered oil piping passing through ballast tanks is to be made of steel, Extra-Heavy (see 4-4-1/7.11 of the *Under 90m Rules*) and all welded pipe; special consideration will be given to ferrous materials having corrosion resistant properties. Provisions are to be made for expansion of the piping within the tank.

5.15 Bow or Stern Discharge

Where bow or stern discharge connections are provided, cargo lines forward or aft of the cargo area are to be led outside accommodation spaces, service spaces, machinery spaces and control stations. Pipe joints outside the cargo area are to be welded except for connections to the manifold or equipment.

The cargo discharge lines are to be clearly identified and provided with means to segregate them from the cargo main line when not in use. The segregation is to be achieved by either two valves, located in the cargo area, which can be locked in the closed position, and fitted with means to detect leakage past the valves; or by one valve together with another closing device providing an equivalent standard of segregation, such as a removable spool piece or spectacle flange.

The discharge connection is to be fitted with a shut-off valve and a blank flange. The blank flange may be omitted if an equivalent means of closing is incorporated in the connection to the hose coupling.

Arrangements are to be provided for cargo lines outside the cargo area for easy draining to a slop tank or cargo tank and for cleaning and inerting. Spill containment is to be provided under the discharge manifolds. The space within 3 m (10 ft) of the manifold and oil spill containment boundary is to be considered as a hazardous area zone 1 with regard to electrical equipment or other sources of vapor ignition. See 7/9.3.2vi).

7 Recovered Oil Tank Venting Systems

7.1 General

Each recovered oil storage tank is to be fitted with a pressure-vacuum type relief valve, or a suitably sized vent pipe is to be led from each tank into a common header fitted with an approved flame arrestor or pressure-vacuum relief valve at the outlet to the atmosphere. Means are to be provided to prevent any tank from being subjected to excessive pressure during any phase of the recovered oil handling process. Vent outlets are to direct gases upwards.

7.3 Height

Where the vent pipes from two or more tanks are led into a common header, the outlet from the header is to be located a minimum height of 2 m (6.6 ft) above the freeboard deck.

7.5 Size

The vent pipes, or overflows if fitted, are to be sized for 125% of the maximum loading rate to prevent the pressure in any recovered oil storage tank from exceeding the design pressure; however, the diameter of each vent pipe is to be not less than 63 mm (2.5 in.) I.D.

7.7 Location

Vent outlets from recovered oil storage tanks are to be located a horizontal distance of greater than 3 m (10 ft) away from openings to accommodation and other gas-safe spaces, ventilation intakes, non-certified safe electrical equipment and other machinery and equipment which may constitute an ignition hazard. See 7/9.3.2iii).

7.9 Portable Vent Pipes

Portable vent pipes, intended for use during oil spill recovery operations only, are acceptable provided the vent pipe, vent and attachment are suitable for the location they are being employed and are stored in a readily accessible location.

7.11 Liquid Level Control

Provision is to be made to guard against liquid rising in the venting system to a height that would exceed to design head of the tanks. This may be accomplished by using high level alarms or overflow control systems or other equivalent means, together with gauging devices and tank filling procedures.

9 Hazardous Areas

9.1 Definitions

9.1.1 Hazardous Areas

Hazardous areas are all those areas where a flammable atmosphere may be expected to exist continuously or intermittently. Hazardous areas are subdivided into Zones 0, 1, 2, defined as follows:

- *Zone 0* A zone in which ignitable concentrations of flammable gases or vapors are continuously present or present for long periods.
- *Zone 1* A zone in which ignitable concentrations of flammable gases or vapors are likely to occur in normal operating conditions.
- *Zone 2* A zone in which ignitable concentrations of flammable gases or vapors are not likely to occur, and if it occurs, it will exist only for a short time.

9.1.2 Enclosed Space

An enclosed space is considered to be a space bounded by decks and bulkheads which may or may not have doors, windows or other similar openings.

9.1.3 Semi-Enclosed Space

A semi-enclosed location is considered to be a location where natural conditions of ventilation are notably different from those on open decks due to the presence of structure such as roofs, windbreaks and bulkheads and which are arranged so that the dispersion of gas may not occur.

9.3 Classification of Areas

The following hazardous areas are those which normally apply to offshore support vessels engaged in oil recovery operations.

9.3.1 Hazardous Areas Zone 0 include:

- i)* The internal space of recovered oil tanks and pipes including the venting arrangements of the recovered oil tanks.
- ii)* Equipment containing recovered oil.
- iii)* Cofferdams and voids adjacent to recovered oil tanks, containing recovered oil pipe flanges, valves, or other sources of release.

9.3.2 Hazardous Areas Zone 1 include:

- i)* Recovered oil pump rooms, spaces in which oil contaminated equipment for handling the recovered oil is located, and oil handling areas.
- ii)* Enclosed or semi-enclosed spaces in which recovered oil pipe flanges, valves, or other sources of release are located.
- iii)* Areas on the open deck within a 3 meter (10 ft) radius of any recovered oil tank opening, recovered oil tank vent, recovered oil pipe flange or valve.
- iv)* Areas on the open deck within a 3 meter (10 ft) radius of any entrance or ventilation opening to any hazardous area zone 1 space.
- v)* Areas on the open deck within a 3 meter (10 ft) radius of any oil recovery equipment. Equipment includes but is not limited to skimmers, containment booms and reels, and separators.
- vi)* Areas on open deck within spillage coaming surrounding oil recovery manifold valves and 3 m (10 ft) beyond the coaming up to a height of 2.4 m (8 ft) above the deck.

9.3.3 Hazardous Areas Zone 2 include:

- i)* Except machinery spaces that comply with 6/3.1.2, enclosed spaces immediately adjacent to recovered oil tanks in any direction, not containing recovered oil pipe flanges, valves, or other sources of release.
- ii)* Enclosed or semi-enclosed spaces having a direct access or opening to any hazardous area.
- iii)* Air lock spaces between Zone 1 and non-hazardous space, in accordance with 7/11.5.1i).
- iv)* Areas on the open deck within 1.5 m (5 ft) radius of any entrance or ventilation opening to any hazardous area zone 2 space excluding tanks adjacent to recovered oil tanks not containing recovered oil pipe flanges, valves, or other sources of release.

11 Openings, Access and Ventilation Conditions Affecting the Extent of Hazardous Zones

Air inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces are not to be located in hazardous areas.

Except for operational reasons, access doors are not to be provided between a non-hazardous space and a hazardous zone, nor between a Zone 2 space and a Zone 1 space.

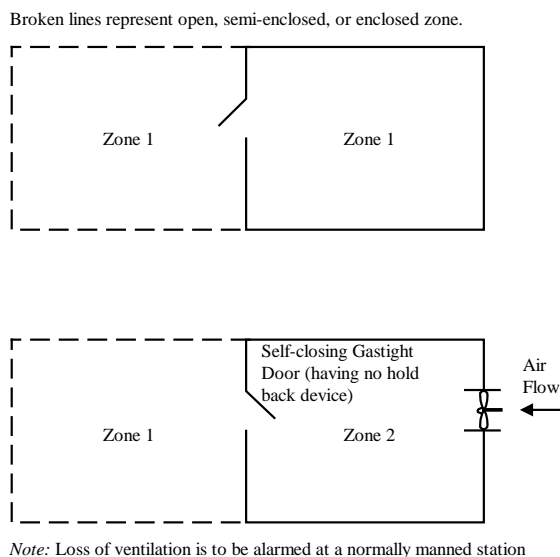
Where such access doors are provided, any enclosed space not referred to under 7/9.3.2 or 7/9.3.3 and having a direct access to any Zone 1 location or Zone 2 location becomes the same zone as the location, except as noted below:

11.1 Enclosed Space with Direct Access to any Zone 1 Location

An enclosed space with direct access to any Zone 1 location is considered as Zone 2, provided: (see also Section 7, Figure 1):

- i) The access is fitted with a self-closing gas-tight door (see 7/11.5.2) 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 normally manned station. See 7/13.9.

**FIGURE 1
Hazardous Zones**



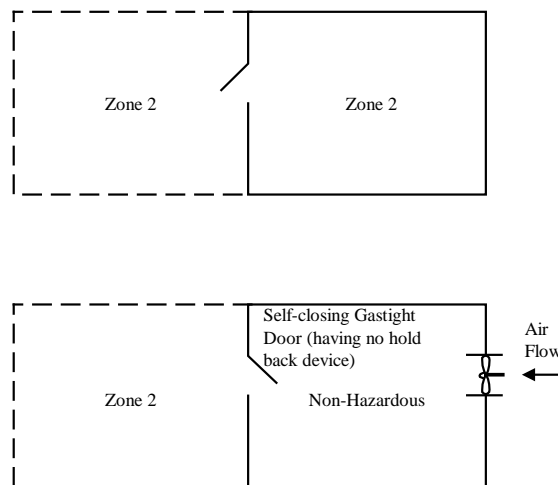
11.3 Enclosed Space with Direct Access to any Zone 2 Location

An enclosed space with direct access to any Zone 2 location is not considered hazardous, provided (see also Section 7, Figure 2):

- i) The access is fitted with self-closing gas-tight door (see 7/11.5.2) that opens into the non-hazardous space,
- ii) Ventilation is such that the air flow with the door open is from the non-hazardous space into the Zone 2 locations, and
- iii) Loss of ventilation is alarmed at a normally manned station. See 7/13.9.

FIGURE 2
Hazardous Zones

Broken lines represent open, semi-enclosed, or enclosed zone.



Note: Loss of ventilation is to be alarmed at a normally manned station

11.5 Enclosed Space with Access to any Zone 1 Location

An enclosed space with access to any Zone 1 location is not considered hazardous, provided the access is through either arrangement described below (see also Section 7, Figure 3):

11.5.1 Air Lock

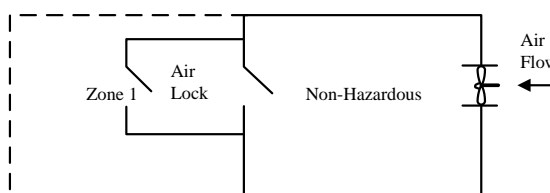
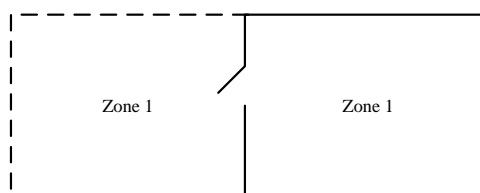
- i) The access is fitted with two self-closing doors forming an air lock, which open toward the nonhazardous space and has no hold-back devices,
- ii) The doors are spaced apart at least a distance that prevents an individual from opening both doors simultaneously with a notice affixed to each side of each door to the effect that only one door is to be open at a time,
- iii) An audible and visual alarm system to give a warning on both sides of the air lock is provided to indicate if more than one door is moved from the closed position,
- iv) Ventilation is such that the non-hazardous space has ventilation overpressure greater than 25 Pa (0.25 mbar) in relation to the Zone 1 location,
- v) The air lock space has independent mechanical ventilation from a gas-safe area such that, with any of the air lock doors open, the air flow is from the less hazardous space to the more hazardous space or area,
- vi) The air lock space is fitted with gas detection, and
- viii) Loss of ventilation overpressure between the non-hazardous space and the Zone 1 location and loss of ventilation in the air lock space are alarmed at a normally manned station. See 7/13.9.

11.5.2 Single Door

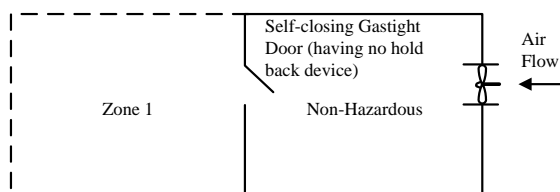
- i) The access is fitted with a single self-closing, gas-tight door which opens toward the nonhazardous space and has no hold-back device,
- ii) Ventilation is such that the air flow with the door open is from the non-hazardous space into the Zone 1 location with overpressure greater than 25 Pa (i.e., non-hazardous space has ventilation overpressure greater than 25 Pa (0.25 mbar) in relation to the Zone 1 location), and
- iii) Loss of ventilation overpressure is alarmed at a normally manned station. See 7/13.9.

**FIGURE 3
Hazardous Zones**

Broken lines represent open, semi-enclosed, or enclosed zone.



Note: Loss of ventilation overpressure is to be alarmed at a normally manned station. Alarms set to a minimum overpressure of 25 Pa (0.25 mbar) with respect to the adjacent Zone 1 location. See 5-6-4/13.9.



Note: Loss of ventilation overpressure is to be alarmed at a normally manned station. Alarms set to a minimum overpressure of 25 Pa (0.25 mbar) with respect to the adjacent Zone 1 location. See 5-6-4/13.9.

11.7 Hold-back Devices

Hold-back devices are not to be used on self-closing gas-tight doors forming hazardous area boundaries.

13 Ventilation Systems

13.1 General

Ventilation systems for gas hazardous areas and safe areas are to be independent of each other. Ventilation inlets are to be located in a safe area on the open deck and as far away from gas hazardous areas as practicable. The air outlet is generally to be located in a safe area on the open deck.

13.3 Pump Room Ventilation

Recovered oil pump rooms are to have a mechanical ventilating system capable of providing at least twenty air changes per hour based on the gross volume of the space. The system is to have a mechanical exhaust, natural or mechanical supply, and ducting as required to effectively purge all areas of the space. Fan motors are to be located outside the space and outside the ventilation ducts. Fans are to be of non-sparking construction in accordance with 4-6-3/11.7 of the *Under 90m Rules*. Provision is to be made for immediate shutdown of the fan motors upon release of the fire extinguishing medium.

13.5 Ventilation of Other Hazardous Areas

In general, enclosed hazardous spaces are to be provided with adequate ventilation so as to maintain them at a lower pressure than less hazardous zones. The arrangement of ventilation inlet and outlet openings in the space is to be such that the entire space is efficiently ventilated, giving special consideration to locations where gas may accumulate.

Enclosed hazardous areas (other than tanks and cofferdams) which do not contain sources for vapor leakage such as pumps, manifold, flanges or valves for recovered oil systems are to have a mechanical ventilating system capable of providing at least eight air changes per hour based on the gross volume of the space. The system is to have a mechanical exhaust, natural or mechanical supply, and ducting as required to effectively purge all areas of the space. Construction and location of fan motors are to be as required by 7/13.3.

13.7 Ventilation of Non-hazardous Areas

Ventilation inlets and outlets for non-hazardous spaces are to be located in non-hazardous areas. Where passing through hazardous areas, ducts are to be constructed in a manner to avoid air leaks and are to have overpressure in relation to the hazardous area.

13.9 Ventilation Alarms

The alarms to indicate failure of the mechanical ventilation as required by 7/11.1iii) and 7/11.3iii) are to provide audible and visual signals at the designated normally manned station. The initiation of these alarms by a fan motor running or fan rotation monitoring device is not acceptable.

The alarms to indicate loss of ventilation overpressure as required by 7/11.5.1vii) and 7/11.5.2iii) are to be set to a minimum overpressure of 25 Pa (0.25 mbar) with respect to the adjacent Zone 1 location. A differential pressure monitoring device or a flow monitoring device may be used for the initiation of the alarm. When a flow monitoring device is used and a single self-closing gas-tight door is fitted, the minimum overpressure is to be maintained with the door fully open without setting off the alarm, or alternatively, an alarm is to be given if the door is not closed. The initiation by a fan motor running or fan rotation monitoring device is not acceptable.

15 Machinery Installations in Hazardous Areas

Electrical equipment and wiring in hazardous areas is to be in accordance with 7/3.11 of this Guide and see 4-6-3/11 of the *Under 90m Rules*.

Internal combustion engines are not to be installed in Zone 0 hazardous areas. When essential for operational purposes, internal combustion engines may be installed in Zone 1 and 2 hazardous areas. Such installations will be subject to special consideration. Fired boilers are not to be installed in hazardous areas.

Exhaust outlets of internal combustion engines and boilers are to discharge outside of all hazardous areas. Air intakes are to be located not less than 3 m (10 ft) from hazardous areas. Exhaust outlets of internal combustion engines are to be fitted with suitable spark-arresting devices, and exhaust piping insulation is to be protected against possible oil absorption in areas or spaces where the exhausting piping is exposed to oil or oil vapors.

The outlets of vent pipes from internal-combustion engine crankcases are to discharge outside of all hazardous areas.

17 Fire Extinguishing Systems and Equipment

17.1 Deck Area

The following fire fighting equipment is to be provided for protection of the operating deck area.

17.1.1 Fire Extinguishers

Two dry powder fire extinguishers, each with a capacity of at least 50 kg (110 lb), are to be provided. The fire extinguishers are to be located in the vicinity of the deck area where the equipment for handling of recovered oil is located and are to be fitted with hoses of adequate length to reach the oil handling equipment.

17.1.2 Portable Foam Applicator Units

Two portable foam applicator units are to be provided. A portable foam applicator unit is to consist of an air-foam nozzle of an inductor type capable of being connected to the fire main by a fire hose together with a portable tank containing at least 20 liters (5 U.S. gallons) of foam-making liquid. The nozzle is to be capable of producing effective foam suitable for extinguishing an oil fire, at the rate of at least 90 m³/hr (3180 ft³/hr). A total of at least eight portable tanks of foam-making liquid are to be supplied on board. In instances where, due to the size of the vessel, only one fire hydrant is required to be fitted, the vessel need only be provided with one portable foam applicator unit.

17.3 Pump Rooms

Recovered oil pump rooms are to be provided with an approved fixed fire extinguishing system controlled from a readily accessible position outside the pump room. See also 7/13.3.

17.5 Gas Measuring Instruments

- Two portable instruments of an approved type are to be provided onboard the vessel for hydrocarbon gas detection/measurements.
- Two portable hydrogen sulfide gas monitoring devices are to be provided onboard the vessel.

19 Oil Pollution Prevention Measures

Pollution prevention equipment such as oil discharge monitoring and control systems to process oil contaminated water from machinery space bilges are to be appropriate to the vessel when engaged in operations other than oil recovery. This is to be in accordance with see 4-4-3/5.15 of the *Under 90m Rules*.

During oil recovery operations, the oil content of any processed, recovered oil/water mixture discharged overboard is to comply with the requirements of the Administration having oversight of the spill response.

21 Other Requirements

21.1

Low sea suctions are to be provided for the sea water cooling pumps for the machinery and all fire pumps.

21.3

If installed, heating coils in recovered oil tanks and adjacent tanks are to be provided with means for blanking off. If applicable, the observation tanks for steam heating return lines from recovered oil tanks are to be located as far away from any sources of ignition as possible and adequately ventilated.