PART 4 Specialized vessels

Contents

CHAPTER 1 Offshore Supply Vessels

Contents

SECTION 1 General

1.1 Application

1.1.1 This Chapter applies to ships which are specially designed for the service of offshore units and intended to have the service notation **OFFSHORE SUPPLY VESSEL**.

1.1.2 Unless otherwise mentioned in this Chapter, the requirements of Part 3 are applicable.

1.1.3 For offshore supply vessels the relevant requirements of the IMO Resolution A.469 (XII) apply with regard to intact stability and damaged stability.

SECTION 2 Longitudinal strength

2.1 General

2.1.1 Longitudinal strength calculations are to be made in accordance with the requirements of Part 3.

SECTION 3 Hull envelope plating

3.1 Side shell plating

3.1.1 The thickness of the side shell plating including the bilge strake is to be in accordance with the requirements of Part 3, but in no case is to be less than 9 mm.

3.1.2 Where the stern area is subjected to loads due to heavy cargo, sufficient strengthening is to be provided.

3.1.3 In exposed areas efficient fenders are to be fitted with adequate support behind them.

3.2 Deck plating

3.2.1 The thickness of the weather deck is to be in accordance with the requirements of Part 3, but in no case is to be less than 8 mm. Additional local increases in scantlings may be required where specialized cargoes are likely to induce concentrated loads.

3.2.2 Stowracks are to be fitted on deck, for deck cargoes, and are to be effectively attached to the deck.

3.2.3 Small hatches, valve controls, ventilators, air pipes etc. are to be located in protected positions in order to avoid damage by cargo and to minimize the possibility of flooding of other spaces.

SECTION 4 Framing

4.1 Transverse framing system

4.1.1 The section modulus of the main and tweendeck frames is to be increased by 25% above the values required by Part 3.

SECTION 5 Superstructures and deckhouses

5.1 Scantlings

5.1.1 The thickness of the side and end bulkhead plating of superstructures and deckhouses is to be increased by 1 mm above the thickness required by Part 3.

5.1.2 The section modulus of stiffeners is to be increased by 5% above the values required by Part 3.

SECTION 6 Access to spaces

6.1 Access to machinery spaces

6.1.1 Access to machinery spaces should, if possible, be arranged within the forecastle. Any access to the machinery space from the exposed cargo deck is to be provided with two weathertight closures.

6.1.2 Machinery space ventilators are to be located as high as is practicable above the deck and are to be fitted with spark arresters.

6.2 Access to spaces below the exposed cargo deck

6.2.1 Access to spaces below the exposed cargo deck shall preferably be from a position within or above the superstructure deck.

CHAPTER 2 Tugs

Contents

SECTION 1 General

1.1 Application

1.1.1 This Chapter applies to ships which are specially designed for towing operations and intended to have the service notation **TUG**.

1.1.2 Unless otherwise mentioned in this Chapter, the requirements of Part 3 are applicable. The draught T used for the determination of scantlings is to be not less than 0,85·D.

1.2 Information required

1.2.1 In addition to the information specified in Part 3, the following plans are to be submitted for approval:

(a) Towing hook.

(b) Slip arrangement.

SECTION 2 Longitudinal strength

2.1 General

2.1.1 Longitudinal strength calculations are to be made in accordance with the requirements of Part 3.

SECTION 3 Bottom structure

3.1 General

3.1.1 The bottom structure is to be in accordance with the requirements of Part 3.

SECTION 4 Machinery casings

4.1 Exposed casings

4.1.1 The height of exposed machinery room casings is not to be less than 900 mm above the upper surface of the deck and are to be made watertight.

4.1.2 Stiffeners to exposed casings are to be connected to the deck or carried through.

4.2 Emergency exit

4.2.1 In the machinery room an emergency exit is to be provided, which can be used at extreme angles of heel and should be positioned as high as possible above the waterline and on or near the vessel's centreline.

4.2.2 The cover of the emergency exit, which is to have a weathertight closure, is to be capable of being opened easily from outside and inside. The axis of the cover is to run in the athwartship direction.

4.2.3 The coaming height is to be at least 600 mm above the upper surface of the deck.

SECTION 5 Towing arrangement

5.1 Towing hook

5.1.1 The towing hook is to be fitted as low as practicable in order to minimize heeling moments arising in normal working conditions.

5.1.2 The towing hook has to be fitted with a reliable slip arrangement which facilitates towline release, regardless of the angle of heel.

5.1.3 The slip arrangement should be operable from the bridge, as well as in the vicinity of the hook itself.

5.1.4 The towing arrangement should be tested to the Surveyor's satisfaction.

5.1.5 The breaking strength of the towing hook should generally be 50 % in excess of that of the towline.

SECTION 6 Fenders

6.1 General

6.1.1 A strong fender is to be provided to the ship's side at deck level extending all fore and aft.

SECTION 7 Equipment

7.1 Towlines

7.1.1 Towlines need not comply with the requirements of Part 3, but should be adequate for the tug's maximum bollard pull, with an appropriate factor of safety which is not to be taken less than 2.

CHAPTER 3 Barges and Pontoons

Contents

SECTION 1 General

1.1 Application

1.1.1 This Chapter applies to manned or unmanned non-self-propelled ships defined as follows:

(a) Barges for the carriage of dry cargoes in cargo holds.

(b) Barges for the carriage of liquid cargoes in bulk.

(c) Pontoons designed for the carriage of cargo on deck.

1.1.2 Vessels built and equipped in compliance with the following requirements may be given the class notation BARGE or PONTOON as applicable.

1.1.3 For barges carrying dry cargoes and for pontoons, unless otherwise mentioned in this Chapter, the requirements of Part 3 are applicable.

1.2 Definitions

1.2.1 For ships with swim ends, the length L may be measured to the outside surface of the rake plating at the summer load waterline.

1.2.2 Where swim ends are fitted both fore and aft, or where a swim end is arranged aft but no rudder is fitted, then L need not exceed 97% of the extreme length on the summer load waterline.

SECTION 2 Longitudinal strength

2.1 General

2.1.1 Longitudinal strength calculations are to be made in accordance with the requirements of Part 3, but the midship section modulus may be 5% less than required according to Part 3.

2.1.2 The scantlings of the primary longitudinal members (strength deck, shell plating, deck longitudinals, bottom and side longitudinals) may be 5% less than required in Part 3.

2.1.3 Longitudinal strength calculations for the condition "Barge, fully loaded, at crane" are required, where barges are intended to be lifted on board ship by means of cranes. for this condition, the following stresses are permissible:

(a) Bending stress σ_b = 150 N/mm^2.

(b) Shear stress τ = 100 N/mm^2.

SECTION 3 Hull envelope plating

3.1 Swim end plating

3.1.1 The bottom shell plating thickness is to be maintained up to the summer load waterline for the rake plating. Above this point, the thickness may be tapered to that of the side shell requirements from a

point not less than 1 m above the load waterline.

SECTION 4 Bulkheads

4.1 Collision bulkhead

4.1.1 For barges and pontoons, the position of the collision bulkhead is to be determined according to Part 3.

4.1.2 Where in barges and pontoons the form and construction of their ends is identical, so that there is no determined fore or aft of the ship, a collision bulkhead is to be fitted at each end.

4.2 Hold watertight bulkheads

4.2.1 A watertight bulkhead is to be fitted at the aft of the hold area. Other watertight bulkheads are to be fitted as necessary to provide transverse strength and watertight subdivision.

SECTION 5 Towing arrangements

5.1 General

5.1.1 All barges and pontoons are to be fitted with adequate arrangements for towing. In general, such arrangements shall consist of not less than two sets of bollards, each of which shall be suitable for accepting a towline with a working load equal to the breaking strength of the towline required by Part 3.

SECTION 6 Equipment

6.1 Manned Barges and pontoons

6.1.1 For manned barges and pontoons the required equipment should be in accordance with Part 3.

6.1.2 Where more than two anchors are required, the spare anchor may be used as a stern anchor.

6.2 Unmanned barges and pontoons

6.2.1 For unmanned barges and pontoons the number of anchors may be reduced to one and the length of the chain cable to 50% of the length required by Part 3.

CHAPTER 4 Floating Cranes

Contents

SECTION 1 General

1.1 Application

1.1.1 This Chapter applies to vessels intended to have the service notation FLOATING CRANE and are specially designed to operate in a harbour or sheltered water environment where there is no significant movement of the vessel due to wave action and the sea state is not worse than that described for Beaufort No. 2.

1.1.2 Unless otherwise mentioned in this Chapter, the requirements of Part 3 are applicable, taking into account necessary strengthening for supporting the crane during operation and in stowed condition at sea.

1.2 Definitions

1.2.1 For vessels with swim ends, the length L may be measured to the outside surface of the rake plating at the summer load waterline.

1.2.2 Where swim ends are fitted both fore and aft, or where a swim end is arranged aft but no rudder is fitted, then L need not exceed 97% of the extreme length on the summer load waterline.

1.3 Information required

1.3.1 In addition to the information specified in Part 3, the following documents are to be submitted for approval:

(a) Supporting structures and strengthening of hull in way of supports.

(b) Electrical installations for the crane.

(c) Intact and damage stability calculations.

SECTION 2 Longitudinal strength

2.1 General

2.1.1 Longitudinal strength calculations are to be carried out in accordance with the requirements of Part 3.

SECTION 3 Hull envelope plating

3.1 Bottom shell plating

3.1.1 The minimum thickness of the bottom plating is to be increased by 30% above the minimum thickness required in Part 3.

3.1.2 Where swim ends are fitted the bottom shell plating is to be maintained up to the summer load

waterline for the rake plating. Above this point, the thickness may be tapered to that of the side shell requirements from a point not less than 1 m above the load waterline.

3.2 Side shell plating

3.2.1 The minimum thickness of the side shell plating is to be increased by 10% against the minimum thickness required in Part 3.

3.3 Deck plating

3.3.1 The minimum thickness of the deck plating is to be increased by 10% against the minimum thickness required in Part 3.

SECTION 4 Crane system

4.1 General

4.1.1 The forces and loads acting on the crane structure are to be determined in accordance with the operating and environmental conditions for which the crane is to be certified and must be clearly specified together with the speeds of all crane movements, braking times, lifting capacities, ranges, etc.

4.1.2 A recognised national standard will be considered as an alternative basis for approval of cranes provided the Society is satisfied that the criteria are at least equivalent to the design criteria specified in this Section.

4.2 Design loads

4.2.1 The crane structure has to be examined for the operation condition, taking into account the following forces and loads:

(a) Dead loads.

(b) Lifting loads.

(c) Dynamic forces due to hoisting.

(d) Slewing forces.

(e) Forces due to vessel motions.

(f) Wind forces.

(g) Loads on access ways and platforms.

4.2.2 The crane structure and any stowed arrangements are to be examine for the stowage condition, taking into account the following forces:

(a) Forces due to vessel motions.

(b) Wind forces.

4.3 Static loads

4.3.1 The dead load F_d is the self-weight of any component of the lifting appliance which is not included in the lifting load.

4.3.2 The lifting load F_L is the maximum static load which the appliance is certified to lift, together with the static weight of any component of the crane structure which is directly connected to, and undergoes the same motion as, the dead load during the lifting operation.

4.4 Dynamic forces due to hoisting

4.4.1 The dynamic forces due to hoisting F_H are those imposed on the structure by shork and accelerating the lifting load F_L from rest to a steady hoisting speed.

4.4.2 The dynamic forces due to hoisting are to be obtained from the following formula:

$$F_H = F_L \times C_H \ [N]$$

Where:

F_L = Lifting load, N.

C_H = Hoisting factor

= $1+0,3 \cdot V_H$.

V_H = Hoisting speed, m/s, but need be taken as not greater than 1,0 m/s.

4.5 Slewing forces

4.5.1 The inertia forces acting on the lifting load and crane structure resulting from slewing the crane are to be considered.

4.5.2 The slewing acceleration is to be supplied by the manufacturer. Where this is not available the acceleration at the jib head of the crane, with the crane jib at maximum radius, is to be taken as 0,6 m/s^2.

4.6 Forces due to vessel motions

4.6.1 Floating cranes are to be designed to operate safely and efficiently in a harbour or sheltered water environment at an angle of heel of 5° and an angle of trim of 2° occurring simultaneously.

4.6.2 Special consideration will be given where it is intended to operate a floating crane at an angle of heel differing from 5° or an angle of trim differing from 2°.

4.6.3 The forces due to vessel motions are to be determined in accordance with Table 4.4.1.

Table 4.4.1: Forces due to vessel motions

Motion		Component of force, N		
		Normal to deck	Parallel to deck	
			Transverse	Longitudinal
	Roll	$w \cdot cos\varphi$	$w \cdot sin\varphi$	-

Static	Pitch Combined	$w \cdot cos\psi$ $0{,}91 \cdot w$	- $0{,}40 \cdot w$	$w \cdot sin\psi$ $0{,}10 \cdot w$
Dynamic	Roll	$\pm 0{,}07 \cdot w \cdot \frac{\varphi}{T_r^2} \cdot y$	$\pm 0{,}07 \cdot w \cdot \frac{\varphi}{T_r^2} \cdot z_R$	-
	Pitch	$\pm 0{,}07 \cdot w \cdot \frac{\psi}{T_r^2} \cdot x$	-	$\pm 0{,}07 \cdot w \cdot \frac{\varphi}{T_r^2} \cdot z_p$
	Heave			
	- Roll	$\pm 0{,}05 \cdot w \cdot \frac{L}{T_H^2} \cdot cos\varphi$	$\pm 0{,}05 \cdot w \cdot \frac{L}{T_H^2} \cdot sin\varphi$	-
	- Pitch	$\pm 0{,}05 \cdot w \cdot \frac{L}{T_H^2} \cdot cos\psi$	-	$\pm 0{,}05 \cdot w \cdot \frac{L}{T_H^2} \cdot sin\psi$

Where:

w = Weight of crane or its component part, [N].

L = Vessels length, as defined in 1.2, [m[.

T_R = Roll period, [s]

T_P = Pitch period, [s]

T_H = Heave period, [s]

x = Longitudinal distance parallel to the deck from centre of pitching motion, taken to be at longitudinal entre of floatation to the centre of gravity of the crane system, [m].

y = Transverse distance parallel to deck from centreline of the vessel to the centre of gravity of crane system, [m].

z_R = Distance normal to deck from centre of rolling motion, taken to be at the vertical centre of gravity of the vessel to the vertical centre of gravity of the crane system, [m].

z_p = Distance normal to deck from centre of pitching motion to the centre of gravity of the crane system, [m].

φ, ψ = in degrees.

4.6.4 The following combination of static and dynamic forces are to be considered:

(a) Rolling motion only: static roll + dynamic roll + dynamic heave at roll angle φ.

(b) Pitching motion only: static pitch + dynamic pitch + dynamic heave at pitch angle ψ.

(c) Combined motion: static combined + 0,8·(dynamic roll + dynamic pitch).

In each case the component of force due to wind is to be included where applicable.

4.6.5 In the stowed condition the crane structure and any stowed arrangements are to be designed to withstand forces resulting from the following two design combinations:

(a) Combination No. 1

.1 Acceleration normal to deck of ± 1,0 g.

.2 Acceleration parallel to deck in fore and aft direction of ± 0,5 g.

.3 Static heel of 30°.

.4 Wind of 63 m/s acting in fore and aft direction.

(b) Combination No. 2

.1 Acceleration normal to deck of ± 1,0 g.

.2 Acceleration parallel to deck in transverse direction of ± 0,5 g.

.3 Static heel of 30°.

.4 Wind of 63 m/s acting in a transverse direction.

4.7 Wind forces

4.7.1 the wind pressure arting on the crane structure is given by the formula:

$$p = 0{,}613 \cdot v^2 \text{ , } [N/m^2]$$

where:

v = Wind speed, m/s.

The wind speed for the "in service" condition is to be taken as 20 m/s and for the stowed condition as 63 m/s.

4.7.2 Where it is anticipated, that wind speeds in excess of those defined in 4.7.1 may occur, then these higher wind speeds are to be considered.

4.7.3 The wind force acting on the suspended load is to be taken as 300 N per tonne of lifting load, but where a floating crane is to be designed to lift loads of a specific shape and size, the wind force may be calculated for the appropriate dimensions and configuration.

4.7.4 The wind force on the crane structure or ondividual members of the structure is to be calculated from the following expression:

$$F_w = A \cdot p \cdot C_f \ [N]$$

A = Solid area projected on to a plane perpendicular to the wind direction, m^2.

p = Wind pressure (see 4.7.1), N/m^2.

Cf = Force coefficient in the direction of wind.

= 1,6 for individual members (rolled sections, rectangles, hollow sections, flat plates).

= 1,1 for machinery houses, etc. (rectangular clad structures on ground or solid base).

4.7.5 For latticed tower structures, the wind force based on the solid area of the windward fare (see 4.7.4) is to be multiplied by the coefficient C_{f1} = 2,6.

4.8 Platform and access-way loading

4.8.1 Platforms and access-ways are to designed to carry a uniformly distributed load over the full platform area of 5000 N/m^2 and a concentrated load of 3000 N on any individual member.

4.9 Load cases

4.9.1 The crane design is to be considered with respect to loads resulting from the following conditions:

(a) Load case 1: crane operating without wind.

(b) Load case 2: crane operating with wind.

(c) Load case 3: crane in stowed condition.

4.9.2 Load case 1

For the condition of the crane operating without wind the design is to be considered with respect to a combination of static loads (see 4.3) and horizontal forces defined in 4.4, 4.5 and 4.6, as given by the following formula:

$$F_1 = 1{,}05 \cdot (F_D + F_{D1} + F_H + F_{L1} + C_H + F_{S1})\ [N]$$

Where:

F_D = Dead load, [N]

F_{D1}= Horizontal component of dead load due to heel and trim, [N]

F_H = Dynamic force due to hoisting (see 4.4.2), [N]

F_{L1} = Horizontal component of live load due to heel and trim (see 4.6), [N]

C_H = Hoisting factor, as specified in 4.4.2.

F_{S1} = Horizontal load due to slewing acceleration (see 4.5), [N]

4.9.3 Load case 2

For the condition of the crane operating with wind the design is to be considered with respect to a combination of static loads (see 4.3) and horizontal forces defined in 4.4, 4.5, 4.6 and 4.7, as given by the following formula:

$$F_2 = F_1 + F_W\ [N]$$

Where:

F_1 = Load as defined in 4.9.2.

FW= Wind force (see 4.7), [N]

4.9.4 Load case 3

The crane is to be considered in its stowed condition when subjected to forces resulting from accelerations due to the vessel motions and static inclination together with wind forces appropriate to the stowed condition. The effects of anchorages, locks and lashings, etc. are to be taken into consideration.

CHAPTER 5 Fire Fighting Vessels

Contents

SECTION 1 General

1.1 Classification

1.1.1 The requirements included in this Chapter apply, in addition to those applicable requirements of other Parts, to vessels which are intended to fight fire.

1.1.2 Vessels built in compliance with these requirements will be assigned by the Society a class notation consisting of the following notations:

(a) The type notation "FIRE FIGHTING SHIP" which is assigned in order to declare that the ship is provided with fire-fighting and fire protection equipment in compliance with these Rules.

(b) The category notation "I", "II" or "III" which signifies that the ship is provided with the equipment specified in Table 5.3.1 depending on her category.

(c) The "SP" notation which signifies that a self-protection system in compliance with SECTION 4 is provided.

1.1.3 In case of ships engaged in fire-fighting operations and which either,

(a) operate in certain strictly defined sea areas, or,

(b) are of novel design, or,

(c) are of limited operational capabilities, or,

(d) have to comply with special requirements imposed by the National Authority with whom the ship is registered and/or by the Administration within whose territorial jurisdiction the ship is intended to operate,

special consideration may be given and a corresponding class notation to be assigned upon agreement with the involved parts.

1.1.4 The Classification of the vessel is based on the following assumptions:

(a) the vessel has been operated in accordance with the approved Operational Manual,

(b) the crew engaged in fire-fighting operations has been properly trained.

1.2 Documentation to be submitted

1.2.1 In addition to the documentation required for the main class, the following plans and particulars are to be submitted:

(a) A general arrangement plan showing the disposition of all fire-fighting equipment.

(b) A general arrangement plan showing the disposition of fire divisions and their class.

(c) Stability calculations.

(d) Plans showing the layout and capacity of the water spraying system.

(e) Plans of any other fire-fighting systems provided.

(f) Construction plan of the fire doors.

(g) A plan of the seating arrangements for the water monitors.

(h) Details of major items of fire-fighting equipment.

(i) Detailed plans of the fire divisions

(j) Particulars of the means of keeping the ship in position during fire-fighting operations.

(k) A plan showing the fire pumps, the fire water main, the hydrants, hoses and hose nozzles and the monitors and their delivery capabilities.

(l) Details of the fireman's outfits provided.

(m) The Operation Manual

1.3 Testing

1.3.1 After the completion of the installation of the fire-fighting systems and the corresponding equipment, appropriate tests, should be carried out in order to ensure that the vessel is able to operate as intended.

1.3.2 During the testing, the angle of list should be measured when various combinations of water monitors are in operation.

SECTION 2 Basic requirements

2.1 Structural design

2.1.1 The hull structure of the ship should be strengthened so that the vessel to be capable to withstand the forces which are expected to be imposed during the fire-fighting operations by the fire extinguishing systems.

2.1.2 The structural design of the ship should be based on the most adverse operational conditions.

2.1.3 All sea-suctions of the fire pumps should be located as low as practicable.

2.1.4 The compartment in which the driving units of the fire-fighting pumps are located should be considered as “machinery space”.

2.1.5 In ships which are not provided with a water spray system all portlights and windows are to be provided with efficient deadlights or external sheet shutters except in the wheel house.

2.2 Manoeuvrability

2.2.1 The ship should be provided with the necessary arrangements which will give to the ship adequate manoeuvrability during fire-fighting operations under the most unfavorable expected conditions.

2.2.2 The most unfavorable manoeuvrability requirements for calm water operation should not require more than 80% of the available propulsion force in any direction.

2.3 Stability

2.3.1 The effect of the monitors, when they are operating at their maximum output in all possible directions of use, should be taken into account in the stability calculations.

2.3.2 The ship should comply with the corresponding stability and draught requirements imposed by the National Authority.

2.4 Lights

2.4.1 At least two horizontally and vertically adjustable searchlights should be provided for operations in darkness.

2.4.2 The lights should provide a level of illumination of 50 lux within an area of not less than 10 m diameter, at a distance of 250 m, in clear atmospheric conditions.

2.5 Operation Manual

2.5.1 The Operational Manual (or envelope) which should be always kept onboard should include the following information:

(a) Detailed description of all fire-fighting and self protection systems and equipment.

(b) Detailed and Clear instructions for the operation, maintenance and testing of all fire-fighting and self protection systems and equipment.

(c) Instructions for operation of the vessel during fire-fighting, including bunkering operations while the ship is operating on station.

SECTION 3 Fire-extinguishing systems

3.1 Water monitor system

3.1.1 Requirements concerning the minimum number of monitors, their discharge rate, the length and the height of the produced jet above the sea level are given in Table 5.3.1.

3.1.2 The monitors and their seating arrangement are to be of robust construction and of appropriate strength for all modes and conditions of operation.

3.1.3 The horizontal angular movement of the monitors is to be at least ± 90° from the center line of the vessel.

3.1.4 The monitors are to be arranged so that the required length and height of jet can be achieved when all monitors are operating simultaneously along the center line of the vessel. Means should be provided for preventing impact of the jets on the ship's structure.

3.1.5 Two of the monitors should be provided with jet dispersion arrangements.

3.1.6 All monitors should be remotely controllable from a protected position providing a good view of the monitors and the operating area.

3.2 Pumps and piping systems

3.2.1 The applicable requirements for pumping and piping systems covered by the main class are to be complied with.

3.2.2 The required number of pumps and the minimum total pump capacities are specified in Table 5.3.1.

3.2.3 The pumps and their piping system which are intended for fire-fighting and self-protection are not to be available for other services and they should be provided with independent sea inlets.

3.2.4 Where the pumps are used for self-protection, the piping is to be independent of that supplying the monitors.

3.2.5 Sea-valves with nominal diameter greater than 450 mm are to be power actuated and manually operable as well.

3.2.6 Arrangements should be provided for the prevention of starting of the fire-fighting pumps when the water inlet valves are closed.

3.2.7 The design maximum water velocity in the suction lines should normally not exceed 2 m/s.

3.2.8 Piping from seawater inlets to water monitors should be protected against corrosion internally. External protection is required for all piping exposed to the weather.

Table 5.3.1: Fire-extinguishing equipment

Category	I	II		III
Monitors				
Number (min.)	2	3	4	4
Minimum discharge rate per monitor (m^3/h)	1200	2400	1800	2400
Length of jet (1) (m)	120	150		150
Height of jet (2) (m)	50	80		90
Minimum fuel oil capacity (h)	24	96		96
Pumps and Piping Systems				
Minimum total pump capacity (m^3/h)	2400	7200		9600
Number of pumps	1-2	2-4		2-4
Number of hose connections each side of ship	4	8		8
Fireman's Outfits				
Number of fireman's outfits	4	8		8

NOTES:
1. Length is considered to be the horizontal distance from the mean impact area to the nearest point of the vessel.
2. Height is considered to be the vertical distance from the sea level to the mean impact area measured at a horizontal distance at least 70 m from nearest point of the vessel.

3.3 Hose connections and hose stations

3.3.1 The required number of hose connections for each ship category is given in Table 5.3.1.

3.3.2 Hose stations should be provided for at least half the number of the hose connections. Each hose station should be provided with 2 x 15 m hose and a nozzle capable of producing a jet or a spray and simultaneously a jet and a spray.

3.4 Fireman's Outfits

3.4.1 The required number of fireman's outfits is given in Table 5.3.1 for each ship category.

3.4.2 A fireman's outfit shall consist of:

(a) Protective clothing of material to protect the skin from heat radiating from the fire and from burns and scalding by steam. The outer surface is to be water-resistant.

(b) Boots and gloves of rubber or other electrically non-conducting material.

(c) A rigid helmet providing effective protection against impact.

(d) An electric safety lamp (hand lantern) of an approved type with a minimum operating period of 3 hours.

(e) An axe with an insulated handle.

(f) A self-contained breathing apparatus which is to be capable of functioning for a period of at least 30 minutes and having a capacity of at least 1200 litters of free air. Spare, fully charged air bottles are to be provided at the rate of at least one set per required apparatus.

For each breathing apparatus a fireproof life-line of sufficient length and strength is to be provided capable of being attached by means of a snaphook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the life-line is operated.

3.4.3 The fireman's outfits should be placed in a separate fire station the entrance of which should be clearly marked.

3.4.4 A suitable air compressor for recharging the bottles of the breathing apparatus of the fireman's outfit should be provided. The capacity of the compressor should be at least 70 lt/min.

SECTION 4 Self-protection

4.1 General

4.1.1 Vessels which have been assigned the special notation "**SP**" should be protected by a permanent water spraying system in accordance with the requirements of this section.

4.2 Fixed water-spraying system

4.2.1 The system should be designed so that to protect all outside vertical parts of hull, superstructures and deckhouses including foundations for water monitors and other equipment.

4.2.2 Pipelines and nozzles should be protected against damage during the fire-fighting operations.

4.2.3 The capacity of the water spraying system should not be less than 10 lt/(min·m^2) for all areas under protection. In case of protected areas which are internally insulated to a A-60 standard the required capacity should not be less than 5 lt/(min·m^2).

4.2.4 The system should be divided into sections in order to be possible to stop the operation of the system in areas which are not exposed to heat.

4.2.5 The pumps of the fire-fighting system may also be used to the spraying system provided that their capacity is properly increased by the capacity required by the latter. In this case a shut-off valve should be fitted in a proper position between the main piping of the two systems.

4.2.6 Sufficient freeing ports and deck scuppers should be provided so that to ensure efficient drainage of accumulated water under all conditions and modes of operation.

CHAPTER 6 Oil Recovery Vessels

Contents

SECTION 1 General

1.1 Classification

1.1.1 The requirements in this Section apply to vessels intended for occasionally handling, storage and transportation of oil with flash point below 60°C, recovered from a spill of oil, in emergency situations.

1.1.2 Vessels built and equipped in compliance with the following requirements may be given the class notation OIL RECOVERY SHIP.

1.1.3 In case of ships engaged in oil recovery operations and which either:

(a) operate in certain, strictly defined sea areas, or,

(b) are of novel design, or,

(c) are of limited operational capabilities,

special consideration may be given and a corresponding class notation to be assigned.

1.2 Scope

1.2.1 The following matters are covered by the classification:

(a) safety against fire and explosion during handling, storage and transportation of oil recovered from a spill on sea,

(b) supporting structures for equipment applied during oil recovery operations,

(c) stability and floatability,

(d) available power for supply to equipment used during oil recovery operations.

1.3 Assumption

1.3.1 The classification of the vessel is based on the assumption that the operation of the vessel during oil recovery operation will be in accordance with the approved operation manual, see 5.1.

1.4 Documentation to be submitted

1.4.1 In addition to the documentation required for the main class, general arrangement plan(s) showing the following particulars is to be submitted for approval:

(a) gas-dangerous zones and spaces

(b) location of equipment for reception and handling of oil such as pumps, skimmer, winches, etc.

(c) tanks intended for storage of recovered oil with accesses

(d) oil tank venting arrangement

(e) doors, hatches, ventilation openings and any other openings to gas-dangerous spaces and adjacent safe spaces

(f) ventilation arrangement for gas-dangerous spaces and adjacent safe spaces

(g) exhaust outlets from machinery

(h) fire extinguishing equipment and structural fire protection, see however 1.4.3

(i) electrical equipment in gas-dangerous areas with specification of explosion protected equipment, together with certificates.

1.4.2 The following plans and particulars are to be submitted for approval:

(a) diagrammatic plan of piping system for handling of oil

(b) plan showing supporting structures and fastening arrangements for equipment applied during oil recovery operations. Reaction forces to be stated.

(c) diagrammatic plan of power supply system for equipment used during oil recovery operations

(d) single line diagram for intrinsically safe circuits

(e) electric power balance for oil recovery operations, if applicable

(f) specification of gas-measuring instrument

(g) stability and floatability calculation of the vessel in the operating mode, however, see 1.4.3

(h) operation manual.

1.4.3 In the case that fire extinguishing equipment and structural fire protection and/or stability and floatability have been approved by a National administration applying requirements which may be considered equivalent to those of the class, such approval, satisfactorily documented, may be accepted as evidence of compliance with the class requirements.

1.5 Testing

1.5.1 Upon completion, the procedure for transfer to oil recovery operation of the vessel is to be demonstrated and such operation is to be simulated to verify that the vessel will be able to operate as intended.

SECTION 2 Basic requirements

2.1 General

2.1.1 The vessel is to be provided with:

(a) a suitable working deck for use in oil recovery operation,

(b) storage tanks for recovered oil,

(c) pumping and piping arrangement for transfer and discharge of recovered oil.

2.1.2 The vessel is to have adequate stability and floatability in all relevant operational conditions. The stability and floatability properties will be considered in each particular case.

2.1.3 The visibility from the maneuvering station is to be such that the Master can easily monitor oil recovery operations both on deck and in the water.

2.1.4 The oil tanks and the deck area, from where the operation is performed, are to be as far away from the accommodation as possible.

2.1.5 Exhaust outlets from machinery are to be located as high as practicable above the deck and are to

be fitted with spark arresters.

2.2 Fire protection and extinction

2.2.1 Exterior boundaries of superstructures and deckhouses enclosing accommodation and including any over hanging decks which support accommodation, are to be insulated to "A-60" standard for the whole of the portions which face the gas dangerous zones and for 3 m aft or forward of these, whichever is relevant. Alternatively a permanently installed water-spraying system in compliance with 2.2.3 may be accepted. Aluminium bulkheads will not be accepted in these boundaries.

2.2.2 Portholes or windows in the area specified in 2.2.1 are to be fitted with permanently installed inside deadlights of steel having a thickness equal to the steel in the bulkhead.

2.2.3 If impractical to fit deadlights, navigating bridge windows and other windows in the area specified in 2.2.1 are to be protected by a sprinkler system having a capacity of at least 10 litres/min/m^2. The system is to be fully activated by opening of one valve on the bridge.

2.2.4 For protection of the working deck area two dry powder fire extinguishers, each with a capacity of at least 50 kg, are to be provided. In addition, a foam applicator is to be provided. The quantity of foam concentrate is to be at least 0,4 litres/m^2 working deck area, minimum 200 litres. The foam expansion ratio is generally not to exceed 12 to 1. The fire extinguishers are to be placed near the deck area where the equipment for handling of recovered oil is located, and are to be fitted with hoses of adequate length.

2.3 Tank arrangement

2.3.1 Tanks within the accommodation and/or engine room area of the vessel are in general not to be used for storage of recovered oil.

2.3.2 Tanks intended for storage of recovered oil are normally to be separated from the engine room and accommodation by means of cofferdams, tanks for other purposes (fuel oil, ballast etc.) or dry compartments other than accommodation. For easy access to all parts, the cofferdams are to have a minimum width of 600 mm.

2.3.3 Where cofferdams are impractical to arrange, tanks adjacent to the engine room may be accepted for storage of recovered oil provided that tank bulkhead is:

(a) accessible for inspection

(b) carried continuously through abutting plate panels, except that full penetration welding may be used at the top of the tank

(c) pressure tested at every periodical survey.

2.3.4 Upon special consideration double bottom tanks in the engine room area may be used for storage of recovered oil. The arrangement of pipes and openings between tanks is to be such that static pressure on the double bottom tank top is prevented. Level alarms are to be fitted.

2.3.5 A tank arrangement requiring removable manhole covers is to be avoided. Open manholes between a maximum of 3 tanks may be accepted, provided the manhole covers are removable from ballast or fresh water tanks.

2.3.6 All openings to the tanks (sounding pipes, hatches for placing of portable pumps and hoses) for recovered oil are to be located on open deck.

2.3.7 Tanks for recovered oil are to have suitable access from open deck for cleaning and gas- freeing. Long tanks are to have access in both ends.

2.3.8 Tanks exceeding a breadth of 0,56·B or a length of 0,1·L or 12 m whichever is the greater are

normally to be provided with wash bulkheads or similar arrangement to reduce liquid sloshing in partially filled tanks.

2.3.9 The height of tanks for recovered oil is not to be less than 1,5 m. Internal obstructions in tanks for recovered oil are to be provided with adequate openings to allow a full flow of oil. The area of one single opening is for that purpose not to be less than twice the sectional area of the discharge pipe. The openings are to be arranged that the tanks can be effectively drained.

2.3.10 Any coating in tanks for recovered oil is to be of an oil and dispersion resistant type.

2.4 Support of heavy components

2.4.1 The strength of the supporting structures for equipment applied during oil recovery operations can be based on the assumption that the oil recovery operations will take place in moderate sea conditions.

2.4.2 For cranes intended for use during oil recovery operations, dynamic loads due to the vessel's motions are to be taken into account. In general the cranes and their supporting structures are to have scantlings based on at least twice the working load of the crane.

SECTION 3 Gas-dangerous and Safe Areas

3.1 Definitions

3.1.1 The following spaces are to be considered as gas dangerous spaces during oil recovery operations:

(a) tanks for storage of recovered oil,

(b) enclosed or semi-enclosed spaces in which pipe flanges, valves, hoses, pumps and/or other equipment for handling of recovered oil are located.

3.1.2 The following spaces are to be considered as gas dangerous if the requirements to ventilation given in 4.2.4 are not complied with:

(a) cofferdams and spaces adjacent to tanks intended for storage of recovered oil,

(b) enclosed or semi-enclosed spaces having access or opening into other gas-dangerous areas,

(c) any enclosed space outside the recovered oil tank area through which piping which may contain recovered oil passes or terminates.

3.1.3 Gas-dangerous zones are:

(a) zones on the open deck or semi-enclosed spaces on the deck within a distance of 3 m from oil skimmer equipment, hoses and valves used for recovered oil handling, openings and air pipes from tanks for recovered oil and openings and ventilation outlets from gas-dangerous spaces

(b) the open over tanks intended for storage of recovered oil and 3 m forward and aft of this area on the open deck up to height of 2,4 m above the deck.

3.1.4 Safe areas are areas which are not defined as gas-dangerous in the above.

3.2 Access and other openings

3.2.1 There are normally not to be access doors or other openings between a safe room and gas-dangerous area. Access doors may, however, be accepted between such spaces on the following conditions:

(a) the safe room is to have ventilation overpressure in relation to the gas-dangerous area

(b) the doors are normally to be self-closing and arranged to swing into the safer space so that they are kept closed by the overpressure

(c) signboards are to be fitted warning that the doors are to be kept closed during oil recovery operations.

SECTION 4 Arrangement and equipment

4.1 General

4.1.1 The vessel is to be arranged and equipped so as to minimize the time needed to make it operational. This implies that systems and equipment for handling of recovered oil as far as practicable are to be permanently installed.

4.1.2 Systems and arrangements are to be such that procedures for and practical execution of filling, venting, discharge, sounding, etc. will be simple to perform.

4.1.3 All electrical and mechanical equipment for use in gas-dangerous areas during oil recovery operations is to be certified for operation in gas contaminated atmosphere.

4.2 Ventilation system

4.2.1 There are to be independent ventilation for gas-dangerous and safe spaces.

4.2.2 Safe spaces adjacent to gas-dangerous areas are normally to have mechanical ventilation with overpressure relative to gas-dangerous areas. The inlet air is to be taken from a safe area on open deck located as far as practicable from possible gas sources. Also the outlet air is normally to be led to a safe area on open deck. Location of the outlet in an open deck gas-dangerous zone may, however, be considered, depending upon the arrangement in each case.

4.2.3 Gas-dangerous spaces are normally to have mechanical ventilation of extraction type, giving at least 8 changes of air per hour. The inlet air is to be taken from a safe area on open deck.

4.2.4 Spaces which normally would be regarded as gas-dangerous spaces according to 3.1.2 above may be accepted as safe on the condition that the following special requirements to ventilation in addition to those given in 4.2.2 above are complied with:

(a) the ventilation capacity is to be at least 20 changes of air per hour

(b) the arrangement of ventilation inlet and outlet openings in the room is to be such that the entire rooms is efficiently ventilated, taking special consideration to locations where gas may be released or accumulated.

4.3 Tank venting system

4.3.1 Ventilation outlets from the tanks are to be led to open deck.

The outlets are to have a minimum height of 2,4 m above deck and be located at a minimum horizontal distance of 5 m away from openings to accommodation and other gas-safe spaces, ventilation intakes for accommodation and engine room and non-certified safe electrical equipment.

4.3.2 Portable ventilation outlet pipes intended for use during oil spill recovery operations only, may be accepted.

4.3.3 The venting arrangement is in general to comply with the requirements given for the main class.

4.4 Arrangement of piping systems

4.4.1 The system for pumping and transfer of recovered oil is to be located outside engine room and accommodation.

4.4.2 The transfer system is to be arranged such that simultaneous filling and discharge will be possible.

4.4.3 For coupling of portable skimming equipment one or maximum two filling connections with branch pipes to all tanks for recovered oil are to be arranged on deck.

4.4.4 The filling line is to be provided with means for injection of emulsion-breaking chemicals. The arrangement is to be so as to facilitate efficient mixing with recovered oil, e.g. by injection to the suction side of a pump. For tanks provided with heating coils the requirements may be dispensed with.

4.4.5 Where permanently installed oil recovery piping is incompatible with the normal cargo system, suitable blanking arrangements are to be provided.

4.4.6 Parts of existing piping and pumping systems may be used if found to satisfy the general safety principles. Such arrangements will be evaluated in each case.

4.4.7 The internal diameter of sounding pipes from tanks for recovered oil is to be less than 50 mm. The sounding pipes are to be located on open deck.

4.4.8 For all piping connections other than mentioned above, blanking-off before oil is loaded into the tanks is to be possible. The blanking device is to be fitted to the nearest detachable pipe connection at the tank.

4.5 Power supply and electrical equipment

4.5.1 The following equipment will be accepted in gas-dangerous areas:

(a) flameproof, pressurized, increased safety or intrinsically safe equipment

(b) cables complying with the requirements of Part 6, Chapter 6, SECTION 1, 1.1.

4.5.2 Means for disconnection of electrical supply to non-certified electrical equipment in gas-dangerous spaces is to be arranged. Signboards are to be fitted at the respective switches. Electrical cables led through these spaces and electrical equipment in the machinery spaces are exempted.

4.5.3 Non-certified safe electrical equipment located in gas-dangerous zones on open deck are to be disconnected during oil recovery operation.

4.5.4 The arrangement of power supply to non- permanent oil skimming and pumping equipment is as far as practicable to be permanently installed. For circuits with higher rating, the outlet is to be arranged from a connection box, provided with a door which is interlocked with a switch. The supply from the main switchboard to the connection box or socket-outlet is to be permanently installed, and provided with separate switchgear with short-circuit and overcurrent protection in each insulated phase.

4.5.5 Non-permanent oil skimming and pumping equipment and independent power-packages are to be certified as safe for operation in gas-contaminated atmosphere.

4.5.6 The socket-outlet and connection boxes mentioned in 4.5.4 are to be located at easily accessible places and in such a way that flexible cables are not carried through doors or accommodation spaces.

4.6 Miscellaneous requirements

4.6.1 A portable hydrocarbon gas-measuring instrument of approved type is to be provided on board.

4.6.2 The deck area where handling of hoses and equipment for recovered oil takes place is to be provided with adequate lighting.

4.6.3 A low sea suctions is to be arranged for cooling water pumps for machinery.

4.6.4 Exhaust pipes or any other pipes with surface temperature exceeding 220°C are not to pass through gas-dangerous spaces.

4.6.5 Signboards are to be fixed by screws, rivets or equal.

SECTION 5 Operational Instructions

5.1 General

5.1.1 The vessel is to have an approved operation manual onboard. The manual is to give information regarding the safe use of the vessel during oil recovery operations and is to have references to enclosed drawings.

5.1.2 The operation manual is in general to give information regarding the following:

(a) Arrangement and equipment

.1 tank arrangement

.2 transfer system

.3 gas measuring instrument

.4 various equipment

(b) Mobilization

.1 checking of all equipment taken onboard to ascertain that it is certified for use in gas- contaminated atmospheres

.2 mounting and fastening of non-permanent equipment

.3 blanking-off of pipes

.4 assembling of air pipes

.5 disconnection of electrical power supply

.6 closing of openings between safe and gas-dangerous areas

.7 start of additional ventilation equipment

.8 change-over to low suction for cooling water pumps

.9 fitting of signboards regarding the use of open flame, non-certified electrical equipment etc.

(c) Operation

.1 guidelines regarding safe distance from an oil spill source. If gases are traced on open deck, the vessel is to be withdrawn immediately.

.2 gas measurements during operation (on open deck and in spaces where gas might accumulate)

.3 actions to be taken if gases are traced in enclosed spaces (cleaning, ventilation, emptying of adjacent tanks, etc.)

.4 precautions against overfilling of tanks

.5 discharging

(d) Cleaning and gas-freeing of tanks and pipes

(e) Stability in all relevant operational condition