

## RESOLUTION A.271(VIII)

*Adopted on 20 November 1973  
Agenda item 10*

### RECOMMENDATION TO PUT FIRE SAFETY MEASURES FOR TANKERS AND COMBINATION CARRIERS INTO EFFECT

THE ASSEMBLY,

NOTING Article 16(i) of the IMCO Convention concerning the functions of the Assembly,

NOTING FURTHER Recommendation 15 of the International Conference on Safety of Life at Sea, 1960 concerning safety measures in tankers,

RECALLING that it had adopted in Resolution A.213(VII) the Recommendation on Fire Safety Requirements for Construction and Equipment of New Tankers and at the same time instructed the Maritime Safety Committee to continue its study on the subject with the view to developing the Recommendation further,

RECALLING ALSO that in Resolution A.213(VII) all governments concerned were invited to take appropriate steps to give effect to the Recommendation as soon as possible and to consider inter-governmental agreement for a common date for its coming into force,

NOTING that the Maritime Safety Committee at its twenty-sixth session expressed concern on the lack of inter-governmental agreement on a common date of coming into force of Resolution A.213(VII) and that the view was expressed that the date of coming into force might be 1 January 1974,

HAVING CONSIDERED the Recommendation of the Maritime Safety Committee at its twenty-eighth session,

DECIDES to approve draft Regulations on Fire Safety Measures for Tankers and Combination Carriers the text of which is shown at Annex to this Resolution, for inclusion in the draft International Convention for the Safety of Life at Sea, 1974,

ENDORSES the above-mentioned draft Regulations as a Recommendation which shall supersede the text of the Annex to Resolution A.213(VII),

INVITES all governments concerned:

- (a) to make known the provisions of the draft Regulations to shipowners and operators under their jurisdiction;
- (b) to make every effort to ensure that the draft Regulations apply to ships the keels of which are laid, or which are at a similar stage of construction, on or after 1 July 1974; and
- (c) to inform the Organization of measures taken by them in this respect,

REQUESTS the Maritime Safety Committee to continue its study on this subject with a view to developing the requirements further as regards the provisions in respect of smaller vessels carrying crude oil and vessels of all sizes carrying products other than those described in Regulation 1 of the above-mentioned draft Regulations.

## ANNEX

### DRAFT REGULATIONS CONCERNING FIRE SAFETY MEASURES FOR TANKERS AND COMBINATION CARRIERS

#### **Regulation 1**

##### *Application*

- (a) These Regulations shall apply to all new tankers of 500 tons gross tonnage and over, including combination carriers, carrying crude oil and petroleum products having a closed flashpoint not exceeding 60°C and whose Reid vapour pressure is below that of atmospheric pressure and other liquid products having a similar fire hazard, the keels of which are laid, or which are at a similar stage of construction on or after the date on which these Regulations come into force. In addition, such ships shall comply with the provisions of Parts E and F of Chapter II of the International Convention for the Safety of Life at Sea, 1960 (hereinafter referred to as the Convention).
- (b) When other cargoes which introduce additional fire hazards are to be carried, additional safety measures shall be required to the satisfaction of the Administration.

#### **Regulation 2**

##### *General*

The purpose of these Regulations is to require an effective and practical degree of fire protection in tankers. The basic principles underlying these Regulations are:

- (a) separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;
- (b) protection of means of escape;
- (c) containment and extinction of any fire in the space of origin;
- (d) restricted use of combustible materials; and,
- (e) minimization of possibility of ignition of cargo vapour.

#### **Regulation 3**

##### *Definitions*

Except as specified in this Regulation the terms used in these Regulations shall be as defined in Regulation 94 of Chapter II of the Convention:

- (a) "Deadweight" means the difference between the displacement of a ship at summer load waterline and the lightweight of the ship in metric tons;
- (b) "Lightweight" means the displacement of a ship in metric tons without cargo, oil fuel, lubricating oil, ballast and fresh water in tanks, stores and crew and their effects;
- (c) "Combination carrier" means a tanker designed to carry oil or alternatively solid cargoes in bulk.

#### **Regulation 4**

##### *Location and Separation of Spaces*

- (a) Machinery spaces of Category A shall be positioned aft of cargo tanks and slop tanks and shall be isolated from them by a cofferdam, cargo pump room or oil fuel bunker tank; they shall also be situated aft of such cargo pump rooms and cofferdams, but not necessarily aft of the oil fuel bunker tanks. However, the lower portion of the pump room may be recessed into such spaces to accommodate pumps provided the deck head of the recess is in general not more than one-third of the moulded depth above the keel except that in the case of ships of not more than 25,000 tons deadweight where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Administration may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

(b) Accommodation spaces, main cargo control stations, control stations and service spaces shall be positioned aft of all cargo tanks, slop tanks, cargo pump rooms and cofferdams which isolate cargo or slop tanks from machinery spaces of Category A. Any common bulkhead separating a cargo pump room, including the pump room entrance, from accommodation, service spaces and control stations shall be constructed to "A-60" Class. Where deemed necessary, accommodation, control stations, machinery spaces other than those of Category A and service spaces may be permitted forward of all cargo tanks, slop tanks, cargo pump rooms and cofferdams subject to an equivalent standard of safety and appropriate availability of fire extinguishing arrangements being provided to the satisfaction of the Administration.

(c) Where the fitting of a navigation position above the cargo tank area is shown to be necessary it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 metres. The fire protection of such navigation position shall in addition be as required for control spaces as set forth in Regulation 7(a) and (b) and other provisions as applicable of these Regulations.

(d) Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a suitable height extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

(e) Exterior boundaries of superstructures and deckhouses enclosing accommodation and service spaces and including any overhanging decks which support such accommodation, shall be insulated to "A-60" Class for the whole of the portions which face cargo oil tanks and for 3 metres aft of the front boundary. In the case of the sides of these superstructures and deckhouses, such insulation shall be carried as high as is deemed necessary by the Administration.

(f) In boundaries, facing cargo tanks, of superstructures and deckhouses containing accommodation and service spaces the following provisions shall apply:

- (i) No doors shall be permitted in the first tier on the main deck, except to those spaces not having access to accommodation and service spaces such as cargo control stations, provision rooms and store-rooms. Where such doors are fitted, the boundaries of the space shall be insulated to "A-60" Class. Bolted plates for removal of machinery may be fitted in such boundaries.
- (ii) Port lights in such boundaries shall be of a fixed (non-opening) type. Pilot house windows may be non-fixed (opening).
- (iii) Port lights in the first tier on the main deck shall be fitted with inside covers of steel or equivalent material.

The requirements of this paragraph, where applicable, shall also be applied to the boundaries of the superstructures and deckhouses for a distance of 5 metres measured longitudinally from the forward end of such structures.

## **Regulation 5**

### *Means of Escape*

In addition to the requirements of Regulation 68(b)(i) of Chapter II of the Convention, consideration shall be given by the Administration to the availability of emergency means of escape for personnel from each cabin.

## **Regulation 6**

### *Ventilation*

(a) The arrangement and positioning of openings in the cargo tank deck from which gas emission can occur shall be such as to minimize the possibility of gas being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In every case the height of the outlet above the deck and the discharge velocity of the gas shall be considered in conjunction with the distance of any outlet from any deckhouse opening or source of ignition.

(b) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of paragraph (a) of this Regulation. Such vents especially for machinery spaces shall be situated as far aft as practicable. Due consideration in this regard should be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

(c) Cargo pump rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimize the possibility of accumulation of flammable vapours. The number of changes of air shall be at least 20 times per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type.

## Regulation 7

### *Construction*

- (a)
- (i) The hull, superstructure, structural bulkhead decks and deckhouses shall be constructed of steel or other equivalent material.
  - (ii) Bulkheads between cargo pump rooms, including their trunks and machinery spaces of Category A shall be "A" Class and shall have no penetrations which are less than "A-0" Class or equivalent in all respects, other than the cargo pump shaft glands and similar glanded penetrations.
  - (iii) Bulkheads and decks forming divisions separating machinery spaces of Category A and cargo pump rooms, including their trunks, respectively, from the accommodation and service spaces shall be of "A-60" Class. Such bulkheads and decks and any boundaries of machinery spaces of Category A and cargo pump rooms shall not be pierced for windows or port lights.
  - (iv) The requirements of sub-paragraphs (ii) and (iii) of this paragraph, however, do not preclude the installation of permanent approved gas-tight lighting enclosures for illuminating the pump rooms provided that they are of adequate strength and maintain the integrity and gas-tightness of the bulkhead as "A" Class. Further, it does not preclude the use of windows in a control room located entirely within a machinery space.
  - (v) Control stations shall be separated from adjacent enclosed spaces by means of "A" Class bulkheads and decks. The insulation of these control station boundaries shall be to the satisfaction of the Administration having in mind the risk of fire in adjacent spaces.
  - (vi) Casing doors in machinery spaces of Category A shall be self-closing and comply with the related provisions of sub-paragraph (b)(vii) of this Regulation.
  - (vii) The surface of the insulation on interior boundaries of machinery spaces of Category A shall be impervious to oil and oil vapours.
  - (viii) Primary deck coverings, if applied, shall be of approved materials which will not readily ignite.
  - (ix) Interior stairways shall be of steel or other suitable material.
  - (x) When adjacent to accommodation spaces, bulkheads of galleys, paint stores, lamp rooms and boatswain's stores shall be of steel or equivalent material.
  - (xi) Paints, varnishes and other finishes used on exposed interior surfaces shall not be of a nature to offer an undue fire hazard in the judgment of the Administration and shall not be capable of producing excessive quantities of smoke or other toxic properties.
  - (xii) Pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk. Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.
  - (xiii) Electric radiators, if used, must be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains or other similar materials can be scorched or set on fire by heat from the element.
  - (xiv) Cellulose-nitrate based film shall not be used in cinematograph installations on board ships.
  - (xv) Power ventilation of machinery spaces shall be capable of being stopped from an easily accessible position outside the machinery spaces.
  - (xvi) Skylights to machinery spaces of Category A and cargo pump rooms shall comply with the provisions of sub-paragraph (a)(iii) of this Regulation in respect of windows and port lights and in addition shall be so arranged as to be capable of being readily closed from outside the spaces which they serve.

- (b) Within the accommodation, service and control spaces the following conditions shall apply:
- (i) Corridor bulkheads including doors shall be of “A” or “B” Class divisions extending from deck to deck. Where continuous “B” Class ceilings and/or linings are fitted on both sides of the bulkhead, the bulkhead may terminate at the continuous ceiling or lining. Doors of cabins and public spaces in such bulkheads may have a louvre in the lower half.
  - (ii) Air spaces enclosed behind ceilings, panellings, or linings shall be divided by close-fitting draught stops spaced not more than 14 metres apart.
  - (iii) Ceilings, linings, bulkheads and insulation except for insulation in refrigerated compartments shall be of non-combustible material. Vapour barriers and adhesives used in conjunction with insulation as well as insulation of pipe fittings for cold service systems need not be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have resistance to propagation of flame to the satisfaction of the Administration.
  - (iv) The framing, including grounds and the joint pieces of bulkheads, linings, ceilings and draught stops, if fitted, shall be of non-combustible material.
  - (v) All exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces shall have low flame-spread characteristics.
  - (vi) Bulkheads, linings and ceilings may have combustible veneer, provided that such veneer shall not exceed 2.0 millimetres within any such space except corridors, stairway enclosures and control stations where it shall not exceed 1.5 millimetres.
  - (vii) Stairways which penetrate only a single deck shall be protected at least at one level by “A” or “B” Class divisions and self-closing doors so as to limit the rapid spread of fire from one deck to another. Crew lift trunks shall be of “A” Class divisions. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by “A” Class divisions and protected by self-closing steel doors at all levels. Self-closing doors shall not be fitted with holdback hooks. However, holdback arrangements fitted with remote release fittings of the failsafe type may be utilized.
- (c) Ducts provided for ventilation of machinery spaces of Category A shall not in general pass through accommodation, service spaces or control stations, except that the Administration may permit relaxation from this requirement, provided that:
- (i) the ducts are constructed of steel, and each is insulated to “A-60” Class, or
  - (ii) the ducts are constructed of steel and are fitted with an automatic fire damper close to the boundary penetrated and are insulated to “A-60” Class from the machinery space of Category A to a point at least 5 metres beyond the fire damper.
- (d) Ducts provided for ventilation of accommodation, service spaces or control stations shall not in general pass through machinery spaces of Category A except that the Administration may permit relaxation from this requirement provided that ducts are constructed of steel and an automatic fire damper is fitted close to the boundaries penetrated.

## Regulation 8

### *Cargo Tank Protection*

- (a) For crude oil tankers of 100,000 tons deadweight and over and crude oil combination carriers of 50,000 tons deadweight and over, the protection of the cargo tanks deck area and cargo tanks shall be achieved by a fixed deck froth system and a fixed inert gas system in accordance with the requirements of Regulations 9 and 10 of these Regulations except that in lieu of the above installations the Administration, after having given consideration to the ship arrangement and equipment, may accept other combinations of fixed installations if they afford protection equivalent to the above, in accordance with Regulation 5 of Chapter I of the Convention.
- (b) To be considered equivalent, the system proposed in lieu of the deck froth system shall:
- (i) be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and
  - (ii) be capable of combating fires in ruptured tanks.
- (c) To be considered equivalent, the system proposed in lieu of the fixed inert gas system shall:
- (i) be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and

- (ii) be so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

### **Regulation 9**

#### *Fixed Deck Froth System*

- (a) The arrangements for providing froth shall be capable of delivering froth to the entire cargo tank area as well as into any cargo tank, the deck of which has been ruptured.
- (b) The deck froth system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside of the cargo tank area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.
- (c) The rate of supply of froth solution shall be not less than the greater of the following:
  - (i) 0.6 litre per minute per square metre of the cargo deck area, where cargo deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces; or
  - (ii) 6 litres per minute per square metre of the horizontal sectional area of the single tank having the largest such area.

Sufficient froth concentrate shall be supplied to ensure at least 20 minutes of froth generation when using solution rates stipulated in sub-paragraph (i) or (ii) of this paragraph, whichever is the greater. The froth expansion ratio (i.e. the ratio of the volume of froth produced to the volume of the mixture of water and froth-making concentrate supplied) shall not generally exceed 12 to 1. Where systems essentially produce low expansion froth but at an expansion ratio slightly in excess of 12 to 1, the quantity of froth solution available shall be calculated as for 12 to 1 expansion ratio systems. When medium expansion ratio froth (between 50 to 1 and 150 to 1 expansion ratio) is employed the application rate of the froth and the capacity of a monitor installation shall be to the satisfaction of the Administration.

- (d) Froth from the fixed froth system shall be supplied by means of monitors and froth applicators. At least 50 per cent of the required froth rate shall be delivered from each monitor.
- (e)
  - (i) The number and position of monitors shall be such as to comply with paragraph (a) of this Regulation. The capacity of any monitor in litres per minute of froth solution shall be at least three times the deck area in square metres protected by that monitor, such area being entirely forward of the monitor.
  - (ii) The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall not be more than 75 per cent of the monitor throw in still air conditions.
- (f) A monitor and hose connection for a froth applicator shall be situated both port and starboard at the poop front or accommodation spaces facing the cargo deck. Applicators shall be provided for flexibility of action during fire-fighting operations and to cover areas screened from the monitors.
- (g) Valves shall be provided in both the froth main and the fire main immediately forward of every monitor position to isolate damaged sections of these mains.
- (h) Operation of a deck froth system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

### **Regulation 10**

#### *Inert Gas System*

- (a) An inert gas system shall be capable of providing to the cargo tanks on demand a gas or mixture of gases, so deficient in oxygen that the atmosphere within a tank may be rendered inert, i.e. incapable of propagating flame.
- (b) The inert gas system shall eliminate the need for fresh air to enter a tank during normal operations, except when preparing a tank for entry by personnel.
- (c) Empty tanks shall be capable of being purged with inert gas to reduce the hydrocarbon content of a tank after discharge of cargo.
- (d) The washing of tanks shall be capable of being carried out in an inert atmosphere.

- (e) During cargo discharge, the system shall be such as to ensure that the volume of gas referred to in paragraph (g) of this Regulation is available. At other times sufficient gas to ensure compliance with paragraph (h) of this Regulation shall be continuously available.
- (f) Suitable means for purging the tanks with fresh air as well as with inert gas shall be provided.
- (g) The inert gas system shall have a capacity of at least 125 per cent of the maximum rated capacity of the cargo pumps.
- (h) Under normal running conditions, when tanks are being filled or have been filled with inert gas, a positive pressure shall be capable of being maintained at the tank.
- (i) Exhaust gas outlets for purging shall be suitably located in the open air and shall be to the same general requirements as prescribed for ventilating outlets of tanks in tankers, referred to in paragraph (a) of Regulation 6 of these Regulations.
- (j) A scrubber shall be provided which will effectively cool the gas and remove solids and sulphur combustion products.
- (k) At least two fans (blowers) shall be provided which together shall be capable of delivering at least the amount of gas stipulated in paragraph (g) of this Regulation.
- (l) The oxygen content in the inert gas supply shall not normally exceed 5 per cent by volume.
- (m) Means shall be provided to prevent the return of hydrocarbon gases or vapours from the tanks to the machinery spaces and uptakes and prevent the development of excessive pressure or vacuum. In addition, an effective water lock shall be installed at the scrubber. Branch piping for inert gas shall be fitted with stop valves or equivalent means of control at every tank. The system shall be so designed as to minimize the risk of ignition from the generation of static electricity.
- (n) Instrumentation shall be fitted for continuously indicating and permanently recording at all times when inert gas is being supplied the pressure and oxygen content of the gas in the inert gas supply main on the discharge side of the fan. Such instrumentation should preferably be placed in the cargo control room if fitted but in any case shall be easily accessible to the officer in charge of cargo operations. Portable instruments suitable for measuring oxygen and hydrocarbon gases or vapour and the necessary tank fittings shall be provided for monitoring the tank contents.
- (o) Means for indicating the temperature and pressure of the inert gas main shall be provided.
- (p) Alarms shall be provided to indicate:
  - (i) high oxygen content of gas in the inert gas main;
  - (ii) low gas pressure in the inert gas main;
  - (iii) low pressure in the supply to the deck water seal;
  - (iv) high temperature of gas in the inert gas main; and
  - (v) low water pressure to the scrubber
 and automatic shut-downs of the system shall be arranged on predetermined limits being reached in respect of (iii), (iv) and (v) of this paragraph.
- (q) Ships equipped with inert gas systems shall have an instruction manual covering operational, safety and occupational health requirements.

### **Regulation 11**

#### *Cargo Pump Room*

Each cargo pump room shall be provided with a fixed fire-fighting system operated from a readily accessible position outside the pump room. The system shall use water spray or another suitable medium satisfactory to the Administration.

### **Regulation 12**

#### *Hose Nozzles*

All hose water nozzles provided shall be of an approved dual purpose type (i.e. spray/jet type) incorporating a shut-off.