RULES FOR
CLASSIFICATION OF

SHIPS

NEWBUILDINGS

SPECIAL EQUIPMENT AND SYSTEMS
ADDITIONAL CLASS

PART 6 CHAPTER 4

ADDITIONAL FIRE PROTECTION (F-AMC)

JANUARY 2003

This booklet includes the relevant amendments and corrections shown in the January 2004 version of Pt.0 Ch.1 Sec.3.

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CHANGES IN THE RULES

General

This booklet is a reprint of the previous edition and apart from clarifications of text and the inclusion of amendments and corrections, published in the July 2002 edition of Pt.0 Ch.1 Sec.3, no other changes have been made.

This chapter is valid until superseded by a revised chapter. Supplements will not be issued except for an updated list of minor amendments and corrections presented in Pt.0 Ch.1 Sec.3. Pt.0 Ch.1 is normally revised in January and July each year.

Revised chapters will be forwarded to all subscribers to the rules. Buyers of reprints are advised to check the updated list of rule chapters printed in Pt.0 Ch.1 Sec.1 to ensure that the chapter is current.

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SECTION 1
GENERAL REQUIREMENTS

A. Classification

A 100 Application

101 The rules in this chapter apply to vessels with additional fire safety measures in accommodation spaces, machinery spaces and cargo areas. The requirements are to be regarded as supplementary to those given in SOLAS Ch. II-2.

102 The rules aim at increased fire protection through preventive measures as well as measures for reducing the consequences of fire.

A 200 Class notations

201 Vessels with the accommodation built and equipped in accordance with the requirements in Sec.1 and Sec.2 will be given the additional class notation **F-A**.

202 Vessels with the machinery spaces built and equipped in accordance with the requirements in Sec.1 and Sec.3 will be given the additional class notation **F-M**.

203 Vessels with the deck and cargo areas built and equipped in accordance with the requirements in Sec.1 and Sec.4 will be given the additional class notation **F-C**.

204 Vessels built and equipped in accordance with all the requirements of this chapter will be given the additional class notation **F-AMC**.

B. Documentation

B 100 Manuals and particulars

101 The requirements in Sec.1 to Sec.4 shall be identified in the following documentation:

- fire pumps and fire main including emergency fire pump and number and positions of hydrants and hoses
- capacity calculation for fire pumps
- fixed fire extinguishing arrangement in cargo spaces. Specification and location of equipment and calculation of discharge capacities, if required
- fire control plan
- automatic sprinkler, fire alarm and fire detection system
- for fixed fire detection and alarm systems in accommodation spaces, service spaces, machinery spaces and cargo spaces: specification and location of detectors, alarm devices and call points, and cable routing layout drawing
- ventilation systems. Layout, dimensions and penetrations of ducts through fire divisions and details of fire dampers
- arrangement of means of control for closure of openings, stop of ventilation fans and stop of fuel oil pumps in machinery spaces of category A
- structural fire protection drawings showing method of construction, the fire insulation and draught stops. Details of insulation and specification of materials. Doors in fire divisions
- protection of ro-ro cargo spaces and cargo spaces intended for carriage of vehicles with ventilation system, fire main, fire extinction and precautions against ignition of flammable vapours, if applicable.

In addition to these documents and plans, the following documentation shall be submitted for approval or incorporated into plans required above.

For class notation **F-A**

- water hose reel system
- documentation of combustible materials (test reports or reference to type approvals by the Society).

For class notation **F-M**

- the local automatic fire extinguishing system, including detection and control system
- infrared thermoscanning report, with corrective measures (for information)
- colour TV monitoring system.

For class notation **F-C**

- fire extinguishing system for cargo areas.

102 The following control and monitoring systems shall be approved by the Society:

- fire doors system
- local fire detection and extinguishing system.

For requirements to documentation, see Pt.4 Ch.9.

C. Manuals and Signboards

C 100 Manuals

101 Manuals for the fire fighting, fire detection and alarm systems are to be kept in the wheelhouse and in any fire control station. The manuals are to include instructions for use of the systems, periodical maintenance and specification of periodical tests.

C 200 Signboards

201 Signboards are required by these rules in:

Sec.4 D214 regarding marking of lockers and boxes for fire extinguishing systems on deck.
Sec.4 D307 regarding marking of boxes for dry chemical powder fire extinguishing system.

D. Firefighter's Outfit

D 100 General

101 Ships with one of or combinations of the additional class notations **F-A**, **F-M**, **F-C** are to have at least 4 sets of firefighter's outfit as specified in Ch.3 of Fire Safety Systems (FSS) Code as defined in Pt.3 Ch.3 Sec.10.

102 Each of the breathing apparatus is to be provided with cylinders of 1800 litres capacity. The total weight of one apparatus (including cylinder, valves and mask) is not to exceed 12.0 kg. Two spare cylinders are to be provided for each apparatus. All cylinders, apparatus and valves are to be of same type. Apparatus with less capacity and less weight may be accepted if they are deemed to be more suitable for the intended service and more spares are provided.

103 A high-pressure compressor suitable for filling of the cylinders for the breathing apparatus is to be installed. The compressor is to be driven by a separate diesel engine or from the emergency power plant and is to be placed in an easily accessible and safe place onboard. The capacity of the compres-

sor is to be at least 75 litres/minute.

Guidance note:

When considering the compressor location it should be kept in mind that, when a fire has broken out onboard, the compressor must be operable and that the air to be compressed must be sufficiently clean for breathing purposes.

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104 The firefighter's outfits are to be divided between two fire stations placed at a safe distance from each other. The fire stations are to be clearly marked and are to have access from open deck.

105 The arrangement of the fire stations is to be such that all the equipment is easily accessible and ready for immediate use, and such that the equipment has its own place. There are to be arrangements for hanging up protective clothing and other equipment, which should be stored in a suspended position.

SECTION 2
ACCOMMODATION

A. General

A 100 Purpose

101 The purpose of the requirements for fire technical subdivision of the accommodation is:

— to prevent a fire in any other part of the ship from spreading to the accommodation
— to prevent a fire in the accommodation from spreading to other parts of the accommodation (within the time limits established for the concerned material's fire-technical class)
— to reduce the use of combustible material
— to provide rapid detection and safe escape from the cabins and corridors.

B. Fire Integrity

B 100 Restricted use of combustible materials

101 All materials used in bulkheads including doors in these bulkheads, deckhead and lining are to be of non-combustible material as defined in Pt.3 Ch.3 Sec.10. Construction method IC (see SOLAS Reg. II-2/9.2.3.2) is to be used.

102 Curtains and other suspended textile materials are to have resistance to flame as given in Part 7 of the IMO Fire Test Procedures (FTP) Code as defined in Pt.3 Ch.3 Sec.10.

103 Furniture in stairways and corridors is only accepted when it does not obstruct the escape ways and complies with FTP Code, Part 8.

104 Bedding components are to comply with FTP Code, Part 9.

B 200 Subdivision

201 On cargo ships, accommodation exceeding 30 m in length or breadth is to have an A-60 class division preferably placed halfway between the bulkheads in length or breadth. Doors in these bulkheads are to be self-closing.

202 Passageways in the accommodation are to be divided by self-closing class B-15 doors at a maximum distance of 20 m from each other. When transverse corridors and longitudinal corridors are connect to each other, class B-15 doors are also to be provided if the total corridor exceeds 20 m.

203 The self-closing passageway doors may to be equipped with approved hold back arrangements, arranged so that they will automatically release the doors when the fire alarm is sounded.

204 Doors from passageways to lounges, day rooms and other public spaces exceeding 30 m^2 are to be of self-closing type.

205 All bulkheads and decks separating the accommodation from all machinery spaces, cargo holds and pump rooms are to be of class A-60.

206 All decks in the accommodation spaces (including corridors) are to be of class A-0.

207 All divisional bulkheads, linings, deckheads in accommodation spaces, service spaces and control stations are to be of at least class B-15.

B 300 Escape ways

301 Dead end corridors are prohibited. Recesses are accepted where their length along the corridor is greater than its width.

302 Spaces exceeding 30 m^2 are to be provided with at least two independent escape routes.

C. Fire Detection and Alarm System

C 100 General

101 In all accommodation, service spaces and control stations there is to be installed an approved automatic fire detection and alarm system.

102 The fire detection system is to be of the addressable type.

103 In lieu of the above detection system, an approved automatic sprinkler, fire detection and fire alarm system may be installed in the said spaces. In addition an approved smoke detection system is to be provided in corridors, stairways and escape routes within accommodation spaces.

D. Dry Powder Extinguishers

D 100 Number and location

101 At least two dry powder extinguishers, of at least 12 kg, are to provided in corridors or stairways at each deck. In addition, at least one such extinguisher is to be installed in all pantries, crew dayrooms and similar spaces. At least two extinguishers of suitable type are to be provided for the galley.

E. Hose Reel System

E 100 General

101 The accommodation is to be provided with a water extinguishing system consisting of fire hose reels for rigid hose permanently connected to a piping system under constant pressure.

102 The hose reels are to be so located that any point in the accommodation can be reached with water spray from at least one hose reel.

103 Hoses for hose reels are to be of at least 19 mm internal diameter and are to have a combined jet or spray nozzle. Hose length is to be maximum 20 m per hose reel.

104 Hose reels are to be ready for immediate use. The hose is to be operable when pressurised on the reel.

105 Conventional fire hose equipment is to be provided to fight more extensive fires in the accommodation. When planning such systems, the fact that the fire is to be fought from the outside has to be considered. Hydrants and hose equipment are therefore to be located outside the entrance doors to the accommodation. Size of fire hoses should be chosen based on the number of fire fighters dedicated to this task (38 mm hoses is normally recommended).

F. Firefighter’s Outfit

F 100 General

101 The ship is to be provided with firefighter's outfit as described in Sec.1D.

SECTION 3
MACHINERY SPACES

A. General

A 100 Emergency escape and access

101 Machinery spaces of category A are to have an enclosed emergency escape and access trunk. The trunk is to provide a continuous fire shelter from the lower floor to the uppermost continuous deck. It is to be insulated to class A-60 within machinery spaces and is to be provided with a self-closing steel door at each level. The trunk is to have a clear passage not less than 80 cm in diameter at all points (excluding ladder). A tunnel escape is considered to meet the requirements, provided the watertight door in the engine room bulkhead can be opened from both sides.

Guidance note:

The emergency escape and access trunk is also intended to be a suitable access in case of fire in the machinery space. Portable extinguishers as well as hose stations should be placed close to the door leading into the machinery space.

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102 One of the escape routes from the engine control room is to be independent of the engine room.

A 200 Ventilation

201 At least one of the machinery space fans is also to have direct power supply from the emergency power source in order to purge the machinery spaces after a gas extinguishing system has been used. This fan is to be of reversible type.

202 All ventilation and air inlets are to be fitted with dampers or other closing arrangements, which can be secured in a closed position. Indicators showing the open or closed position of the dampers are to be fitted adjacent to the controls. The dampers are to be manoeuvrable from the open deck. The hand lever of dampers is not to be located more than 2 m above the deck.

Guidance note:

The aim of these requirements is to isolate a fire to the space in which it originated and to prevent supply of oxygen.

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203 Dampers exposed to open decks are to be made of corrosion resistant materials, such as stainless steel and brass.

A 300 Centralised fire control station

301 Controls for release of the local extinguishing system, main extinguishing system, closing of fuel valves, fuel pumps and ventilation fans are to be located in a centralised fire control station. One set of the firefighter's equipment, as given in Sec.1 D104, should be stored in the centralised station.

A 400 Emergency fire pump and fire hoses

401 The emergency fire pump is to have a capacity as required in SOLAS Reg. II-2/10.2.2.4, but not less than 50 m^3/hour. The pump is to provide a minimum pressure of 5.0 bar for the hydrants in the vicinity of machinery spaces with two water jets in operation.

402 Size of fire hoses intended for use in machinery spaces should be chosen based on the number of fire fighters dedicated to this task (38 mm hoses are normally recommended).

B. Oil Systems

B 100 General

101 The term *oil systems* means systems for fuel oils, thermal oils, lubricating oils and hydraulic oils.

102 The arrangement of oil tanks, pipelines for oil under pressure, oil processing machinery etc. is to be such that the danger of leakage and ignition is reduced to a minimum.

B 200 Separation of risk objects

201 The following installations are to be located in separate rooms:

— oil fired thermal oil heaters
— fuel oil purifiers
— incinerators
— hydraulic power aggregates with output above 7 kW.

202 The rooms are to be provided with fixed main fire extinguishing system as per F100 and a local extinguishing as per E100. The local fire extinguishing system may be omitted for rooms not having sources of ignition, i.e. combustion installations or electric switchgear.

B 300 Shielding of oil piping

301 Oil piping with working pressure above 15 bar located in machinery spaces outside the rooms addressed in 200 is to be provided with continuous shielding in order to prevent spray, from possible leakage, reaching sources of ignition.

C. Hot Surfaces

C 100 Infrared thermoscanning

101 All engines, exhaust ducts, steam ducts (if any) and similar equipment, where hot surfaces above 220°C may be expected, are to be examined by thermoscanning equipment during normal operation of the equipment.

102 A report is to be issued to plan approval centre and the local surveyor, identifying all items with temperatures above 220°C. The thermoscanning should be carried out by certified personnel or in co-operation with a DNV surveyor. The calibration of equipment to be documented and the chosen emissivity factor is to be justified.

103 Corrective actions are to be taken for all surfaces with temperatures above 220°C. Such actions may include improved or extensive insulation or improved heat dissipation (cooling ribs and similar). Dedicated ventilation, directed towards the identified hot spots, is normally not accepted.

104 The corrective actions may be verified by manual equipment.

C 200 Insulation of hot surfaces

201 All insulation is to be made of non-combustible insulation protected by steel sheet cladding. The cladding shall be easy to dismantle and assemble wherever inspection of the protected equipment is necessary.

D. Fire Detection and Confirmation

D 100 Fire detection

101 The requirements in Ch.3 Sec.2 E for ships with periodically unattended machinery space are to be complied with.

102 Both machinery spaces of category A and other machinery spaces are to be covered by a detection system. For passenger vessels, auxiliary machinery spaces (fire category 10 and 11) are to be covered by the detection system.

103 Fire detectors of more than one type are to be used. A suitable combination of smoke and heat detectors is to be arranged. In addition, flame detectors are to cover all engines, heated fuel oil separators, oil fires boilers and similar equipment. One flame detector may as a maximum cover a pair of engines.

D 200 TV monitoring system

201 Colour TV monitoring system is to cover all engines, heated fuel oil separators, oil fired boilers and all oil fired equipment. Monitors are to be available in a manned control station.

E. Local Extinguishing Systems

E 100 General

101 A local fire fighting system in accordance with SOLAS Reg. II-2/7.7 and IMO MSC/Circ.913 is to be installed. Spaces identified by B202 are also to be protected.

102 Operation of at least one of the extinguishing systems (either the main or the local) is to be independent of power from main or emergency power source.

Guidance note:

Examples of acceptable solutions are gas-extinguishing systems stored in pressure vessels or accumulator based water mist systems.

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E 200 Arrangement

201 The local extinguishing system is to be type approved by the Society in accordance with IMO MSC/Circ.913.

202 The system is to be provided with both main and emergency power, if such power is required to operate the system.

203 Separation of the system into sections is to be approved in each separate case. In any case, risk objects less than 3 m apart are to be covered simultaneously. The water supply should be designed to cover at least half of the auxiliary engines or the main engine (alternatively half of the main engines) whichever demands the largest water supply.

204 The nozzles should not be positioned to discharge the extinguishing medium directly into generators or engine air intakes or on to turbo machinery.

205 Distribution valves and other control equipment are to be located outside the protected spaces.

206 Where automatic release of the system is required, fire detectors of more than one type are to be used. A suitable combination of smoke, flame or heat detectors is to be arranged. To avoid erroneously release of the system, discharge of water may be arranged upon signal from two detectors. More than two detectors should be provided for each section.

207 Automatic stop of all or some of the engine room fans upon release of the local extinguishing system is to be considered based on the effect such ventilation may have on the systems performance.

Guidance note:

Some small droplet water mist system may be sensitive with respect to performance in well ventilated spaces. Risk of reduced propulsion or power supply in case of erroneously release of the local extinguishing system should also be taken into consideration.

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208 Procedures describing the philosophy for manual release of system, extent of manual fire fighting, escape and preparation of main fire fighting system is to be stored in the engine control room.

F. Main Extinguishing Systems

F 100 General

101 Machinery spaces of category A are to be protected by one of the following fixed fire extinguishing systems:

- CO_2 total flooding system as described in 200
- high expansion foam system complying with Ch.6 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.
- water mist system as described in 300
- approved system using a gaseous agent.

Guidance note:

Reference is made to IMO MSC/Circ.776 "Guidelines for the approval of equivalent fixed gas fire-extinguishing systems, as referred to in SOLAS 74, for machinery spaces and cargo pump rooms."

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102 Operation of at least one of the extinguishing systems (either the main or the local) is to be independent of power from the main or emergency power source.

Guidance note:

Examples of acceptable solutions are gas-extinguishing systems stored in pressure vessels or accumulator based water mist systems.

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103 Spaces containing main electric propulsion systems are also to be covered by the main extinguishing system. The system may be omitted for bow thruster rooms if these spaces contain no other fire risks; such as combustion machinery, fuel systems and similar equipment.

F 200 CO_2 total flooding system

201 A CO_2 total flooding system for the machinery spaces category A is to comply with Ch.5 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.

202 The quantity of CO_2 gas is to be sufficient for a minimum volume of 40% of the complete engine and boiler room, including casing.

203 CO_2 section valves, including stem and seat, are to be made of corrosion resistant materials, such as stainless steel or brass.

204 Slow leak valves are to be provided for the pneumatic release lines, whereas a pressure gauge should be fitted to the manifold.

F 300 Water mist system

301 A water fog and or mist system may be accepted as a fixed fire extinguishing system.

Guidance note:

Reference is made to IMO MSC/Circ.668 "Guidelines for the approval of water-based fire-extinguishing systems as referred to in

SOLAS 74 for machinery spaces and cargo pump rooms", as amended by IMO MSC/Circ.728.

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302 Arrangement and dimensioning of the system is to be approved in each case, taking into consideration the size of protected space, capacity, location of nozzles, location of pump units and power source.

F 400 High expansion foam system

401 For requirements for high expansion foam systems, reference is made to requirements given in Ch.6 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.

G. Dry Powder Extinguishers

G 100 Number and location

101 The following minimum numbers of approved portable dry powder extinguishers of at least 12 kg capacity are to be placed in the engine room:

— 1 near each casing door
— 4 at the engine top floor
— 4 on the engine room bottom floor
— 1 near each auxiliary engine
— 1 near each boiler installation
— 1 in each separate workshop in the engine room
— 1 at entrance to purifier room.

Additionally, one approved dry powder extinguisher of at least 25 kg capacity is to be provided in the engine room. In vessels where the engine and boiler rooms are separated, at least one such extinguisher is to be placed in each room. The extinguisher is to be fitted with an approved type of hose with a length of at least 15 m.

102 Separate boiler rooms are to be provided with at least 2 portable dry powder extinguishers for each boiler, each of minimum 12 kg capacity.

103 At least one spare charge of each extinguisher is to be kept onboard.

Guidance note:

The above-mentioned locations of the extinguishers is general, and efforts should be made to place these in the vicinity of the installations representing the greatest risk of fire. When installations are placed in separate rooms, the required extinguishers should be placed outside the doors leading into the rooms. See also guidance in A101.

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H. Firefighter's Outfit

H 100 General

101 The ship is to be provided with firefighter's outfits as specified in Sec.1 D.

SECTION 4
DECK AND CARGO AREA

A. General

A 100 Access openings and skylights

101 Access openings leading to cargo holds from deck houses are to be provided with hinged steel covers, which are to be arranged to be opened and closed from each side.

102 Doors leading to rooms below the uppermost deck in the cargo area are to be of steel and of self-closing type.

103 Covers for skylights and other covers in the cargo area are to be arranged so that they may be closed from open deck at a safe distance from the openings. The covers are not to have openings for light.

B. Fire Detection Systems

B 100 General

101 All dry cargo holds are to be fitted with a detection system based on smoke extraction or heat detection which automatically indicates the presence of smoke or abnormal heat in any of these holds.

102 All cargo pump rooms, cargo compressor rooms and other service rooms for flammable cargo are to be fitted with a detection system based upon a combination of smoke and heat/flame detectors.

103 For vessels which are dedicated to carry cargoes which are non-combustible or constitute a low fire risk, the requirement for fire detection system may be waived.

104 The detection system is to be in accordance with the rules as specified in Ch.9 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.

105 The detection system is to give warning of fire early enough to start the extinguishing operation in the first stages of the fire.

C. Extinguishing Systems for Cargo Holds and Cargo Pump Rooms

C 100 Dry cargo holds

101 All dry cargo holds are to have a fixed extinguishing system.

102 For vessels which are dedicated to carry cargoes which are non-combustible or constitute a low fire risk, the requirement for fixed extinguishing system may be waived.

103 When CO_2 is used for extinguishing, the available quantity of CO_2 gas is to be sufficient to give a minimum volume of free gas corresponding to 35% of the gross volume of the largest hold, measured from the tank top to the weather deck, or to the tweendeck if the hatches on this deck are provided with steel hatch covers. The volume of tweendeck spaces is calculated to the transverse steel bulkheads without any openings, or with openings which may be closed by steel doors. The corresponding quantity of CO_2 for ro/ro cargo spaces capable of being sealed is to be 45%.

104 Vessels with CO_2 extinguishing system for both machinery space and cargo holds are to have a total available quantity of CO_2 gas at least 50% greater than the quantity required for the larger of these rooms.

105 A CO_2 extinguishing system for cargo holds is to be in accordance with the requirements specified in Ch.5 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.

106 Other extinguishing systems than CO_2 systems may be approved provided the same degree of extinguishing effect is achieved. Special vessels for carrying special cargoes or based on special loading procedures will be considered in each case taking into consideration the risk these cargoes or procedures represent.

C 200 Cargo pump rooms

201 Cargo pump rooms, cargo compressor rooms or other service rooms for flammable cargo are to have a fixed fire extinguishing system as specified for machinery spaces (see Sec.3 F).

D. Extinguishing Systems on Deck

D 100 Water extinguishing system

101 The vessel is to have a fire main on deck as specified in SOLAS Reg. II-2/10.2.1. In addition the requirements in 102 and 103 apply.

102 The fire main on deck is to be fitted with hydrants at intervals of maximum 15 m. The distance from the individual hydrant to the ship's side is not to exceed 20 m. Where a double piping system for foam extinguishing on deck is fitted (closed ring pipe system) this may be accepted as fire main (see 202).

103 For fire protection of the deck area, there is to be fire hose equipment for at least half the number of hydrants required by 102. Onboard ships fitted with foam extinguishing systems, this hose equipment includes the foam stations required by 200.

D 200 Foam extinguishing system

201 Ships fitted with foam extinguishing systems are to satisfy the requirements specified in Pt.5 Ch.3 Sec.7. In addition the requirements in 202 to 219 apply.

202 The foam extinguishing systems are to be based on a closed ring pipe line system with two foam mixing units and two foam concentrate pumps placed together with the storage tank for foam concentrate in the control station. From the control station two fire mains fitted with automatic air relief valves are to be arranged, one on each side of the monitors, widely separated and connected to these with branch pipes equipped with stop valves on each side of the monitors.

203 Both mains are to be fitted with stop valves immediately forward of each foam monitor. At the positions of these stop valves the mains are to be provided with expansion joints. The mains are to be fitted with hydrants at intervals of maximum 15 m.

204 The arrangement of the foam concentrate pumps and the foam mixing units together with the main fire pumps is to be such that each of the two sets will be capable of delivering separately the required amount of foam solution or water through whichever of the fire mains is chosen.

Guidance note:

The purpose of the above requirements is to prevent damage to one of the mains from putting the foam system out of action, and, by closing off the damaged main, to ensure the delivery of foam through the other main lines.

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205 The pumps supplying water for the foam system are, at the required capacity, to have a pressure head sufficient to maintain a pressure of 7,5 bar at the foam monitors.

206 Foam concentrate sufficient for 30 minutes of continuous foam production is to be stored onboard.

207 The monitors are to have a free movement of ±45° in the vertical plan and in the horizontal plan they are to be able to point at any part of the deck intended to be protected.

The monitors are to be lockable in any position within these ranges.

208 The monitors and their foundations are to be of strong construction and capable of withstanding the loads which they will be subjected to on the open deck.

The materials are to be selected with due regard to the corrosive properties of sea water and saline air.

209 At a pressure of 7,5 bar, the monitors are to have a throw of at least 40 metres for both foam and water. Shorter throw may be considered for small deck areas.

210 The two foam monitors on main deck aft part are to be arranged for remote control from the bridge or from another protected area with a good view over the area covered by the monitors. The valves fitted on the open deck for water and foam supply to the monitors are also to be capable of being operated from the same location. The remote control arrangement is to cover the vertical as well as the horizontal movement of the monitors.

211 The foam extinguishing system is to be arranged in such a way that it will be capable of extinguishing burning oil on deck and fighting fires in ruptured tanks. The monitors are to be fitted in such places and at such heights that there will be a free line of throw to the part of the deck which is to be protected. The system is to be arranged so it can be switched over from foam to water by a simple operation in order to be able to wash burning oils over board and cool heated surfaces.

212 In addition to the fixed monitors, mobile foam extinguishing equipment consisting of foam stations is to be provided.

213 Each foam station is to consist of:

— 1 foam nozzle
— 3 hoses of 50 mm diameter, each of 15 m length
— 1 extension spray pipe for spraying foam into the cargo tanks.

214 The equipment specified in 213 is to be kept in clearly visible and marked lockers or boxes on deck placed as close to the hydrants or monitors as practical. The extension spray pipes may be placed outside the lockers or boxes, but in the immediate vicinity of these. The lockers or boxes are to be provided with an inventory list together with brief instructions for operation in the official language of the flag state as well as in English.

215 Where three or more foam stations are required, two of these are to be placed at the poop front.

216 The foam nozzles are to have a water rate capacity of at least 400 to 500 litres per minute at a discharge pressure of 5 bar. The foam nozzle is to be equipped with a stop valve and is to be made of metallic, corrosion resistant material. All movable parts are to be of copper alloy.

The foam nozzle couplings and the hose connections onboard are to be completely interchangeable.

217 The hoses are to be of synthetic fibres and coated internally. The hose couplings are to fit all the hydrants onboard and are to be made of copper alloy.

218 The extension spray pipe is to be at least 4 m in length and is to be provided with a coupling connection to the foam nozzle at the lower end and a spray nozzle with a 90° bend. In order to prevent the foam from submerging below the cargo liquid surface, the spraying appliance is to be so formed that the critical quantity of foam per square unit area for free fall will not be exceeded. The spraying appliance is to be turnable.

219 The following number of foam stations is to be arranged dependent on the size of the ship:

below 10000 tdw	2 sets
from 10000 to 100000 tdw	4 sets
above 100000 tdw	6 sets

D 300 Dry chemical powder fire-extinguishing system

301 Dry chemical powder fire-extinguishing systems are to satisfy the requirements as specified in Pt.5 Ch.5 Sec.11. In addition the requirements in 302 to 307 apply.

302 Sufficient dry powder is to be stored on board to provide 60 seconds operation of each system when all attached monitors and hose stations are activated.

303 The dry powder monitors are to have a free movement of ±45° in the vertical direction and 360° in the horizontal direction, and are to be lockable in any position within these ranges.

304 The dry powder monitors and their foundations are to be of strong construction and capable of withstanding the loads and environmental conditions to which they will be subjected on the open deck. The materials used for the monitors' individual parts are to be selected with due regard to the corrosive properties of the seawater and saline air.

305 The dry chemical powder fire-extinguishing systems are to be arranged in such a way that they will be capable of extinguishing fires in burning gas from leakages, ruptured pipes etc. in the cargo systems. The monitors are to be fitted in such places and at such height that a free line of throw to the part of the deck that is to be protected is achieved.

306 Each dry powder hose station is to consist of:

— 1 dry powder trigger nozzle
— 1 dry powder hose line
— 1 nitrogen gas container for pneumatic release.

307 The equipment specified in 306 is to be stored in boxes made of steel or other suitable material. The boxes are to be clearly marked and provided with brief instructions for operation of the system in the official language of the flag state as well as in English.

D 400 Fire extinguishing in gas venting arrangement

401 Venting masts for cargo tank venting system on liquefied gas carriers are to be provided with a fixed system for extinguishing a fire at the vent outlet.

E. Portable Dry Powder Extinguishers

E 100 General

101 Portable dry powder extinguishers as required in the following are to be approved in accordance with Ch.4 of the FSS Code as defined in Pt.3 Ch.3 Sec.10.

102 At least one spare charge is to be available for each portable extinguisher onboard.

E 200 Number and location

201 Two portable extinguishers of 12 kg each are to be placed in each cargo pump room or other service room where a leakage of flammable gas or liquids is possible. One of the portable extinguishers is to be located near the entrance door.

202 Rooms for combustion engines (e.g. for the operation of emergency fire pump etc.), hydraulic systems etc. are to be provided with at least one portable extinguisher of 12 kg.

F. Firefighter's Outfit

F 100 General

101 The ship is to have firefighter's outfit as specified in Sec.1 D.