

## Chapter 25

### Fire Fighting Ships

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### Section 1

#### General

##### 1.1 Application

1.1.1 The requirements of this Chapter apply to ships intended for fire fighting operations and are additional to those applicable in Pt.1 to 4 of the Rules.

1.1.2 A ship provided with fire protection and fire fighting equipment in accordance with these Rules will be eligible for an appropriate class notation, as given in 1.2, and which will be recorded in the Register Book.

1.1.3 Requirements additional to these Rules may be imposed by the National Authority with whom the ship is registered and/or by the Administration within whose territorial jurisdiction the fire fighting ship is intended to operate.

##### 1.2 Classification and class notations

1.2.1 Vessels complying with the requirements of this Chapter may be assigned class notations as under:

- "Agni 1 (total monitor discharge capacity in brackets)";
- "Agni 2 (total monitor discharge capacity in brackets)"; and
- "Agni 3 (total monitor discharge capacity in brackets)".

1.2.2 The notation "Agni 1" implies that the vessel has been built for early stage fire fighting and rescue operations close to the structure on fire including means for self protection of the vessel.

1.2.3 The notation "Agni 2 or 3" implies that the vessel has been built for continuous fighting of large fires and for cooling of the structures on fire.

For the notation "Agni 3", a larger water pumping capacity and a more comprehensive fire fighting equipment is required than for the notation "Agni 2".

1.2.4 If a vessel fitted with fire fighting systems and equipment in accordance with the notation "Agni 2 or 3", also has a system for self protection in accordance with the notation "Agni 1", the combined class notation "Agni 1 and 2" or "Agni 1 and 3" may be assigned.

### 1.3 Scope of classification

1.3.1 The following additional matters are covered by classification :

- The vessel's fire fighting capability;
- The vessel's stability and its ability to keep its position when the fire fighting monitors are in operation; and
- The vessel's ability of self-protection against external fires in case of vessels with the notation "Agni 1".

### 1.4 Assumptions

1.4.1 The classification of the vessel is based upon the following assumptions :

- the operation of the vessel during fire fighting will be in accordance with the approved operating manual;
- the vessel will carry a sufficient quantity of fuel oil for continuous fire fighting operation with all the fixed water monitors in use for a period not less than :
  - 24 hours for the notation "Agni 1"
  - 96 hours for the notations "Agni 2 or 3";
- foam-forming liquid for at least 30 minutes continuous foam production for the fixed foam monitors is stored on vessels with notation "Agni 3";
- foam-forming liquid for at least 30 minutes continuous foam production by the mobile generator is stored on board in suitable containers on vessels with notation "Agni 2 or 3"; and
- crew operating the fire fighting systems and equipment has been trained in such operations and in the use of air breathing apparatus, and that the skill of the crew is maintained by exercises.

### 1.5 Submission of plans

1.5.1 The following plans and information are to be submitted:

- A general arrangement showing the disposition of all fire fighting equipment required by this Chapter;
- Manual for the operation of the fire fighting installation and maneuvering of the vessel during fire fighting;
- Details of major items of fire fighting equipment such as pumps and monitors, including their capacity, range and trajectory of delivery;
- A general arrangement plan showing the disposition of the fire divisions and their class;
- Detailed plans of the fire divisions and, where applicable, copies of the certificates of approval for the insulating materials proposed;
- A plan of the construction of the fire doors;
- Plans showing the layout and capacity of the water spray system;
- A plan of the seating arrangements for the water monitors;
- Particulars of the means of keeping the ship in position during fire fighting operations;
- A plan showing the fire pumps, the fire water main, the hydrants, hoses and hose nozzles and the monitors together with particulars of their delivery capability;

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- Details of the foam generating system;
  - Calculations showing the point of balance between the reaction forces from the water monitors and the forces from the vessel's propulsion machinery and its side thrusters;
  - Calculations proving satisfactory stability of the vessel when all monitors are in operation at full capacity in the most adverse direction for stability;
  - Report on inclining test determining the centre of gravity and the light weight of the completed vessel;
  - Details of the fireman's outfits provided; and
  - Plans of any other fire fighting systems provided.

### **1.6 Operation manual**

1.6.1 The following information is to be included in an approved operation manual available on board :

- Detailed description of each fire fighting system;
- Instructions for use, testing and maintenance of the fire fighting installations and the equipment; and
- Instructions for operation of the vessel during fire fighting.

### **1.7 Items to be manufactured under survey**

1.7.1 The following items are to be manufactured under the survey of IRS:

- Fire fighting pumps and their prime movers
- Water / foam monitors
- Compressors for breathing apparatus
- Pipes / valves
- Spray nozzles for self-protection.

1.7.2 The extent of survey and testing is to be in accordance with Pt.4, Ch.2, Sec.1.9 for pipes and valves and as per Pt.4, Ch.1, Sec.1.3 for remaining items.

## **Section 2**

### **Construction**

#### **2.1 Hull**

2.1.1 The structure of the ship is to be strengthened as necessary to withstand the forces imposed by the fire-extinguishing systems when operating at their maximum capacity.

#### **2.2 Sea suction**

2.2.1 The seawater suction of the fire pumps are to be arranged as low as practicable in the ship's structure to avoid icing or the ingress of oil from the surface of the sea.

2.2.2 All seawater inlet valves are to be provided with a low pressure steam or compressed air connection for clearing purposes.

2.2.3 Seawater suction for fire fighting pumps are not to be used for any other purpose. Seawater suction valve, the discharge valve and the pump prime mover are to be operable from the same position. Valves with nominal diameter exceeding 450 [mm] are to both manually operated and power actuated.

### 2.3 Stability

2.3.1 Each ship is to comply with the draught and stability requirements of the National Authority and is to have on board sufficient stability data to enable the ship to be properly loaded and handled. This data is to take full account of the effect of the monitors when they are operating at their maximum output in all possible directions of use.

### 2.4 Maneuverability

2.4.1 Arrangements are to be provided to enable the ship to maintain position so that the monitors may be effectively deployed.

2.4.2 Side thruster(s) and main propellers are to be able to keep the vessel at a standstill in calm waters at all combinations of capacity and direction of throw of the water monitors, and the most unfavourable combination is not to require more than 80 per cent of the available propulsion force in any direction.

2.4.3 If the system design is such that, in any operating combination, it will be possible to overload the power supply, a power management system is to be arranged. The system is to include alarm at 80 per cent of available power and automatic action at 100 per cent available power.

### 2.5 Floodlights

2.5.1 As an aid for operations in darkness at least two adjustable floodlights are to be fitted on board. The floodlights are to be capable of illuminating areas at a distance of 250 [m] in clear air. The floodlights are to be of high pressure sodium vapour type or equivalent.

### 2.6 Bunkering

2.6.1 The Owner should ensure that any fuel which may be required while the ship is operating on station can be safely received on board.

### 2.7 Self-protection of the vessel (class notation Agni 1)

2.7.1 The vessel to be protected by a permanently installed water-spraying system.

2.7.2 The fixed water-spraying system is to provide protection for all outside vertical areas of hull, superstructures and deckhouses including foundations for water monitors and other equipment.

2.7.3 The arrangement for the water-spraying system are to be such that necessary visibility from the wheelhouse and the control station for remote control of the fire fighting water monitors can be maintained during the water spraying.

2.7.4 The pipelines and nozzles are to be so arranged and protected that they will not be exposed to damage during the operations for which the vessel is intended.

2.7.5 The fixed water-spraying system is to have a capacity not less than 10 litres per min. per [m<sup>2</sup>] of the areas to be protected. For areas internally insulated to class A-60, however, a capacity of 5 litres per min. per [m<sup>2</sup>] may be accepted.

2.7.6 The pumping capacity for the fixed water-spraying system is to be sufficient to deliver water at the required pressure for simultaneous operation of all nozzles in the total system. The pumps for the fire fighting water monitors may also serve the spraying system, provided the pump capacity is increased by the capacity required for the water-spraying system. A connection with shut-off valve is then to be fitted between the fire main for the monitors and the main pipeline for the water spraying system.

2.7.7 All pipes for the fixed water-spraying systems are to be protected against corrosion externally and internally by hot galvanizing or equivalent. Drainage plugs are to be fitted to avoid damages by freezing water.

2.7.8 The spray nozzles are to be able to give an effective and even distribution of water spray over the areas to be protected.

### 2.8 Self-protection of the vessel (class notations Agni 2 and 3)

2.8.1 In ships which are not provided with a water spray system as described in 2.7 all windows and port lights are to be provided with efficient deadlights or external steel shutters, except in the wheelhouse.

2.8.2 Ships which are intended to operate in close proximity to a large fire will require protection from the heat radiated from the fire. Such protection may be afforded by a system which provides a water spray over the surface of the ship, or by a combination of insulation and a water spray system.

## Section 3

### Fire-extinguishing

#### 3.1 Water monitors

3.1.1 The minimum number of monitors, their discharge rate, their range and their height of trajectory above sea level are to comply with the requirements of Table 3.1.1.

Equipment	Class Notation			
	Agni 1	Agni 2		Agni 3
Minimum number of water monitors	2	3	4	4
Minimum discharge rate per monitor [m <sup>3</sup> /h]	1200	2400	1800	2400
No. of pumps	1-2	2-4		2-4
Minimum total pump capacity [m <sup>3</sup> /h]	2400	7200		9600
Minimum height of throw in [m <sup>1</sup> ]	45	70		70
Minimum length of throw in [m <sup>2</sup> ]	120	150		150
Minimum fuel capacity in hours <sup>3)</sup>	24	96		96
Number of hose connections each side of ship	4	8		8
Number of fireman's outfits	4	8		8
Notes:				
1) Measured vertically from sea level to mean impact area at a horizontal distance of at least 70 [m] from the nearest part of the vessel.				
2) Measured horizontally from the mean impact area to the nearest part of the vessel when all the monitors are in operation satisfactorily.				
3) Capacity for continuous operation of all monitors to be included in the total capacity of the vessel's fuel oil tanks.				

3.1.2 The monitors are to be so arranged that the required direction, range and height of trajectory can be achieved with the required number of monitors when they are operating simultaneously.

3.1.3 The monitors are to be capable of adequate adjustment in the vertical and horizontal direction and are to be so positioned that the jets will be unimpeded within the required range of operation. The horizontal angular movement of the monitors is to be at least 90°.

3.1.4 Means are to be provided for preventing the monitor jets from impinging on the ship's structure and equipment.

3.1.5 The monitors are to be of robust construction and their seating arrangements are to be of adequate strength for all modes of operation, particular attention being paid to shock loading when all the monitors are activated simultaneously.

### 3.2 Monitor controls

3.2.1 The activating and the maneuvering of the monitors are to be capable of remote control. The remote control station is to be arranged in a protected control room with a good general view. The valve control is to be designed to avoid water hammer.

3.2.2 The control system is to be designed in such a manner that normal operation can be restored within 10 minutes in case of any failure in the control system.

3.2.3 In case of electrical control systems, each control unit is to be provided with overload and short-circuit protection. In case of hydraulic or pneumatic control systems, the control power units are to be duplicated.

3.2.4 In addition to the remote control, local/manual control of each monitor is to be provided.

### 3.3 Foam monitor system (For class notation Agni 3 )

3.3.1 In addition to the water monitors, the vessel is to be equipped with 2 foam monitors, each of a capacity not less than 5000 litres/minute with a maximum foam expansion ratio of 15 : 1.

3.3.2 The foam system, together with the arrangements and location of monitors, is to give a height of throw at least 50 [m] above sea level when both monitors are used simultaneously with maximum foam generation.

3.3.3 The foam concentrate tank is to have a capacity for at least 30 minutes of maximum foam generation from both foam monitors. When determining the necessary quantity of foam concentrate, the admixture is assumed to be 5 per cent.

3.3.4 The foam generating system is to be of a fixed type with separate foam concentrate tank, foam-mixing unit and pipelines to the monitors. The water supply to the system may be taken from the main pumps for the water monitors and in such cases it may be necessary to reduce the main pump pressure to ensure correct water pressure for maximum foam generation.

3.3.5 Foam monitors are to be controlled in the manner given in 3.2 and the controls are to be located in the same control room as that for water monitors.

### 3.4 Pumps and piping

3.4.1 The pumps and their piping system which are intended for serving the monitors are not to be available for services other than fire-extinguishing and water spraying.

3.4.2 Where the pumps are used for fixed water spray systems, the piping is to be independent of that supplying the monitors. The water spray systems are to be adequately protected against overpressure.

3.4.3 The minimum total pump capacities required are shown in Table 3.1.1.

3.4.4 The piping system from the pumps to the water monitors is to be separate from the piping system to the hose connections required for mobile fire fighting equipment.

3.4.5 The piping systems are to have arrangements to avoid overheating of the pumps at low delivery rates.

3.4.6 All piping from seawater inlets to monitors is to be protected internally and externally against corrosion to a degree at least corresponding to hot galvanizing.

### **3.5 Mobile fire fighting equipment**

#### **3.5.1 Hose stations**

3.5.1.1 Hose stations are to be provided on each side of the ship in accordance with Table 3.1.1.

3.5.1.2 Each hose station is to be provided with a hydrant, a hose and a nozzle capable of producing a jet or a spray and simultaneously a jet and a spray. The hoses are to be 15 [m] in length and not less than 38 [mm] nor more than 65 [mm] in diameter. Where hose stations are connected to the monitor supply lines, provision is to be made to reduce the water pressure at the hydrants to an amount at which each fire hose nozzle can be safely handled by one man. The water pressure shall be sufficient to produce a water jet throw of at least 12 [m].

#### **3.5.2 Foam generator**

3.5.2.1 Vessels with class notation "Agni 2 or 3" are to have a mobile high expansion foam generator with a capacity not less than 100 [m<sup>3</sup>/minute] for fighting of external fires.

3.5.2.2 Foam-forming liquid is to be stored in containers each of about 20 litres and suitable for mobile use. The total storing capacity of foam forming liquid is to be sufficient for 30 minutes continuous foam production.

### **3.6 Fireman's outfits**

3.6.1 The number of fireman's outfits provided in addition to those provided in accordance with Pt.6, Ch.3, Sec.4.10 is to be in accordance with Table 3.1.1. They are to be stored in a safe position which is readily accessible from the open deck.

3.6.2 The composition of a fireman's outfit is to be as follows:

- 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.
- Boots and gloves of rubber or other electrically non-conducting material.
- A rigid helmet providing effective protection against impact.
- An electric safety lamp (hand lantern) of an approved type with a minimum operating period of 3 hours.
- An axe having an insulated handle.
- 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 litres 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 lifeline of sufficient length and strength is to be provided and is to be 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 lifeline is operated.

### **3.7 Recharging of equipment**

3.7.1 A suitable air compressor for recharging the bottles used in the breathing apparatus of the fireman's outfits is to be provided. It is to be capable of recharging the bottles of the breathing apparatus required to be carried in accordance with Table 3.1.1 in a time not exceeding 30 minutes.

***End of Chapter***