

SECTION 10 FIRE SAFETY SYSTEMS

1 General

1.1 Application

1.1.1 This Section is applicable to fire safety systems as referred to in Ch 4, Sec 2 to Ch 4, Sec 9.

1.2 Use of toxic extinguishing media

1.2.1 The use of a fire-extinguishing medium which, in the opinion of the Society, either by itself or under expected conditions of use gives off toxic gases, liquids and other substances in such quantities as to endanger persons is not to be permitted.

2 Portable fire extinguishers

2.1 Engineering specifications

2.1.1 Safety requirements

Fire extinguishers containing an extinguishing medium which, in the opinion of the Society, either by itself or under the expected conditions of use gives off toxic gases in such quantities as to endanger persons or which is an ozone depleting substance is not to be permitted.

2.1.2 Quantity of medium

- a) Each powder or carbon dioxide extinguisher is to have a capacity of at least 2 kg and each foam extinguisher is to have a capacity of at least 6 l. The mass of all portable fire extinguishers is not to exceed 23 kg and they are to have a fire-extinguishing capability at least equivalent to that of a 6 l fluid extinguisher
- b) The Society is to determine the equivalents of fire extinguishers.

3 Fixed gas fire-extinguishing systems

3.1 General

3.1.1 Application

Yachts on which a fixed gas fire-extinguishing system is installed are to comply with the requirements of Ch 4, Sec 13, [4.1.1] of the Rules for Steel Ships and, if relevant, with the subsequent requirements.

3.1.2 Gas-tightness of the protected space

Every space protected by a fixed gas fire-extinguishing system is to be designed such that rapid and efficient gas-tightness can be ensured. The means of closing may be manually operated. Fans serving the protected spaces are to be capable of being stopped from outside the protected spaces.

3.2 Carbon dioxide systems

3.2.1 General arrangement

In addition to [3.1.2], fixed carbon dioxide systems are to comply with the requirements of Part C, Ch 4, Sec 13, [4.1.2] to [4.1.4] of the Rules for Steel Ships.

3.2.2 For the calculation of minimum volume of free gas, the percentage reductions (35% and 30% respectively) specified in Part C, Ch 4, Sec 13, [4.1.2] item a) 3) of the Rules for Steel Ships are also applicable for yachts of less than 2000 gross tonnage.

3.3 Equivalent fixed gas fire-extinguishing systems

3.3.1 In addition to [3.1], equivalent fixed gas fire-extinguishing systems are to comply with the requirements of IMO MSC/Circ. 848 Annex.

4 Fixed pressure water-spraying and water-mist systems

4.1 Fixed pressure water-spraying fire-extinguishing systems

4.1.1 Application

Yachts on which a fixed water-spraying system is installed are to comply with the requirements of Part C, Ch 4, Sec 13, [6.1.1] of the Rules for Steel Ships.

4.2 Equivalent water-mist fire-extinguishing systems

4.2.1 Application

Yachts on which an equivalent water-mist system is installed are to comply with the requirements of IMO MSC/Circ. 668/728 Annex.

5 Automatic sprinkler, fire detection and fire alarm systems

5.1 Conventional sprinkler system

5.1.1 Application

Yachts on which a conventional automatic sprinkler, fire detection and fire alarm system is installed are to comply with the requirements of Part C, Ch 4, Sec 13, [7] of the Rules for Steel Ships, except [7.1.2] and [7.1.3] c) 2) which are replaced by [5.1.2] and [5.1.3] below.

5.1.2 Sources of power supply

There are to be not less than two sources of power supply for the sea water pump and automatic alarm and detection system. If the pump is electrically driven, it is to be connected to the main source of electrical power, which is to be capable of being supplied by at least two generators. The feeders are to be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards. One of the sources of power supply for the alarm and detection system is to be an emergency source. Where one of the sources of power for the pump is an internal combustion engine, it is, in addition to complying with the provisions of item c) of Ch 4, Sec 13, [7.1.4] of the Rules for Steel Ship, to be so situated that a fire in any protected space will not affect the air supply to the machinery.

5.1.3 Sprinkler pumps capacity requirements

The pump and the piping system are to be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 150 m² at the application rate specified in Part C, Ch 4, Sec 13 [7.1.5] item b) 3) of the Rules for Steel Ships. The design area can be reduced to the maximum size of the largest space within A or B class divisions on a single deck area. The hydraulic capability of the system is to be confirmed by the review of hydraulic calculations, followed by a test of the system, if deemed necessary by the Society.

5.2 Equivalent sprinkler systems

5.2.1 Application

Yachts on which an equivalent automatic sprinkler, fire detection and fire alarm system is installed are to comply with the requirements of IMO Resolution A.800(19) Annex, except that paragraph [3.22] of the above mentioned resolution is replaced by [5.2.2] below.

5.2.2 Sprinkler pumps capacity requirements

Pumps and alternative supply components are to be sized so as to be capable of maintaining the required flow to the hydraulically most demanding area of not less than 150 m². The design area can be reduced to the maximum size of the largest space within A or B class divisions on a single deck area.

6 Fixed fire detection and fire alarm systems

6.1 Engineering specifications

6.1.1 General requirements

- Any required fixed fire detection and fire alarm system are to be capable of immediate operation at all times
- The fixed fire detection and fire alarm system are not to be used for any other purpose

- The system and equipment are to be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in yachts
- Fixed fire detection and fire alarm systems with a zone address identification capability are to be so arranged that:
 - means are provided to ensure that any fault (e.g. power break, short circuit, earth, etc.) occurring in the loop will not render the whole loop ineffective

Note 1: Loop means an electrical circuit linking detectors of various sections in a sequence and connected (input and output) to the indicating unit(s).

- all arrangements are made to enable the initial configuration of the system to be restored in the event of failure (e.g. electrical, electronic, informatics, etc.)
- the first initiated fire alarm is not to prevent any other detector from initiating further fire alarms, and
- no loop is to pass through a space twice. When this is not practical (e.g. for large public spaces), the part of the loop which by necessity passes through the space for a second time is to be installed at the maximum possible distance from the other parts of the loop.

6.1.2 Sources of power supply

There are to be not less than two sources of power supply for the electrical equipment used in the operation of the fixed fire detection and fire alarm system, one of which is to be an emergency source. The supply is to be provided by separate feeders reserved solely for that purpose. Such feeders are to run to an automatic change-over switch situated in, or adjacent to, the control panel for the fire detection system.

The main (respective emergency) feeder is to run from the main (respective emergency) switchboard to the change-over switch without passing through any other distributing switchboard.

6.1.3 Detector requirements

- Detectors are to be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered by the Society provided that they are no less sensitive than such detectors. Flame detectors are only to be used in addition to smoke or heat detectors
- Smoke detectors required in stairways, corridors and escape routes within accommodation spaces are to be certified to operate before the smoke density exceeds 12,5% obscuration per metre, but not until the smoke density exceeds 2% obscuration per metre. Smoke detectors to be installed in other spaces are to operate within sensitivity limits to the satisfaction of the Society having regard to the avoidance of detector insensitivity or oversensitivity

- c) Heat detectors are to be certified to operate before the temperature exceeds 78°C but not until the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector is to operate within temperature limits to the satisfaction of the Society having regard to the avoidance of detector insensitivity or oversensitivity
- d) The operation temperature of heat detectors in drying rooms and similar spaces of a normal high ambient temperature may be up to 130°C, and up to 140°C in saunas
- e) All detectors are to be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

6.1.4 Installation requirements

- a) Sections:

- 1) Detectors are to be grouped into sections.

Note 1: Section means group of fire detectors as shown in the indicating unit(s) required in item a) 3) of [6.1.5].

- 2) A section of fire detectors which covers a control station, a service space or an accommodation space is not to include a machinery space of category A. For fixed fire detection and fire alarm systems with remotely and individually identifiable fire detectors, a loop covering sections of fire detectors in accommodation, service spaces and control stations is not to include sections of fire detectors in machinery spaces of category A
 - 3) Where the fixed fire detection and fire alarm system does not include means of remotely identifying each detector individually, no section covering more than one deck within accommodation spaces, service spaces and control stations is normally to be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of fire, the number of enclosed spaces included in each section is to be limited as determined by the Society. In no case more than fifty enclosed spaces are to be permitted in any section. If the system is fitted with remotely and individually identifiable fire detectors, the sections may cover several decks and serve any number of enclosed spaces

- b) Position of detectors:

- 1) Detectors are to be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely are to be avoided. Detectors which are located on the overhead are to be at a minimum distance of 0,5 m away from bulkheads, except in corridors, lockers and stairways

- 2) The maximum spacing of detectors is to be in accordance with Tab 1. The Society may require or permit different spacing to that specified in Tab 1 if based upon test data which demonstrate the characteristics of the detectors
- c) Arrangement of electric wiring:
 - 1) Electrical wiring which forms part of the system is to be so arranged as to avoid galleys, machinery spaces of category A and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarms in such spaces or to connect to the appropriate power supply
 - 2) A loop of fire detection systems with a zone address identification capability is not to be damaged at more than one point by a fire.

Table 1 : Spacing of detectors

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m²	9 m	4,5 m
Smoke	74 m²	11 m	5,5 m

6.1.5 System control requirements

- a) Visual and audible fire signals:

- 1) The activation of any detector or is to initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within two minutes, an audible alarm is to be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of category A. This alarm sounder system need not be an integral part of the detection system
 - 2) The control panel is to be located on the navigation bridge or in the continuously manned central control station
 - 3) Indicating units are, as a minimum, to denote the section in which a detector has been activated. At least one unit is to be so located that it is easily accessible to responsible members of the crew at all times. One indicating unit is to be located on the navigation bridge if the control panel is located in the main fire control station
 - 4) Clear information is to be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections
 - 5) Power supplies and electric circuits necessary for the operation of the system are to be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition is to initiate a visual and audible fault signal at the control panel which is to be distinct from a fire signal.

- b) Testing:

Suitable instructions and component spares for testing and maintenance are to be provided.