

Part C - Suppression of Fire

Regulation 7 - Detection and Alarm

1. Purpose

The purpose of this regulation is to detect a fire in the space of origin and to provide for alarm for safe escape and fire fighting activity. For this purpose, the following functional requirements shall be met:

- 1.1 fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases;*
- 1.2 manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and*
- 1.3 fire patrols shall provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.*

2. General requirements

- 2.1 A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this regulation.*
- 2.2 A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this regulation and other regulations in this part shall be of an approved type and comply with the Fire Safety Systems Code.*
- 2.3 Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph 5.1, at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.*

3. Initial and periodical tests

- 3.1 The function of fixed fire detection and fire alarm systems required by the relevant regulations of this chapter shall be tested under varying conditions of ventilation after installation.*
- 3.2 The function of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the Administration by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.*

4. Protection of machinery spaces

4.1 Installation

A fixed fire detection and fire alarm system shall be installed in:

- 4.1.1 periodically unattended machinery spaces; and*
- 4.1.2 machinery spaces where:*

4.1.2.1 the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and

4.1.2.2 the main propulsion and associated machinery including sources of the main sources of electrical power, are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

4.2 Design

The fixed fire detection and fire alarm system required in paragraph 4.1.1 shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigation bridge and by a responsible engineer officer. When the navigation bridge is unmanned, the alarm shall sound in a place where a responsible member of the crew is on duty.

5. Protection of accommodation and service spaces and control stations

5.1 Smoke detectors in accommodation spaces

Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces as provided in paragraphs 5.2, 5.3 and 5.4. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

5.2 Requirements for passenger ships carrying more than 36 passengers

A fixed fire detection and fire alarm system shall be installed and arranged as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors, stairways and escape routes within accommodation spaces. Smoke detectors need not be fitted in private bathrooms and galleys. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with a fixed fire detection and alarm system.

5.3 Requirements for passenger ships carrying not more than 36 passengers

There shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by the Administration, in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc., either:

5.3.1 a fixed fire detection and fire alarm system so installed and arranged as to detect the presence of fire in such spaces and providing smoke detection in corridors, stairways and escape routes within accommodation spaces; or

5.3.2 an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

5.4 Protection of atriums in passenger ships

The entire main vertical zone containing the atrium shall be protected throughout with a smoke detection system.

5.5 Cargo ships

Accommodation and service spaces and control stations of cargo ships shall be protected by a fixed fire detection and fire alarm system and/or an automatic sprinkler, fire detection and fire alarm system as follows depending on a protection method adopted in accordance with regulation 9.2.3.1.

5.5.1 Method IC - A fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

5.5.2 Method IIC - An automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code shall be so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

5.5.3 Method IIIC - A fixed fire detection and fire alarm system shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, providing smoke detection in corridors, stairways and escape routes within accommodation spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

6. Protection of cargo spaces in passenger ships

A fixed fire detection and fire alarm system or a sample extraction smoke detection system shall be provided in any cargo space which, in the opinion of the Administration, is not accessible, except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

7. Manually operated call points

Manually operated call points complying with the Fire Safety Systems Code shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.

8. Fire patrols in passenger ships

8.1 Fire patrols

For ships carrying more than 36 passengers an efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

8.2 Inspection hatches

The construction of ceilings and bulkheads shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Administration there is no risk of fire originating in such places.

8.3 Two way portable radiotelephone apparatus

Each member of the fire patrol shall be provided with a two way portable radiotelephone apparatus.

9. Fire alarm signalling systems in passenger ships*

** Refer to the Code on Alarms and Indicators adopted by the Organization by resolution A.830(19).*

9.1 Passenger ships shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

9.2 The control panel of fixed fire detection and fire alarm systems shall be designed on the fail safe principle (e.g., an open detector circuit shall cause an alarm condition).

9.3 Passenger ships carrying more than 36 passengers shall have the fire detection alarms for the systems required by paragraph 5.2 centralized in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans shall be centralized in the same location. The ventilation fans shall be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station shall be capable of indicating open or closed positions of fire doors and closed or off status of the detectors, alarms and fans. The control panel shall be continuously powered and shall have an automatic change over to standby power supply in case of loss of normal power supply. The control panel shall be powered from the main source of electrical power and the emergency source of electrical power defined by regulation II-1/42 unless other arrangements are permitted by the regulations, as applicable.

9.4 A special alarm, operated from the navigation bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system and shall be capable of being sounded independently of the alarm to the passenger spaces.

MCA Guidance

G1 A section is defined as a group of detectors and manually operated call points as reported in the required indicating unit(s).

G2 A detector loop is defined as an electrical circuit linking detectors of various sections in a sequence and connected (input and output) to the indicating unit(s). Zone address identification capability is a system with individually identifiable fire detectors.

G3 Acceptable activating arrangements; the fire control panel may be permitted to:

G3.1 activate a paging system;

G3.2 activate the fan stops;

G3.3 activate the closure of fire doors;

G3.4 activate the closure of fire dampers;

G3.5 activate the sprinkler system;

G3.6 activate the smoke extraction system; and

G3.7 activate the low-location lighting system.

G4 Fire detection systems with a zone address identification capability. Shall comply with:

G4.1 Detectors installed within cold spaces such as refrigerated compartments should be tested according to IEC 68-2-1 (1990) - Section one - Test Aa. The temperature of operation of heat detectors in spaces covered by this Regulation may be 130°C, in saunas up to 140°C.

G5 Cargo spaces

G5.1 All spaces in a passenger ship except cargo spaces, baggage and store rooms may, as a general rule, be regarded as accessible to the fire patrol. In ships engaged on voyages not exceeding 10 hours, if the cargo holds are opened within that time to discharge or receive cargo etc. the holds may be deemed accessible to the patrol and an automatic fire detecting system need not be fitted. Applications for exemption should be submitted to MCA Headquarters in writing giving reasons why it would be unreasonable to comply with the requirements.

G5.2 Where a fire detecting system of the sample extraction smoke detection type is combined with a fixed gas fire extinguishing system, the arrangement should be such that gas cannot be admitted to the detecting cabinet.

G6 Fire detectors

G6.1 All fire detectors must be of approved types for the area in which they are to be used. In general the functional performance and sensitivity of detectors should be in accordance with the appropriate parts of BS 5445.

G7 Control and indicating units

G7.1 In general, control and indicating units should be designed and constructed in accordance with BS5839 : Part : 4 1988, but full compliance with the detail of that Standard is not necessary provided the equipment carries out the functions specified satisfactorily. A second battery reserved solely for fire detection purposes need not be provided if a second satisfactory source of power is available. However where such a second battery is provided its capacity should be sufficient for the maximum load of the system for the period stipulated for the emergency source of power on the ship.

G8 Ancillary equipment

G8.1 Ancillary equipment such as manual call points, sounders and power packs should, in general, be designed and constructed to the relevant British Standard where one is published. Where no relevant standard exists each case will be assessed individually on its merits.

G9 Environmental tests

G9.1 Environmental tests as specified in the various relevant standards are not adequate to prove equipment is suitable for use in the marine environment. In order to be considered suitable for this use the type approval certificate should specify that the appropriate tests have been carried out.

G10 Sample extraction smoke detection systems.

G10.1 Sequential scanning intervals, the interval (I) should depend on the number of scanning points (N) and the overall response time (T) of the fans. With a 20 per cent allowance:

$$I = 1.2 \times T \times N$$

However, the maximum allowable interval should not exceed 120 sec ($I_{max} = 120 \text{ s}$) the maximum response time for the fans should be around 15 sec.

G11 Smoke detectors above ceilings – spacing

G11.1 The spacing of smoke detectors above ceilings should be in accordance with the table as follows (paragraph 2(e) of Schedule 5 of MSN 1666(M)) unless the presence of draught stops requires closer spacing.

G12 Every vessel shall have developed a regular routine to ensure that detectors are functioning correctly, the test interval will take into account the degree of self-monitoring provided by the system. Addressable detectors should be tested every year and non-addressable detectors every 3 months.

G13 Method IIC

G13.1 In a ship in which Method IIC has been adopted the following applies:

G13.2 The sprinkler system is required to be fitted in all accommodation spaces and service spaces in which fire may be expected to originate. Sprinklers need not be fitted in either private or communal sanitary accommodation not fitted with electric space heaters or void spaces. Surveyors should note that the Regulations do not require sprinklers to be fitted in fire control stations.

G14 Method IIIC

G14.1 In a ship in which Method IIIC has been adopted the following applies:

G14.2 The fire detection system is required to be fitted in all accommodation spaces and service spaces in which fire may be expected to originate except that smoke detection and manually operated call points are required to be fitted in corridors, stairway enclosures and escape routes within accommodation spaces. Fire detectors need not be fitted in either private or communal sanitary accommodation not fitted with electric space heaters or void spaces. Surveyors should note that the Regulations do not require fire detectors to be fitted in control stations.

G15 Manual fire alarm systems may be combined with an automatic fire detection and alarm system and should be so arranged that a fire alarm can be raised, even though a zone or zones in the automatic detection system have been disconnected for maintenance or repair.

G16 See regulation 8.G2