

ANNEX 5

**RESOLUTION MSC.311(88)
(adopted on 3 December 2010)**

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE
FOR FIRE SAFETY SYSTEMS (FSS CODE)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.98(73) by which it adopted the International Code for Fire Safety Systems (hereinafter referred to as "the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

HAVING CONSIDERED, at its eighty-eighth session, amendments to the FSS Code, proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code for Fire Safety Systems, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 2012, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 July 2012 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

The existing chapter 9 is replaced by the following:

"Chapter 9 Fixed fire detection and fire alarm systems

1 Application

1.1 This chapter details the specification of fixed fire detection and fire alarm systems as required by chapter II-2 of the Convention. Unless expressly provided otherwise, the requirements of this chapter shall apply to ships constructed on or after 1 July 2012.

1.2 Definitions

1.2.1 *Section* means a group of fire detectors and manually operated call points as reported in the indicating unit(s).

1.2.2 *Section identification capability* means a system with the capability of identifying the section in which a detector or manually operated call point has activated.

1.2.3 *Individually identifiable* means a system with the capability to identify the exact location and type of detector or manually activated call point which has activated, and which can differentiate the signal of that device from all others.

2 Engineering specifications

2.1 General requirements

2.1.1 Any required fixed fire detection and fire alarm system with manually operated call points shall be capable of immediate operation at all times (this does not require a backup control panel). Notwithstanding this, particular spaces may be disconnected, for example, workshops during hot work and ro-ro spaces during on and off-loading. The means for disconnecting the detectors shall be designed to automatically restore the system to normal surveillance after a predetermined time that is appropriate for the operation in question. The space shall be manned or provided with a fire patrol when detectors required by regulation are disconnected. Detectors in all other spaces shall remain operational.

2.1.2 The fire detection system shall be designed to:

- .1 control and monitor input signals from all connected fire and smoke detectors and manual call points;
- .2 provide output signals to the navigation bridge, continuously manned central control station or onboard safety centre to notify the crew of fire and fault conditions;
- .3 monitor power supplies and circuits necessary for the operation of the system for loss of power and fault conditions; and

- .4 the system may be arranged with output signals to other fire safety systems including:
 - .1 paging systems, fire alarm or public address systems;
 - .2 fan stops;
 - .3 fire doors;
 - .4 fire dampers;
 - .5 sprinkler systems;
 - .6 smoke extraction systems;
 - .7 low-location lighting systems;
 - .8 fixed local application fire-extinguishing systems;
 - .9 closed circuit television (CCTV) systems; and
 - .10 other fire safety systems.

2.1.3 The fire detection system may be connected to a decision management system provided that:

- .1 the decision management system is proven to be compatible with the fire detection system;
- .2 the decision management system can be disconnected without losing any of the functions required by this chapter for the fire detection system; and
- .3 any malfunction of the interfaced and connected equipment should not propagate under any circumstance to the fire detection system.

2.1.4 Detectors and manual call points shall be connected to dedicated sections of the fire detection system. Other fire safety functions, such as alarm signals from the sprinkler valves, may be permitted if in separate sections.

2.1.5 The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships. All electrical and electronic equipment on the bridge or in the vicinity of the bridge shall be tested for electromagnetic compatibility, taking into account the recommendations developed by the Organization*.

2.1.6 Fixed fire detection and fire alarm systems with individually identifiable fire detectors shall be so arranged that:

* Refer to the General requirements for electromagnetic compatibility for all electrical and electronic equipment, adopted by the Organization by resolution A.813(19).

- .1 means are provided to ensure that any fault (e.g., power break, short circuit, earth, etc.) occurring in the section will not prevent the continued individual identification of the remainder of the connected detectors in the section;
- .2 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.);
- .3 the first initiated fire alarm will not prevent any other detector from initiating further fire alarms; and
- .4 no section will pass through a space twice. When this is not practical (e.g., for large public spaces), the part of the section which by necessity passes through the space for a second time shall be installed at the maximum possible distance from the other parts of the section.

2.1.7 In passenger ships, the fixed fire detection and fire alarm system shall be capable of remotely and individually identifying each detector and manually operated call point. Fire detectors fitted in passenger ship cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located. In cargo ships and on passenger ship cabin balconies the fixed fire detection and fire alarm system shall, as a minimum, have section identification capability.

2.2 **Sources of power supply**

2.2.1 There shall 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 shall be an emergency source of power. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall 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 shall run from the main (respective emergency) switchboard to the change-over switch without passing through any other distributing switchboard.

2.2.2 There shall be sufficient power to permit the continued operation of the system with all detectors activated, but not more than 100 if the total exceeds this figure.

2.2.3 The emergency source of power specified in paragraph 2.2.1 above shall be sufficient to maintain the operation of the fire detection and fire alarm system for the periods required under regulations II-1/42 and 43 of the Convention, and at the end of that period, shall be capable of operating all connected visual and audible fire alarm signals for a period of at least 30 min.

2.3 **Component requirements**

2.3.1 Detectors

2.3.1.1 Detectors shall 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 Administration provided that they are no less sensitive than such detectors.

2.3.1.2 Smoke detectors required in all stairways, corridors and escape routes within accommodation spaces shall 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, when tested according to standards EN 54:2001 and IEC 60092-505:2001. Alternative testing standards may be used as determined by the Administration. Smoke detectors to be installed in other spaces shall operate within sensitivity limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

2.3.1.3 Heat detectors shall 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 min, when tested according to standards EN 54:2001 and IEC 60092-505:2001. Alternative testing standards may be used as determined by the Administration. At higher rates of temperature rise, the heat detector shall operate within temperature limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

2.3.1.4 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.

2.3.1.5 Flame detectors shall be tested according to standards EN 54-10:2001 and IEC 60092-505:2001. Alternative testing standards may be used as determined by the Administration.

2.3.1.6 All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

2.3.1.7 Fixed fire detection and fire alarm systems for cabin balconies shall be approved by the Administration, based on the guidelines developed by the Organization*.

2.3.1.8 Detectors fitted in hazardous areas shall be tested and approved for such service. Detectors required by regulation II-2/20.4 and installed in spaces that comply with regulation II-2/20.3.2.2 of the Convention need not be suitable for hazardous areas. Detectors fitted in spaces carrying dangerous goods, required by regulation II-2/19, table 19.3, of the Convention to comply with regulation II-2/19.3.2 of the Convention, shall be suitable for hazardous areas.

2.3.2 Control panel

The control panel for the fire detection system shall be tested according to standards EN 54-2:1997, EN 54-4:1997 and IEC 60092-504:2001. Alternative standards may be used as determined by the Administration.

* Refer to the Guidelines for approval of fixed fire detection and fire alarm systems for cabin balconies (MSC.1/Circ.1242).

2.3.3 Cables

Cables used in the electrical circuits shall be flame retardant according to standard IEC 60332-1. On passenger ships, cables routed through other main vertical zones that they serve, and cables to control panels in an unattended fire control station shall be fire resisting according to standard IEC 60331, unless duplicated and well separated.

2.4 *Installation requirements*

2.4.1 Sections

2.4.1.1 Detectors and manually operated call points shall be grouped into sections.

2.4.1.2 A section of fire detectors which covers a control station, a service space or an accommodation space shall not include a machinery space of category A or a ro-ro space. A section of fire detectors which covers a ro-ro space shall not include a machinery space of category A. For fixed fire detection systems with remotely and individually identifiable fire detectors, a section covering fire detectors in accommodation, service spaces and control stations shall not include fire detectors in machinery spaces of category A or ro-ro spaces.

2.4.1.3 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 shall normally 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 shall be limited as determined by the Administration. If the detection system is fitted with remotely and individually identifiable fire detectors, the sections may cover several decks and serve any number of enclosed spaces.

2.4.1.4 In passenger ships, a section of detectors and manually operated call points shall not be situated in more than one main vertical zone, except on cabin balconies.

2.4.2 Positioning of detectors

2.4.2.1 Detectors shall 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, shall be avoided. Detectors shall be located on the overhead at a minimum distance of 0.5 m away from bulkheads, except in corridors, lockers and stairways.

2.4.2.2 The maximum spacing of detectors shall be in accordance with the table below:

Table 9.1 – Spacing of detectors

Type of detector	Maximum floor area per detector (m ²)	Maximum distance apart between centres (m)	Maximum distance away from bulkheads (m)
Heat	37	9	4.5
Smoke	74	11	5.5

The Administration may require or permit other spacing based upon test data which demonstrate the characteristics of the detectors. Detectors located below moveable ro-ro decks shall be in accordance with the above.

2.4.2.3 Detectors in stairways shall be located at least at the top level of the stair and at every second level beneath.

2.4.2.4 When fire detectors are installed in freezers, drying rooms, saunas, parts of galleys used to heat food, laundries and other spaces where steam and fumes are produced, heat detectors may be used.

2.4.2.5 Where a fixed fire detection and fire alarm system is required by regulation II-2/7.5 of the Convention, spaces having little or no fire risk need not be fitted with detectors. Such spaces include void spaces with no storage of combustibles, private bathrooms, public toilets, fire-extinguishing medium storage rooms, cleaning gear lockers (in which flammable liquids are not stowed), open deck spaces and enclosed promenades having little or no fire risk and that are naturally ventilated by permanent openings.

2.4.3 Arrangement of cables

2.4.3.1 Cables which form part of the system shall 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.

2.4.3.2 A section with individually identifiable capability shall be arranged so that it cannot be damaged at more than one point by a fire.

2.5 **System control requirements**

2.5.1 Visual and audible fire signals^{*}

2.5.1.1 The activation of any detector or manually operated call point shall initiate a visual and audible fire detection alarm signal at the control panel and indicating units. If the signals have not been acknowledged within 2 min, an audible fire alarm shall 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.

2.5.1.2 In passenger ships, the control panel shall be located in the onboard safety centre. In cargo ships, the control panel shall be located on the navigation bridge or in the fire control station.

2.5.1.3 In passenger ships, an indicating unit that is capable of individually identifying each detector that has been activated or manually operated call point that has operated shall be located on the navigation bridge. In cargo ships, an indicating unit shall be located on the navigation bridge if the control panel is located in the fire control station. In cargo ships and on passenger cabin balconies, indicating units shall, as a minimum, denote the section in which a detector has activated or manually operated call point has operated.

* Refer to the Code on Alerts and Indicators, 2009, as adopted by the Organization by resolution A.1021(26).

2.5.1.4 Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.

2.5.1.5 Power supplies and electric circuits necessary for the operation of the system shall be monitored for loss of power and fault conditions as appropriate including:

- .1 a single open or power break fault caused by a broken wire;
- .2 a single ground fault caused by the contact of a wiring conductor to a metal component; and
- .3 a single wire to wire fault caused by the contact of two or more wiring conductors.

Occurrence of a fault condition shall initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.

2.5.1.6 Means to manually acknowledge all alarm and fault signals shall be provided at the control panel. The audible alarm sounders on the control panel and indicating units may be manually silenced. The control panel shall clearly distinguish between normal, alarm, acknowledged alarm, fault and silenced conditions.

2.5.1.7 The system shall be arranged to automatically reset to the normal operating condition after alarm and fault conditions are cleared.

2.5.1.8 When the system is required to sound a local audible alarm within the cabins where the detectors are located, a means to silence the local audible alarms from the control panel shall not be permitted.

2.5.1.9 In general, audible alarm sound pressure levels at the sleeping positions in the cabins and 1 m from the source shall be at least 75 dB(A) and at least 10 dB(A) above ambient noise levels existing during normal equipment operation with the ship under way in moderate weather. The sound pressure level should be in the 1/3 octave band about the fundamental frequency. Audible alarm signals shall not exceed 120 dB(A).

2.5.2 Testing

Suitable instructions and component spares for testing and maintenance shall be provided. Detectors shall be periodically tested using equipment suitable for the types of fires to which the detector is designed to respond. Ships with self-diagnostic systems that have in place a cleaning regime for areas where heads may be prone to contamination may carry out testing in accordance with the requirements of the Administration."
