

CHAPTER 4

FIRE PATROLS, AUTOMATIC SPRINKLER, FIXED FIRE DETECTION AND SAMPLE EXTRACTION SMOKE DETECTION SYSTEMS

Key Changes

Minor revision which incorporates the latest IMO Resolutions and Circulars, EU Directives and IACS Unified Interpretations for these items/equipment.

All amendments are highlighted in **yellow**

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4.1 Fire patrols

4.1.1 SI 1998 No.1012 (Fire Protection: Large Ships) Regulations 11(1), 14, 15, the Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU and SOLAS Reg. II-2/7.8 require an efficient fire patrol system to be maintained on specific classes of passenger ships. The surveyor should be satisfied that the ship's organisation is such as to ensure the patrolling is efficient having regard to the size and type of the ship and that instructions to this effect have been included in the ship's standing orders or ISM procedures.

4.1.2 In vehicle ferries it is particularly important that inspection of the vehicle decks be carried out immediately after loading and prior to discharge. The patrol system should be maintained when ships in service are in port. Every part of the ship accessible to the fire patrol should be visited regularly. The value of openings to holds, store and baggage rooms should not be overlooked, as fire can be detected by sight or smell.

4.1.3 SOLAS Reg. II-2/7.8.2 requires that inspection hatches are available to detect smoke sources. These are not needed for enclosed spaces which contain no electrical wiring or combustible materials. Existing accesses to fire flaps and valves can be accepted for smoke detection purposes provided a view behind the division is obtained as far as the draught stops or boundaries.

4.2 Automatic sprinkler, fire detection and fire alarm systems

The general requirements for automatic sprinkler, fire detection and fire alarm systems are contained in MSN 1666(M) Schedule 1 and the FSS Code Chapter 8 as amended by IMO Resolution MSC.327(90) which enters into force on 1 January 2014, and IMO Resolution MSC.339(91) which enters into force on 1 July 2014. The requirements of the FSS Code should be met by new systems for SOLAS ships and Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU. Where any other ship is required to fit an automatic sprinkler system, the FSS Code should be followed as far as practicable.

As the name suggests, these systems are designed to detect fire and raise an alarm, as well as being an extinguishing system. The FSS Code makes clear that the system is expected to be of the 'wet pipe' type, with sealed sprinkler heads which will burst on temperature rise to start extinguishing the fire with 5 l/m²/min of water. Since this standard was established, 'watermist' systems have been developed which have been proven to extinguish fires with a lower quantity of water. These watermist systems must comply with the alternative system specification in IMO Resolution A.800(19) as amended, see [4.3](#) below, and are acceptable for use on SOLAS ships, Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU and on ships to which MSN 1666 applies.

4.2.1 Submission of plans and particulars

4.2.1.1 The following plans and particulars of the system should be submitted for information or approval:

- (a) a general lay-out of the system showing the spaces, including:
 - position and size of all spaces to be protected;
 - pipe line diameters, materials, jointing methods and lay-out;
 - positions of the sprinkler heads and operating temperatures;
 - designed water application rate in those spaces and calculations to confirm the required rates can be achieved;
 - position of the water pump, air compressor and pressure tank;
 - tank capacity;
 - discharge characteristics of the pump and its motor power rating;
- (b) proposed sectional grouping and the position of the sectional shut-off valves;
- (c) design of the compressed air or nitrogen and water pressure tank, unless it is type approved or certified as a pressure vessel for water by another acceptable authority;
- (d) position and type of the fire detectors and alarm sounders;
- (e) discharge nozzle limitations, including maximum dimensional and area coverage, minimum and maximum installation height limitations;
- (f) approval certification in accordance with the Marine Equipment Directive (MED), as applicable, including relevant schedules, or other documents referred to by the approval certification, of sectional control valves, detectors, alarm sounders, sprinkler heads, etc.;
- (g) type and pressure rating of piping, tubing and fittings to be used, including flexible pipes used in concealed 'pop-down' nozzles installations;
and
- (h) electrical arrangements, including cable specification and routing, power source and safety devices.

4.2.2 System approval

It should be noted that the sprinkler system coverage requirements for cargo ships applying Method IIC structural fire protection and large yachts (LY2 Code) are different to those for passenger ships.

Sprinkler systems required by the regulations relating to ships carrying more than 36 passengers must cover all accommodation, service spaces, control stations, stairways and corridors.

- Accommodation and service spaces are defined in the regulations and include public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, game and hobby rooms, barber shops, pantries containing no cooking appliances and similar spaces.
- Control stations including those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised.
- Stairways should include stairway enclosures other than those wholly contained within the machinery spaces.

The requirements for systems on ships carrying not more than 36 passengers are contained in SOLAS Reg. II-2/7.5.3.

Deck lockers which are remote from the accommodation and other service spaces may be excluded with the agreement of HQ. CO₂ rooms may be excluded.

In control stations, where water leakage may cause serious damage to essential equipment, an approved fixed fire-extinguishing system of another type may be fitted.

In domestic refrigerated compartments designed to operate below 5°C, the sprinkler system should be automatic, with suitable anti-freeze protection. The required fire detection system in such spaces should utilise heat detectors.

In domestic refrigerated compartments designed to operate above 5°C, the sprinkler system should be automatic. The required fire detection system in such spaces should utilise smoke detectors.

Retrofitting of sprinklers in refrigerated compartments may be relaxed where the installation is impracticable, but in such cases owners should be advised to obtain their own approval of the proposed arrangement from USCG where ships are likely to trade to USA.

4.2.2.1 "Dry pipe systems"– FSS Code Ch 8.2.1.1

*For the definition of "dry pipe system" see Resolution A.800(19), Annex, paragraph 2.3.
(Unified Interpretation - MSC/Circ.1120)*

In spaces where the possibility of freezing exists during operation of the ship in cold climates, in refrigerated provision stores with an ambient temperature below 5°C, a sprinkler system of a dry pipe type, with an automatically

operated valve at a position close to the entrance door leading into the protected space, may be accepted. The valve should be opened upon activation of a fire detector within the space and be powered from the emergency supply.

Saunas and steam rooms should be fitted with a dry pipe system which may be operated manually outside the sauna. If the valve is arranged for automatic operation, the sprinkler heads operating temperature may be up to 140°C.

(Reg. II-2/7.5.2 and Reg. II-2/10.6.1.1)

(Reg. II-2/41-2.5 as contained in MSC 24(60), FSS Code, Ch. 8, 2.1.1)

Heat detectors are acceptable in refrigerated chambers and in other spaces where steam and fumes are produced such as saunas and laundries. Refrigerated chambers may be fitted with dry pipe sprinkler systems.

(IACS Unified Interpretation SC130)

4.2.2.2 “Nominal area” – FSS Code Ch 8.2.5.2.3

The nominal area is defined as being the gross, horizontal projection of the area to be covered.

(Unified Interpretation - MSC/Circ.1120)

Pipework should, in general, be treated as if a fire main however, fittings on parts of the line which are constantly pressurised with water do not need to pass the dry fire test referred to in IACS Unified Rules P1 and P2 or be type approved for sprinkler systems. Proposals to use plastic pipework complying with IACS Unified Rule P4 should be referred to HQ.

4.2.3 Tests of new sprinkler systems

The following tests should be witnessed by the surveyor to a new sprinkler system after it has been installed in the ship:

- (a) tests to ensure that all pipes are clear and properly connected;
- (b) the piping, with the sprinkler heads in position, should be tested by hydraulic pressure to not less than twice the maximum working pressure of the system;
- (c) a test to ensure that the pump cuts in automatically on reduction of pressure in the system, and the pressure should be noted;
 - (i) by opening in rotation the test valve at each sectional control station; and
 - (ii) by the local switches provided at the central control station.

- (d) the pump should be operated with the test valve on the discharge open, to ensure that the pressure required by the regulations is maintained. The actual discharge pressure maintained during the test should be noted;
- (e) the setting of the pressure relief valve on the pressure tank, and its ability to prevent overpressure when the air compressor or re-charging pump is working, should be checked; and
- (f) tests to ensure satisfactory operation of all electrical circuits and switching arrangements.

4.2.4 Instructions to Master and crew

4.2.4.1 Surveyors should ensure that a diagrammatic plan of the sprinkler system, showing the various decks and spaces served, and comprehensive instructions regarding the maintenance, testing and operation of the system, are supplied to the ship, and that the plan is properly exhibited.

4.2.4.2 Instructions for the carrying out of periodic tests should be exhibited prominently at the control station and each section stop valve.

4.2.4.3 Surveyors should advise the Master that while the ship is in service, the tests detailed in paragraphs [4.2.3 \(d\) and \(f\)](#) above should be made every week by the ship's officers, and care should be taken to see that the level of fresh water in the pressure tank is again brought up to the correct level, immediately after the tests have been completed. All sprinkler heads should be examined periodically by the ship's officers for possible damage or loss of coloured liquid in the glass bulb, so that faulty sprinkler heads are renewed without delay.

4.3 Equivalent sprinkler systems (IMO Resolution A.800(19), as amended by IMO Resolutions MSC.265(84) and MSC.284(86))

The general requirements for equivalent sprinkler systems are contained in IMO Resolution A.800(19), as amended by IMO Resolutions MSC.265(84) and MSC.284(86).

New installations on SOLAS ships and Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU should be approved under the Marine Equipment Directive (MED), as applicable.

Other ships should comply with IMO Resolutions MSC.265(84) and MSC.284(86) as far as practicable.

These water mist systems have been proven to need less than 5 l/m²/min of water to extinguish fires.

4.3.1 Water spray systems for passenger ship balconies:-

See MSC.1/Circ.1268.

4.3.2 Water spray systems for passenger ship external areas:-

See MGN 382 and MSC.1/Circ.1274.

4.4 Fixed Fire Detection and Fire Alarm Systems

4.4.1 For vessels built before 1 July 2012 the general requirements for fixed fire detection and fire alarm systems are contained in SI 1998 No. 1012 (Fire Protection: Large Ships) Regulations 11 and 24, MSN 1666(M) Schedule 5 and FSS Code Chapter 9, as amended by IMO Resolution MSC.217(82).

New installations on SOLAS ships and Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU built on or after 1 July 2012 should comply with IMO Resolution MSC.311(88) which amends FSS Code Chapter 9, and IMO Resolution MSC.339(91) which enters into force on 1 July 2014.

Other ships should comply with IMO Resolution MSC.311(88) as far as practicable.

4.4.2 MSN 1666 Schedule 5.1(n): The following activating arrangements may be accepted:-

4.4.2.1 to activate a paging system;

4.4.2.2 to activate the fan stops;

4.4.2.3 to activate the closure of fire doors;

4.4.2.4 to activate the closure of fire dampers;

4.4.2.5 to activate the sprinkler system;

4.4.2.6 to activate the smoke extraction system; and

4.4.2.7 to activate the low-location lighting system.

Where addressable systems are installed, they may be used to transmit data such as fire, and/or down flooding, door open/close position and output any necessary information to the Voyage Data Recorder, provided that the surveyor is satisfied that the efficient operation of the fire detection system will not be impaired.

4.4.3 MSN 1666 Schedule 5.1(c): Sources of power supply should comply with the following interpretations:-

(FSS Code, Ch. 9, 2.2)

1. Continuity of power supply

1.1 Operation of the automatic changeover switch or a failure of one of the power supplies shall not result in permanent or temporary degradation of the fixed fire detection and fire alarm system.

1.2 Where the fixed fire detection and fire alarm system would be degraded by the momentary loss of power, a source of stored energy having adequate capacity shall be provided to ensure the continuous operation during changeover between power supplies.

1.3 Connection of electrical power supplies to an automatic changeover switch shall be arranged such that a fault will not result in the loss of all supplies to the automatic changeover switch.

2. Emergency supply

2.1 The fixed fire detection and fire alarm system emergency power may be supplied by an accumulator battery or from the emergency switchboard. Where the system is supplied from an accumulator battery, the arrangements are to comply with the following requirements:

1. the accumulator battery shall have the capacity to operate the fire detection system under normal and alarm conditions during the period required by SOLAS Chapter II-1, Regulation 42 or 43 (as applicable) for the emergency source of power supply.

2. the rating of the charge unit, on restoration of the input power, shall be sufficient to recharge the batteries while maintaining the output supply to the fire detection system.

3. the accumulator batteries are to be suitably located for use in an emergency.

Note:

For battery recording and UPS arrangements, see IACS UR E18 and E21.

2.2 Where the emergency feeder for the electrical equipment used in the operation of the fixed fire detection and fire alarm system is supplied from the emergency switchboard, it shall run from this switchboard to the automatic changeover switch without passing through any other switchboard.

Note:

This UI is to be uniformly implemented by IACS Members and Associates for systems approved on or after 1 July 2010.

(IACS Unified Interpretation SC35)

4.4.4 MSN 1666 Schedule 5.1(o): Fire detection systems with a zone address identification capability, fitted on or after 1 October 1994 should comply with the following interpretations:-

(FSS Code, Ch. 9, 2.4.1.1 and 2.5.1.1)

Section: Group of fire detectors and manually operated call points as reported in the indicating unit(s).

Loop: Electrical circuit linking detectors of various sections and connected to the control panel.

(IACS Unified Interpretation SC115)

(FSS Code, Ch. 9, 2.1.4 and 2.4.3.2)

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

Zone address identification capability means a system with individually identifiable fire detectors.

(IACS Unified Interpretation SC117)

4.4.5 MSN 1666 Schedule 3(a) and (c): Detectors installed within cold spaces, such as refrigerated compartments, should be tested according to publication IEC 60068-2-1 (2007) - Test Ab.

4.4.6 Fixed fire detection and fire alarm system for passenger ship cabin balconies:-

See MGN 367, MGN 382 and MSC.1/Circ.1242.

4.4.7 Accommodation, service spaces and control stations of cargo ships built in accordance with SOLAS Reg. II-2/9.2.3.1, Method IIIC should comply with the following interpretation:-

(Reg. II-2/7.5.5.3)

In the case of ships built in accordance with Method IIIC, the detection system is only relevant to the accommodation block. Service spaces built away from the accommodation block need not be fitted with a fixed fire detection system.

(IACS Unified Interpretation SC160)

4.5 Fire Detecting Systems

4.5.1 Cargo spaces

4.5.1.1 The requirements to fit fire detecting systems in cargo spaces are stated in the regulations appropriate to the ship concerned.

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 in writing giving reasons why it would be unreasonable to comply with the requirements.

4.5.1.2 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.

4.5.2 Vehicle, special category and ro-ro spaces

The smoke detector sections in vehicle, special category and ro-ro spaces may be provided with an arrangement, (e.g. a timer) for disconnecting detector sections during loading and unloading of vehicles to avoid "false" alarms. The time of disconnection should be adapted to the time of loading/unloading. The central unit should indicate whether the detector sections are disconnected or not.

However, manual call points should not be capable of being disconnected by the arrangements referred to above.

(Unified Interpretation - MSC/Circ.1120)

4.5.3 Machinery spaces

The requirements to fit fire detecting systems in machinery spaces are stated in the regulations appropriate to the ship concerned. An efficient and effective automatic fire detection system should be fitted in all machinery spaces which are periodically unattended or which are under manned supervision from a control room. It is strongly recommended that each system should employ a combination of detector types, and it is preferable for at least one flame detector to be included, in order to enable the system to react to more than one type of fire symptom. The system should not normally use only thermal detectors. It should be designed to detect rapidly the onset of fire in any part of the space, under any normal condition of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. The detection system should be self-monitoring for faults and, on fire detection, should initiate audible and visual alarms, both distinct from any other system, in sufficient places to ensure that the alarms are heard and observed both on the navigation bridge and by a responsible engineer officer. When the navigation bridge is unmanned, the alarm should sound in some other location where a responsible member of the crew is on duty. The alarm control panel required by the regulations should be located on the navigation bridge, in the continuously manned central control station or main fire control station. If the control panel is located in the main fire control station, one indicating unit must be located on the navigation bridge.

4.6 Approval of Fire Detection Equipment

4.6.1 General

The general requirements for fire detection equipment are contained in the relevant regulations, which are now superseded when approval under the Marine Equipment Directive (MED) is required.

Fire detectors and associated equipment used in cargo holds and ro-ro spaces, which are used for the carriage of dangerous goods, should be of the certified safe type, as necessary.

4.6.2 Fire detectors

All fire detectors must be type approved to meet the testing standards quoted in the Marine Equipment Directive for the area in which they are to be used.

4.6.3 Control and indicating units

Control and indicating units must be type approved to meet the testing standards quoted in the Marine Equipment Directive.

A second battery, reserved solely for fire detection purposes, need not be provided if a second satisfactory source of power is available, e.g. from the emergency switchboard. 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.

4.6.4 Manual call points, alarm sounders and power packs

SI 1998 No. 1012 (Fire Protection: Large Ships) Regulation 11(1)(b) requires manual call points on ships of Classes I and II, and on ships of Class II(A) of 21.34 m in length and over, which are for the use of the fire patrol or any person identifying a fire. The same requirement is applied by SOLAS to all types of ships built after 2002, and the Domestic Passenger Ships Directive 2009/45/EU as amended by Directive 2010/36/EU built after 2003.

SI 1998 No. 1012 (Fire Protection: Large Ships) Regulations 82(1)(2)(3) requires non-passenger vessels of 500 tons and over to be provided with manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

Manual call points, alarm sounders and power packs must be type approved to meet the testing standards quoted in the Marine Equipment Directive. Where no relevant standard exists each case will be assessed individually on its merits.

4.6.4.1 The general requirements for visual and audible fire signals are contained in the FSS Code Chapter 9, and should also meet the requirements of the IMO Code on Alarms and Indicators (Resolution A.830(19)).

4.6.4.2 Manual call points should be sited throughout the accommodation spaces, service spaces and control stations and should be located at each exit. They should be readily accessible in the corridors of each deck, so that no part of the corridor is more than 20 m from a manually operated call point, and no point should serve more than two decks. Any call point for the alarm system situated in well ventilated vehicle deck spaces above the bulkhead deck, or in similar spaces having a specific flammable vapour hazard, should be mounted more than 450 mm above the deck and should be suitably enclosed, unless of a certified safe type.

Manually operated call points (SOLAS Reg. II-2/7.7)

The phrase 'Manually operated call points complying with the Fire Safety Systems Code shall be installed throughout the accommodation spaces, service spaces and control stations' does not require the fitting of a manually operated call point in an individual space within the accommodation spaces, service spaces and control stations. However, a manually operated call point shall be located at each exit (inside or outside) to the open deck from the corridor such that no part of the corridor is more than 20 m from a manually operated call point.

Service spaces and control stations which have only one access, leading directly to the open deck, shall have a manually operated call point not more than 20 m (measured along the access route using the deck, stairs and/or corridors) from the exit. A manually operated call point is not required to be installed for spaces having little or no fire risk, such as voids and carbon dioxide rooms, nor at each exit from the navigation bridge, in cases where the control panel is located in the navigation bridge.

(IACS Unified Interpretation SC241)

4.6.4.3 Any manual call point for the alarm system situated in a cargo hold space used for carriage of vehicles with petrol in their tanks should be of a certified safe type suitable for use in explosive petrol and air mixtures, e.g. flameproof or intrinsically safe.

4.6.4.4 The manual fire alarm system may be combined with an automatic fire detection and alarm system, and should generally 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.

4.6.5 Environmental criteria

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.

4.6.6 Public address systems

For passenger ships, a public address system or other effective means of communication complying with SOLAS Reg. III/6.5 shall be available throughout the accommodation, service spaces, control stations and open

decks, which can be used for notifying crew and passengers of a fire for safe evacuation.

4.6.7 Provision of two-way portable radio telephone apparatus

On ships provided with special category spaces or ro-ro cargo spaces for the carriage of dangerous goods, two-way portable telephone apparatus should be of certified safe type for use in Zone 1 areas as defined in publication IEC 60079-15 - Electrical Apparatus for Explosive Gas Atmospheres. The two-way portable telephone apparatus should be capable of being used from most parts of the vessel. As a minimum, they should be audible where the fire patrol makes their rounds such as key box locations and the routes specified on the fire patrol check list. If necessary, extra antennas should be fitted to obtain effective communication.

4.7 Testing of Fire Detecting Systems

4.7.1 Initial survey

4.7.1.1 During the initial survey, the power supply arrangements, associated alarms, indicating and fault monitoring systems should be checked to ensure that the control and indicating panels and detectors have been correctly installed. For systems with zone address identification capability, the correct location/labelling should also be checked.

4.7.1.2 Suitable instructions and spare components for testing and maintenance should be provided. All detectors shall be of a type that can be tested for correct operation without the removal of any component.

4.7.1.3 The adequacy and efficiency of the placement of detector heads in all the areas covered should be tested in all conditions of ventilation expected during operation, and it may be necessary to test the detectors located in machinery spaces with the main machinery operational. The method of testing will vary depending on the type of detector involved, but may involve the use of aerosols or specially designed testing equipment.

4.7.1.4 The activation response time during tests may vary considerably from ship to ship depending on various factors such as deckhead height, ventilation rates, etc. In determining whether an achieved response time is adequate, surveyors should consider the potential for the fire to spread and the ability of personnel responding to the alarm to contain and control the fire with available equipment.

4.7.2 Re-survey

At re-survey the alarm, self-monitoring and indication functions should be tested, and it is advisable for detectors to be serviced and cleaned by the manufacturers or their authorised agents. A representative sample of detector heads, at least one in each zone, should be tested.

4.8 Sample Extraction Smoke Detection Systems

4.8.1 The general requirements for sample extraction smoke detection systems are contained in **SI 1998 No. 1012 (Fire Protection: Large Ships)** Regulations 11, 24 and 66, MSN 1666(M) Schedule 6 and FSS Code chapter 10. New installations on SOLAS ships should comply with the FSS Code.

4.8.2 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:-

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

However, the maximum allowable interval should not exceed 120 sec ($I_{\max} = 120$ s).

4.8.3 MSN 1666(M) Schedule 6, 3(c): depending on the capacity of the fans, the number of scanning points and the length of the system piping, the maximum response time for the fans should be around 15 sec.

4.8.4 In sample extraction smoke detection systems, provision should be made to prevent the discharge of contaminated atmosphere, through the sampling system, to the space containing the control cabinet, in the event of the cargo space atmosphere being contaminated due to cargo leakage. When cargo is carried, which may give off flammable or toxic fumes, a notice stating that samples must be exhausted to the open air, should be permanently exhibited and positive locking arrangements provided. The control cabinet and exhaust fans for the system should be certified safe for flammable atmospheres.

4.9 Fire Control Plans

4.9.1 **SI 1998 No. 1012 (Fire Protection: Large Ships)** Regulation 49 requires every ship of Classes I and II, every ship of Class II(A) of 21.34 m in length or over and cargo ships of 500 tons or over to permanently exhibit Fire Control Plans, for the guidance of the Master and officers, showing clearly for each deck the position of the control stations, the various "A" & "B" class division fire sections, together with particulars of the fire alarms, fire detection systems, fixed and portable fire extinguishing appliances, firemen's outfits, ventilating system and means of access to different compartments and decks, etc. The same requirement is applied by SOLAS to all types of ships and the Domestic Passenger Ships **Directive 2009/45/EU as amended by Directive 2010/36/EU**.

4.9.2 It should be noted that the "mimic" plans required under SOLAS Reg. II-2/13.7.2.2 must show the escape routes, the symbols for which can be found in IMO Resolution A.952(23) however, these escape routes may also be shown on the Fire Control Plans.

4.9.3 The descriptions in the fire control plan must be in the language(s) required by the Administration, one of which must be either English or French.

4.9.4 Signs to identify fire equipment should conform to IMO Resolution A.952(23) which gives details of the graphical symbols for fire control plans and IMO Resolution A.756(18) concerning guidelines on the information to be provided with fire control plans and booklets. ISO Standard 17631:2002 +A1:2011 provides additional guidance for the preparation of shipboard fire control plans.

Ships constructed before 1 January 2004 may continue to carry fire control plans that use the graphical symbols contained in IMO Resolution A.654(16).

4.9.5 For new plans, it is acceptable to use any signs contained in IMO Resolution A.654(16) that are not included in IMO Resolution A.952(23) or ISO Standard 17631:2002+A1:2011, e.g. Control Station, until such time as these standards are updated / superseded.

4.9.6 IMO Resolution A.952(23) includes a symbol for a fire locker and states that the legend should include the contents of the locker. For practical purposes, a supplementary sign listing the contents can be included alongside the legend on each numbered fire locker. The items contained in a fire locker need not be indicated on the fire control plans.

4.9.7 Although the regulations require “A” and “B” class divisions to be indicated, as there is no specific symbol to indicate an “A” class deck, generally, only bulkheads are shown.

4.9.8 MSC/Circ.451 gives guidance concerning the storage location of a duplicate set of fire control plans or a booklet for the assistance of shore-based fire-fighting personnel.

4.10 Requirements for Passenger Ships Carrying More than 36 Passengers Constructed Before 1st October 1994

4.10.1 Ships constructed before 1st October 1994 may use the graphical symbols contained in IMO Resolution A.654(16) for their fire control plans and refer to IMO Resolution A.756(18) for guidelines on the information to be provided with fire control plans and booklets.

4.10.2 On ships provided with special category spaces or ro-ro cargo spaces for the carriage of dangerous goods, two-way portable telephone apparatus should be of certified safe type for use in Zone 1 areas as defined in publication IEC 60079-15 - Electrical Apparatus for Explosive Gas Atmospheres. The two-way portable telephone apparatus should be audible from most parts of the vessel. As a minimum, they should be audible where the fire patrol makes their rounds, such as key box locations, and the routes specified on the fire patrol check list. If necessary, extra antennas should be fitted to obtain effective communication.

4.10.3 The maximum spacing of smoke detectors above ceilings should be in accordance with MSN 1666(M) Schedule 5, 2(e) unless the presence of draught stops requires closer spacing.

4.10.4 Provision of a sprinkler system in stairway enclosures: on ships to which the regulations apply, this sprinkler system may be achieved by a suitable connection from the ship's fire main or other suitable water supply. The valve of this sprinkler system should be located outside the protected space. The system may be manually operated.

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| Author | Allan Greenland | Branch | Marine Technology |
| Approved by | Martyn Turek | Branch | Marine Technology |
| Authorised by | Paul Coley | Branch | AD Ship Standards |