

9 Automatic Sprinkler, Fire Detection and Fire Alarm Systems

9.1 General (1 July 2002)

9.1.1 Basic Sprinkler System Requirements

Any required automatic sprinkler, fire detection and fire alarm system is to be capable of immediate operation at all times and no action by the crew is to be necessary to set it in operation. It is to be of the wet pipe type (i.e., permanently filled with water under pressure from the freshwater tank), but small exposed sections may be of the dry pipe type (i.e., not permanently filled with water) where this is a necessary precaution. Saunas are to be fitted with a dry pipe system, with sprinkler heads having an operating temperature up to 140°C (284°F). Any parts of the system which may be subjected to freezing temperatures in service are to be suitably protected against freezing. It is to be kept charged at the necessary pressure and is to have provision for a continuous supply of water.

9.1.2 Basic Fire Alarm System Requirements

Each section of sprinklers is to include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. Such alarm systems are to be such as to indicate if any fault occurs in the system. Such units are to indicate in which section served by the system a fire has occurred and are to be centralized on the navigating bridge or in the continuously manned central control station and, in addition, visible and audible alarms from the unit are to be placed in a position other than on the aforementioned spaces to ensure that the indication of fire is immediately received by the crew.

9.1.3 Sprinkler Systems Equivalency

Automatic sprinkler systems equivalent to those specified in 4-7-3/9 are to be submitted for approval by the Bureau. Reference is to be made to the Revised Guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS Regulation II-2/12 as adopted by the IMO by resolution A.800(19).

9.3 Sprinkler System Arrangements

9.3.1 Sprinkler Sections

Sprinklers are to be grouped into separate sections, each of which is to contain not more than 200 sprinklers.

9.3.2 Section Isolating Valves (1 July 2002)

Each section of sprinklers is to be capable of being isolated by one stop valve only. The stop valve in each section is to be readily accessible in a location outside of the associated section or in cabinets within stairway enclosures. The valve's location is to be clearly and permanently indicated. Means are to be provided to prevent the operation of the stop valves by any unauthorized person.

9.3.3 Pressure Indicators

A gauge indicating the pressure in the system is to be provided at each section stop valve and at a central station.

9.3.4 Information and Instructions for Crew

A list or plan is to be displayed at each indicating unit, showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance are to be available.

9.5 Sprinklers Characteristics

Sprinklers are to be resistant to corrosion by marine atmosphere. In accommodation and service spaces, the sprinklers are to come into operation within the temperature range from 68°C (154°F) to 79°C (174°F), except that in locations such as drying rooms, where high ambient temperatures might be expected, the operating temperature may be increased by not more than 30°C (86°F) above the maximum deckhead temperature.

Sprinklers are to be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 liters/m²/min (0.12 gal/min/ft²) over the nominal area (i.e., gross, horizontal projection of the area to be covered) covered by the sprinklers. However, the use of sprinklers providing such an alternative amount of water suitably distributed as to be not less effective may be considered.

9.7 Pressure Tank

9.7.1 Pressure Tank Characteristics

A pressure tank having a volume equal to at least twice that of the charge of water specified in this subparagraph is to be provided. The tank is to contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in 4-7-3/9.9.2, and the arrangements are to provide for maintaining an air pressure in the tank such as to ensure that where the standing charge of fresh water in the tank has been used, the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system.

Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank are to be provided. A glass gauge is to be provided to indicate the correct level of the water in the tank.

9.7.2 Protection from Sea Water

Means are to be provided to prevent the passage of seawater into the tank.

9.9 Pumps and Piping Systems

9.9.1 Required Pump

An independent power pump is to be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump is to be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.

9.9.2 Pump and Piping Capacity (1 July 2002)

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 280 m² (3050 ft²) at the application rate specified in 4-7-3/9.5. The hydraulic capacity of the system is to be confirmed by the review of hydraulic calculations, followed by a test of the system by the Surveyor.

9.9.3 Test Valve

The pump is to have fitted on the delivery side a test valve with a short open-ended discharge pipe. The effective area through the valve and pipe is to be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in 4-7-3/9.7.1.

9.9.4 Sea Inlet

The sea inlet to the pump is to, wherever possible, be in the space containing the pump and is to be so arranged that when the vessel is afloat, it will not be necessary to shut off the supply of sea water to the pump for any purpose other than the inspection or repair of the pump.

9.11 Location of Sprinkler Pump and Tank

The sprinkler pump and tank are to be situated in a position reasonably remote from any machinery space of category A and are not to be situated in any space required to be protected by the sprinkler system.

9.13 Power Sources

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, in addition to complying with the provisions of 4-7-3/9.11, the source is to be so situated that a fire in any protected space will not affect the air supply to the machinery.

9.15 Connection with the Fire Main

The sprinkler system is to have a connection from the vessel's fire main by way of a lockable screw-down non-return valve at the connection, which will prevent a backflow from the sprinkler system to the fire main.

9.17 Testing

9.17.1 Test Valve

A test valve is to be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section is to be situated near the stop valve for that section.

9.17.2 Pump Operation Testing

Means are to be provided for testing the automatic operation of the pump on reduction of pressure in the system.

9.17.3 Alarms and Indicators Testing

Switches are to be provided at one of the indicating positions referred to in 4-7-3/9.1.2 which will enable the alarm and the indicators for each section of sprinklers to be tested.

9.19 Spare Parts (1 July 2002)

A quantity of spare sprinkler heads is to be provided for all types and ratings installed on the vessel, as follows:

<i>Total number of heads</i>	<i>Required number of spares</i>
<i><300</i>	<i>6</i>
<i>300 - 1000</i>	<i>12</i>
<i>>1000</i>	<i>24</i>

The number of spare sprinkler heads of any type need not exceed the total number of heads installed of that type.

11 Fixed Fire Detection and Fire Alarm Systems

11.1 System Requirements

11.1.1 Readiness

Any required fixed fire detection and fire alarm system with manually operated call points is to be capable of immediate operation at all times.

11.1.2 System Monitoring

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.

11.1.3 Arrangements of Power Supplies

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 changeover switch situated in or adjacent to the control panel for the fire detection system.

The feeders from the main and the emergency switchboards are run to the changeover switch without passing through any other distribution board.

11.1.4 System Arrangements

Detectors and manually operated call points are to be grouped into sections. The activation of any detector or manually operated call point 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.

11.1.5 Location of Control Panel (1 July 2002)

The control panel is to be located on the navigating bridge or in the continuously manned central control station.