Translation: Only the Danish version is authentic

The Danish Maritime Authority's Guidance no. 4 of 24 November 2004

Guidance on fixed fire-extinguishing systems with aerosol-extinguishing agents

This Guidance contains guidelines for the use, installation and approval of fixed fire-extinguishing systems with aerosol-extinguishing agents.

1 Scope

This Guidance applies to the following ships[1] on which aerosols are permitted as an extinguishing agent:

.1 Fishing vessels with a length of less than 45 metres,

.2 Cargo ships with a gross tonnage of less than 500,

.3 Ships approved pursuant to the Danish Maritime Authority's Technical Regulation on traditional ships,[2]

.4 Pleasure craft with a length of or above 24 metres,

.5 Pleasure craft approved for chartering purposes.[3]

2 Definitions

.1 "Aerosols" are chemical substances which stop the fire.

.2 The "design amount" (g/m^3) is the amount of aerosol required per cubic meter of enclosed space to extinguish a defined type of fire.

.3 The "net volume" is the volume of the protected room, including casings and bilges, which the extinguishing agent fills after release.

.4 "Category A machinery spaces" are the spaces and trunks for such spaces containing:

4.1 Internal combustion engines used for propulsion; or

4.2 Internal combustion engines used for other purposes than propulsion if such machinery has a total output of no less than 375 kW; or

4.3 An oil-fired boiler or a fuel oil installation.

3 General provisions

.1 The utilisation of fixed fire-extinguishing systems with aerosol-extinguishing agents is only permitted in category A machinery spaces.

.2 The extinguishant must have been tested[4] with a satisfactory result by a recognised test institution. The approval documentation of the institution must state the composition and concentration of the aerosol as well as the resulting concentration of oxygen in the protected space (the test space) when the extinguishant has been released. The extinguishant must not be used in machinery spaces with a larger volume than that of the test space.

.3 The extinguishant must be wheel-marked[5] or approved by the Danish Maritime Authority.

.4 The amount of aerosol required must be calculated on the basis of the net volume of the protected space.[4]

.5 Where the volume of free air in air containers in a space is of such a size that the release of air in such a space in the event of fire would significantly reduce the effectiveness of the fixed fire-extinguishing system, there must be an additional amount of fire-extinguishing agent to compensate for this.

.6 When calculating the amount of aerosol required, the design amount (g/m^3) must be multiplied by a safety factor of 1.3. The amount installed must be at least equal to the amount calculated.

7 Automatic release of the system is not permitted.

8 There must be clear instructions on the operation of the system at the place of release.

.9 There must be means for manual closing of all openings from which air can flow into a protected space or from which emissions of gases from such a space may occur.

.10 It must be possible to stop all internal combustion engines installed in spaces protected by the system immediately from a central position outside the room.

.11 Prior to release, the ventilation in the protected space must be stopped automatically.

.12 There must be means to emit automatically sound signals to warn of release of a fire-extinguishant into a space in which personnel work or to which they have access. The alarm must be sounded at an appropriate time before the agent is released.

.13 All alarms linked to the fire-extinguishing system must be labelled ”Aerosol alarm”.

.14 All doors to protected spaces must be labelled:
"This space is connected to a fire-extinguishing system with aerosols and must be evacuated immediately when the alarm sounds" (*"Rummet er tilsluttet et brandslukningsanlæg med aerosoler og skal øjeblikkelig forlades, når alarmen lyder"*).

.15 Drawings, including a description of the location of the components in the space as well as calculations of the amount of aerosol, must be submitted to and approved by the Danish Maritime Authority before a survey is commenced. The gross and net volume of the machinery space must be stated in the material. The material must be sent to: The Danish Maritime Authority, Centre for Ships (CFS), Vermundsgade 38 C, 2100 Copenhagen Ø, Denmark. Approved drawings of the system must be available before a survey can commence. Three copies of the material described above must be submitted.

.16 Manuals with instructions as well as a set of approved drawings of the installation must be kept on board.

4 Installation requirements

.1 In installations with more than two cartridges, these cartridges must be distributed throughout the room, including beneath the deck.

.2 The location of the cartridges must secure escape routes from released aerosols.

.3 Each cartridge must be labelled to ease fault-finding and testing. The labelling must be such that it is easy to localise even if it has been painted over.

.4 The maximum lifetime of cartridges must be imprinted on the cartridges.

.5 The installation must be fitted with two separate release devices which must be mounted as far apart as possible. The required release devices must have separate circuits. All circuits, release devices and cartridges must be monitored for defects and voltage failure. The monitoring unit must itself be monitored for defects and voltage failure. A faulty cartridge must not affect the operation of the remaining cartridges. The release devices and cartridges must be arranged so that, in the event of damage to a release device/cartridge in the relevant space, in accordance with the concept of a single defect, the amount of extinguishant necessary can still be released, taking into account the requirement for a uniform distribution of extinguishant throughout the entire space. In the event of a short circuit/disconnection of one of the two release devices for a cartridge, the remaining cartridges must still be functional. The arrangement in connection with systems for spaces which only require one or two containers must be to the satisfaction of the Danish Maritime Authority.

.6 The installation must be supplied from two independent energy sources, of which one must be located outside the protected space.

.7 Both the energy sources mentioned above must have a capacity corresponding to the current recommended by the manufacturer for release of the system.

.8 The separate energy source for the radio installation must not be used as an energy source for the fire-extinguishing system.

.9 There must be optical and acoustic alarms to warn of defects in the system.

.10 There must be an indication that the system has been released and there must be optical and acoustic alarms in the wheelhouse that the system has been released.

.11 The installation must have an alarm panel, located at a suitable position outside the protected space, at which the monitoring functions required are indicated.

.12 Existing alarm panels (control cabinets) from previous halon installations must be used only for the monitoring and ignition functions required if this is possible without construction changes.

.13 The release must be by activating a two-poled rotary switch with a cover.

.14 All cables in the installation must be ”fire-retardant” cables in accordance with IEC Publication 332-3A, but cables in the release circuit must be fire-proof in accordance with IEC Publication 331, and screened off.

.15 The release circuit must be installed with metal conduits and with cable relief. Porcelain connectors must be used for connections in connection boxes.

.16 Minimum degree of enclosure for electric components in the protected space is IP 55.

.17 Fire-detection systems which only utilise heat detectors must only be used on ships on which the height of the machinery space does not exceed 2.5 metres. In machinery spaces with a height exceeding 2.5 metres, either a combination of heat detectors and smoke detectors may be used, or a fire detection system with detectors which only indicate smoke. The existing fire-detection system may be retained in existing ships, provided that it complies with the provisions in force at the date of build.

5 Inspection and approval

.1 A simulated release test must be carried out in connection with a survey for approval of the system as follows:

.2 A release test with each release device independently. This test must be carried out by fitting a test bulb with a load corresponding to a current of one ampere at each cartridge. The test must show that it is possible to release all cartridges.

.2 There must be checks that it is still possible to release the system even in the event of a defect in one or more of the release devices/cartridges.

.3 The function tests necessary must be carried out, including the monitoring and alarm functions, ventilation and emergency cut-off.

.4 Annual inspections must be carried out by an authorised enterprise. The inspection must include the function tests mentioned in item 5.3 above as well as checks that the release circuits are intact.

Centre for Maritime Regulation / Ralph Sylvestersen

---

1 The extinguishant must not be used on ships approved for voyages with more than 12 passengers.

2 Cf. technical regulation no. 15 of 20 November 2000 on traditional ships issued by the Danish Maritime Authority.

3 Cf. technical regulation no. 4 of 1 May 2004 on pleasure craft issued by the Danish Maritime Authority.

4 Cf. MSC/Circ. 1007: Guidelines for the approval of fixed aerosol fire-extinguishing system.

5 Cf. technical regulation no. 12 of 2 December 2002 on ship equipment issued by the Danish Maritime Authority.