

Order on the installation and testing of fire-extinguishing systems with mixed atmospheric gases in engine spaces in ships¹

In pursuance of section 1(2), section 3(1)(i), (vi) and (viii) and section 32(8) of the act on safety at sea (*love om sikkerhed til søs*), cf. consolidated act no. 72 of 17 January 2014, and in pursuance of section 1(2), section 3(1)(i), (vi) and (viii) and section 32(8) of the act on safety at sea, as enacted for Greenland by decree no. 71 of 29 January 2013, and in consultation with the Government of Greenland, the following provisions are laid down:

Part 1

Application

Section 1. This order shall apply to:

- 1) Passenger ships engaged on international voyages, irrespective of size, and cargo ships with a length of or above 15 metres or with scantlings of or above 100, irrespective of whether they are engaged on domestic voyages or international voyages, as well as recreational craft with a hull length above 24 metres covered by the order on Notice B from the Danish Maritime Authority, the construction and equipment, etc. of ships.
- 2) Passenger ships engaged on domestic voyages covered by the order on Notice D from the Danish Maritime Authority, technical regulation on the construction and equipment, etc. of passenger ships engaged on domestic voyages.
- 3) Fishing vessels with a length L of or above 15 metres as well as fishing vessels with scantlings of or above 100 covered by the order on Notice E from the Danish Maritime Authority, technical regulation on the construction and equipment, etc. of fishing vessels.
- 4) Commercial vessels with a length L below 15 metres and with scantlings of or above 20, but below 100, covered by the order on Notice F from the Danish Maritime Authority, technical regulation on the construction and equipment, etc. of small commercial vessels.
- 5) Ships covered by the technical regulation on traditional ships (ships worthy of preservation, sport fishing vessels, etc.).

Subsection 2. The provisions of this order are an addition to the provisions of chapter 5 of the "Fire Safety Systems Code" (FSS Code).

Part 2

General requirements

Standard tests

Section 2. Each individual mixture of gases shall be tested in accordance with the standard tests stipulated in MSC/Circ.848, as amended by MSC.1/Circ.1267.

¹ This order has been notified in draft in accordance with Directive 98/34/EC of the European Parliament and of the Council (information procedure directive), as amended most recently by directive 98/48/EC.

Subsection 3. An authorised body/recognised test institute shall test the mixture of gases with a satisfactory result in accordance with the standard tests referred to in subsection 1. The approval certificate from such a test institute shall, inter alia, state the composition of the mixture and the minimum and maximum oxygen concentrations permitted in the protected space when the extinguishant has been released (the concentration of extinguishant).

Installation requirements

Section 3. The system shall be designed only for manual release.

Subsection 2. In special cases, the Danish Maritime Authority may, however, permit automatic release of both new and existing fire-extinguishing systems provided that:

- 1) the ship in question is not covered by the provisions of the International Convention for the Safety of Lives at Sea (SOLAS Convention);
- 2) a green indicator lamp and a sign on the release panel indicate when the system has been set for manual release;
- 3) a red indicator lamp and a sign on the release panel indicate when the system has been set for automatic release; and
- 4) a conspicuous red sign with white letters of suitable size is affixed below the red indicator lamp with the following text: "When at sea, the system must not be set for automatic release" (in Danish: "Under sejlads må anlægget ikke stå til automatisk udløsning").

Subsection 3. If the system is intended to serve more than one space, its storage and release functions shall be arranged so as to ensure that the required volumes of extinguishant are released into the spaces.

Subsection 4. Means shall be provided for automatic stop of all ventilators serving the protected space before the extinguishant is released.

Subsection 5. At the release point(s), written instructions shall be available clearly stating that all ventilation and all combustion engines shall be stopped and that all fire dampers and hatches shall be closed before the system is released.

Subsection 6. The release arrangement shall be designed so that 85% of the amount of extinguishant required according to the approval certificate is released within a maximum period of 120 seconds.

Subsection 7. It shall be possible to maintain the minimum concentration of extinguishant in the space for at least 15 minutes.

Subsection 8. The system shall be designed to resist temperatures, vibrations, shocks and mechanical impact, fouling and corrosion as well as moist that may occur in the space where the system is installed.

Subsection 9. The release of the system as well as any release via the frangible discs of the containers shall not present any danger to personnel engaged in the maintenance of equipment or using the normal access ladders to and exits from the space.

Subsection 10. It shall be possible for the crew to check the pressure (the content) of the containers without any risk.

Subsection 11. Unless otherwise provided, the amount of the mixture of gases available for cargo spaces shall be sufficient to produce the minimum volume of free mixture stated on the approval certificate. If two or more cargo spaces are connected through ventilation ducts, such spaces shall be considered one space.

Subsection 12. The amount of the mixture of gases available for machinery spaces shall be sufficient

to produce the minimum volume of free mixture stated on the approval certificate. Two or more machinery spaces of category A (cf. Notice B from the Danish Maritime Authority, chapter II-2, regulation 3, paragraph 31) that are not separate shall be considered one space.

Subsection 13. The number and location of nozzles shall be such as to achieve a homogenous distribution of the mixture of gases in the space.

Subsection 14. All doors leading to spaces protected by a system with atmospheric gases shall be clearly marked with a sign stating that the space is protected by a system with atmospheric gases and that the spaces shall be left when the alarm sounds.

On-board testing

Section 4. The distribution and extinguishing capacity of each system installed shall be demonstrated in practice on board.

Subsection 2. The extinguishant shall be tested in connection with a test fire that is under control in the form of fires caused by burning alcohol fuels in small trays placed at different levels in the machinery space; during the test, the combustion engines and the ventilation shall have been stopped and the fire dampers shall have been closed. The fires shall be distributed evenly throughout the space.

Subsection 3. When the extinguishant has been released, the concentration of oxygen in the machinery space is measured in order to prove that the extinguishant has been well distributed. The concentration of oxygen shall, at no point in time, be below 10% and not above 12%. In addition, the following shall be checked:

- 1) How long it takes to discharge the extinguishant into the space.
- 2) How long it takes from the release of the system until all fires in the trays have been extinguished.
- 3) For how long the concentration capable of extinguishing a fire is maintained in accordance with the approval.
- 4) If, during the above tests, doubt arises as to the efficiency of the extinguishant, the Danish Maritime Authority can require further tests to be carried out. The Danish Maritime Authority may, however, sustain from requiring such a test if previous tests carried out in spaces of the same design and size and with approximately the same number and location of nozzles have proved satisfactory.
- 5) The release arrangement shall be designed so that the release function can be demonstrated through activation of the valve arrangement. Such a check shall be demonstrated to the Danish Maritime Authority with a satisfactory result before the system is put into operation.

Location, release arrangement and surveillance system of pressure containers

Section 5. The mixture of gases may be stored in the protected space, cf. however section 3(8). The location of the containers in the protected space and the release arrangement shall be such that it is possible to release at least 5/6 of the extinguishant prescribed in section 3(11) or (12) though one of the release connections have been damaged due to a fire or explosion. The containers shall always be distributed into at least two sections.

Subsection 2. If the mixture of gases is not stored in the protected space, it shall be stored in a space

designed for this purpose and meeting the requirements of the order on Notice B from the Danish Maritime Authority, the construction and equipment, etc. of ships, chapter II-2, regulation 10.4.3.

Subsection 3. A manual, servo-driven or electrically driven release arrangement shall be provided outside the protected space. Two sources of power shall be connected to this release arrangement, both of which shall be located outside the protected space and shall be readily available. In the case of machinery spaces, one of the said sources of power may, however, be located in the protected space.

Subsection 4. Electrical circuits shall be under surveillance for defects and power failure by means of visual and acoustic alarms.

Subsection 5. Pneumatic, hydraulic or electrical release circuits connecting the containers shall be available in duplicate. Pneumatic or hydraulic sources of pressure shall be under surveillance for pressure failure by means of visual and acoustic alarms.

Subsection 6. System surveillance alarms shall be located centrally so that they are at any time easily accessible to responsible members of the crew when the ship is at sea or in port.

Subsection 7. The containers shall be under surveillance for a drop in pressure caused by leakage and release. Visual and acoustic alarms shall be available that will sound when 80% of the recharging pressure has been reached at 20°C.

Subsection 8. In the protected space, the electrical circuits needed to release the system shall be carried in fire-proof cables in accordance with the standards of the International Electrotechnical Commission (IEC). The required piping for hydraulic or pneumatic operation shall be made of steel or another similar heat-resistant material, which the Danish Maritime Authority can approve.

Subsection 9. All doors leading to the protected space shall be marked with the following text: "The space is connected to a fire-extinguishing system using fire-extinguishing gases and must be left immediately if the alarm sounds." (in Danish: "Rummet er tilsluttet et brandslukningsanlæg med ildslukkende luftarter og skal øjeblikkeligt forlades, når alarmen lyder").

Subsection 10. Arrangements in connection with systems serving spaces that require only two containers of ordinary size shall be executed to the satisfaction of the Danish Maritime Authority.

Pressure containers

Section 6. The containers shall comply with the Danish or any other EU and EEA state provisions on containers of the type in question in force at any time. Containers manufactured in other countries may be permitted provided that they comply with a recognised standard in the country in question and that the safety level of this standard is similar to that of the EU or EEA states or provided that they comply with the rules on such containers used by a recognised classification society. A maximum pressure of 30 N/mm² shall be permitted.

Subsection 2. Any container or container valve shall be fitted with a frangible disc which, according to the manufacturer's guarantees, protects the container against harmful overpressure, and the arrangement shall allow gas to flow freely from the container if the frangible disc bursts.

Subsection 3. The tare and gross weight, month and year of the latest pressure test as well as the test pressure shall be stamped on the containers.

Subsection 4. Only the manufacturer or other companies approved by the manufacturer shall charge the containers. The manufacturer or – in case the containers are not charged by the manufacturer – the company shall be responsible for the charging of the containers and the composition of the mixture of gases. The manufacturer or – in case the containers are not charged by the manufacturer – the company shall issue a certificate stating the composition of the mixture and this certificate shall be delivered together with the container. Furthermore, in a conspicuous place, a durable label shall be affixed to the containers stating:

- 1) The composition of the mixed, atmospheric mixture of gases.
- 2) Date and year of the charging.
- 3) The name and address of the company responsible for the charging.

Subsection 5. The containers shall be solidly fixed and placed so that it is easy to check the container valves. Furthermore, they shall be stored above the floor and be protected against corrosion. The marking of the containers, including their label and the size of the connection for the outlet nozzle on both the container valve and container manifold shall be executed in accordance with the standards in force.

Subsection 6. The containers shall be pressure tested every 10 years by an authorised body/recognised test institute or a recognised classification society. The chief engineer of the ship in question may also perform pressure tests, but only on board ships where a certificate of competency as a chief engineer officer is required in accordance with the STCW Convention, chapter III, regulation III-2.

Subsection 7. If more than 5 years have passed since the latest pressure test, a discharged container shall not be recharged until a renewed pressure test has been carried out with satisfactory result.

Subsection 8. If, in connection with the inspection of the containers, a 10% loss of pressure or more is found, the container in question shall be recharged.

Local, automatic installations

Section 7. Local, automatic, fixed fire-extinguishing systems located in encased areas in machinery spaces presenting a great fire hazard may be permitted provided that they are independent of the prescribed, fixed fire-extinguishing system.

Subsection 2. The area where such an additional, local protection is provided shall primarily be at a working level and at the same level as the access to the space. More than one working level may be permitted at the discretion of the Danish Maritime Authority if means of access are provided at each level.

Subsection 3. The size of the space and the means of access thereto as well as the location of the machinery shall be arranged so that it is possible to leave all points in the space in less than 10 seconds.

Subsection 4. The activation of a system shall be indicated both visually and acoustically outside any means of access to the machinery space and on the navigation bridge or in the space where the fire control equipment is located.

Subsection 5. A sign stating that the space contains one or more automatic fire-extinguishing systems and giving the name of the extinguishant used shall be affixed outside any means of access thereto.

Subsection 6. Outlet nozzles and frangible discs shall be located so that the release does not present any danger to personnel using ordinary access ladders to and exits from the space. Furthermore, it shall be ensured that personnel engaged in the maintenance of machinery are protected against inadvertent release of

extinguishants.

Subsection 7. The system shall be designed to resist temperatures, vibrations, shocks and mechanical impact, fouling and corrosion as well as moist that may occur in the space where the system is installed.

Subsection 8. Measures shall be taken to allow the crew to check the pressure (the content) of the containers without any risk.

Subsection 9. The total amount of extinguishant in the local, automatic installations shall be such that the maximum permitted concentration of the mixture of gases, based on the net cubic capacity of the encased space, is not exceeded, cf. section 4(3). This requirement shall be applied when either a local, automatic system or a permanently installed system has been released, but not if both systems have been released.

Subsection 10. Local, automatic fire-extinguishing systems shall be designed so that their release does not lead to loss of electrical power or deterioration of the ship's manoeuvrability.

Inspection and checks

Section 9. Suppliers of systems shall also provide a description of the system, including a checklist for maintenance.

Subsection 2. The ship's chief engineer or a classification society or company recognised by the Danish Maritime Authority shall check the system at least once a year.

Subsection 3. The continuous inspections, etc. carried out by the chief engineer or by order of the ship's management shall be recorded in the ship's annex file or in the safety management system of the ship (SMS) stating the extent of the inspection, any repairs made as well as the date of the inspection.

Part 3

Penalty provisions, measures and entry into force, etc.

Section 9. Contraventions of this order shall be liable to punishment by fine or imprisonment for a term not exceeding 1 year.

Subsection 2. The penalty may be increased to imprisonment for a term not exceeding 2 years if

- 1) the contravention has caused harm to life or health or risk hereof;
- 2) a prohibition or order has previously been issued for the same or similar conditions; or
- 3) the contravention has achieved or been intended to achieve an economic advantage for the contravener or others.

Subsection 3. If the benefit obtained through the contravention is not confiscated, the size of such financial benefit obtained shall be taken into account when determining the fine, including additional fines.

Subsection 4. Companies, etc. (legal persons) may be liable to punishment in accordance with the provisions of part 5 of the penal code (*straffeloven*).

Section 10. If the condition is covered by the decree on the entry into force for Greenland of the act on safety at sea (*lov om sikkerhed til søs*), measures may be laid down in accordance with the penal code for Greenland.

Subsection 2. The conditions referred to in section 9(2) shall be considered aggravating circumstances.

Subsection 3. If the benefit obtained through the contravention is not confiscated, cf. part 37 of the penal code (*straffeloven*), the size of such financial benefit obtained or sought obtained shall be taken into account when determining the fine, including additional fines.

Subsection 4. If the contravention is committed by companies etc. (legal persons), liability to pay a fine may be incurred by the legal person as such. If the contravention is committed by the State, the Government of Greenland, a municipality, a municipal cooperative covered under section 64 of the Landing act on municipal councils and local authorities, etc. or a local authority, liability to pay a fine may be incurred by the relevant public authority as such.

Subsection 5. If the relevant party is not resident in Greenland, or if his connection to Greenland society is otherwise so remote that the prerequisites for measures to be taken do not exist, legal proceedings may be instigated or the case may be referred for trial in Denmark.

Section 11. This order shall enter into force on 1 July 2014.

Section 12. This order shall not apply to the Faroe Islands.

Danish Maritime Authority, 13 June 2014
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