

MSC.1/Circ.1270 - REVISED GUIDELINES FOR THE APPROVAL OF AEROSOL FIRE-EXTINGUISHING SYSTEMS, AS REFERRED TO IN SOLAS 74, FOR MACHINERY SPACES (This supersedes circular MSC/Circ.1007)



General

1. Fixed aerosol fire-extinguishing systems for use in machinery spaces of category A equivalent to fire-systems required by SOLAS regulation II-2/10.5 must be tested.
2. Aerosol systems release a chemical to extinguish a fire by interruption of the process of the fire. There are two methods considered for applying the aerosol agent to the protected space:
 - .1 condensed aerosols are created in generators through the combustion of the agent charge; and
 - .2 dispersed aerosols are stored with gases with the release via valves, pipes and nozzles.

Principal requirements

10. The system discharge time should not exceed 120 s.
11. Agent quantity should be calculated using on the net volume of the protected space, including the casing.
- 11.2 The net volume of a protected space, includes the volume of the bilge, and the volume of free air contained in air receivers that may be released into the space.
- 11.3 The objects that occupy volume in the protected space should be subtracted from the gross volume of the space. They include, but are not necessarily limited to:

.1 auxiliary machinery;	.4 evaporators;	.7 tanks; and
.2 boilers;	.5 main engines;	.8 trunks.
.3 condensers;	.6 reduction gears;	
- 11.4 Modifications to the protected space that alter the net volume require the quantity of agent to be adjusted.
12. No fire system should be used which is carcinogenic, mutagenic or teratogenic during use. The discharge of aerosol could create a hazard to personnel from the natural form of the aerosol. Other hazards may be reduced visibility, thermal hazard, and eye irritation from direct contact with aerosol particles. All aerosols used in fire-extinguishing systems should have non-ozone depleting characteristics.
- 12.1 Systems should be designed to evacuate the space prior to discharge through the use of two separate controls for release. Audible and Visual warning of release should be provided for any space in which personnel work or have access. The alarms should operate for not less than 20 s before release.
13. The system and its components should be designed to withstand temperature changes, vibration, humidity, shock, impact, clogging, electromagnetic compatibility and corrosion normally encountered in machinery spaces. Condensed Aerosols must not self-activate at a temperature below 250°C.
14. The system to be designed, and installed in accordance with standards. This should cover:
 - 14.1 Safety:
 - .1 toxicity;
 - .2 noise, generator/nozzle discharge;
 - .3 decomposition products;
 - .4 obscuration; and

- .5 minimum safe distances required for escape routes and combustible materials;
- 14.2 Storage, design and arrangement:
 - .1 strength requirements;
 - .2 maximum/minimum fill density, operating temperature range;
 - .3 pressure and weight indication;
 - .4 pressure relief; and
 - .5 agent identification, production date, installation date and hazard classification;
- 14.3 Agent supply, quantity, quality standards, shelf life and service life of agent and igniter;
- 14.4 Handling and disposal of generator after service life;
- 14.5 Pipes and fittings:
 - .1 strength, material properties, fire resistance; and
 - .2 cleaning requirements;
- 14.7 generators:
 - .1 height and area testing requirements;
 - .2 elevated temperature resistance; and
 - .3 mounting location - clearances to escape routes and combustible materials;
- 14.8 Actuation and control systems:
 - .1 testing requirements; and
 - .2 backup power requirements;
- 14.9 Alarms and indicators:
 - .1 predischage alarm, agent discharge alarms and time delays;
 - .2 supervisory circuit requirements;
 - .3 warning signs, audible and visual alarms; and
 - .4 annunciation of faults.
- 14.10 Integrity and leakage:
 - .1 enclosure leakage;
 - .2 openings; and
 - .3 mechanical ventilation interlocks;
- 14.11 Electrical circuits for generators - requirements for mounting and protection of cables;
- 14.12 Design density requirements, total flooding quantity;
- 14.13 Agent flow calculation:
 - .1 verification and approval of design calculation method;
 - .2 fitting losses and/or equivalent length; and
 - .3 discharge time;
- 14.14 Inspection, maintenance, service and testing requirements; and
- 14.15 Handling and storage requirements for pyrotechnical components.
- 15. Generator type, spacing, maximum generator installation height should be within limits tested.
- 16. Installations should be limited to the maximum volume tested.
- 17. If agent is located within a protected space, it should be distributed in the space and meet the following:
 - 17.1 A manually initiated power release, located outside the protected space, should be provided. Duplicate sources of power should be provided for this release and be immediately available;
 - 17.2 Electric power circuits connecting the generators should be monitored for fault conditions and loss of power. Visual and audible alarms should be provided to indicate this;
 - 17.3 Electric circuits connecting the generators should be duplicated and widely separated;

- 17.4 Within the space, electrical circuits essential for the release of the system should be fire resistant standards;
- 17.6 The arrangement of generators and the electrical circuits for the release of any system should be such that in the event of damage to any one power release line or generator through mechanical damage, fire or explosion in a protected space, i.e., a single fault concept, at least the amount of agent needed to achieve the test density can still be discharged having regard to the requirement for uniform distribution of medium throughout the space; and
18. The release of an extinguishing agent may produce significant over and under pressurization in the protected space. Constructive measures to limit the induced pressures to acceptable limits may have to be provided.
19. The fire system manual should address procedures for the control and disposal and agent decomposition
20. Spare parts and operating and maintenance instructions, tests for the system should be provided.
23. Minimum distances required for escape routes and areas where people may be present for exposure to 75°C.
24. Minimum distances to be observed for combustible materials for exposure to 200°C.
25. The useful life of condensed aerosol generators should be determined by the manufacturer for the temperature range and conditions likely to be encountered on board ships. Generators should be replaced before the end of their useful life. Each generator should be permanently marked with the date of manufacture and the date of mandatory replacement.