

	<b>تعلیمة</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

## **Guidance and Instructions for Ship-owners, Managers, Masters, Recognized Organizations**

### **1. General**

These Guidelines provide the minimum recommended level of maintenance and inspections for fixed carbon dioxide fire-extinguishing systems on all ships, and are intended to demonstrate that the system is kept in good working order as specified in SOLAS regulation II-2/14.2.1.2. These Guidelines are intended to supplement the fire-extinguishing system manufacturer's approved maintenance instructions. Certain maintenance procedures and inspections may be performed by competent crewmembers, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance should be completed by trained personnel.

### **2. Safety**

Whenever carbon dioxide fire-extinguishing systems are subjected to inspection or maintenance, strict safety precautions should be followed to prevent the possibility that individuals performing or witnessing the activities are placed at risk. Prior to performing any work, a safety plan should be developed to account for all personnel and establish an effective communications system between the inspection personnel and the on-duty crew. Measures to avoid accidental discharges such as locking or removing the operating arms from directional valves, or shutting and locking the system block valve should be taken as the initial procedure for the protection of personnel performing any maintenance or inspections. All personnel should be notified of the impending activities before work is begun.

### **3. Maintenance and inspection plan**

	<b>تعليمية</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

Fixed carbon dioxide fire-extinguishing systems should be kept in good working order and readily available for immediate use. Maintenance and inspections should be carried out in accordance with the ship's maintenance plan having due regard to ensuring the reliability of the system. The onboard maintenance plan should be included in the ship's safety management system and should be based on the system manufacturer's recommendations including:

- .1 maintenance and inspection procedures and instructions;
- .2 required schedules for periodic maintenance and inspections;
- .3 listing of recommended spare parts; and
- .4 records of inspections and maintenance, including corrective actions taken to maintain the system in operable condition.

#### **4. Monthly inspections**

4.1 At least every 30 days a general visual inspection should be made of the overall system condition for obvious signs of damage, and should include verification that:

- .1 all stop valves are in the closed position;
- .2 all releasing controls are in the proper position and readily accessible for immediate use;
- .3 all discharge piping and pneumatic tubing is intact and has not been damaged;
- .4 all high pressure cylinders are in place and properly secured; and
- .5 the alarm devices are in place and do not appear damaged.

	<b>تعليمية</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

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التاريخ: ١٠ أكتوبر ٢٠١٦

4.2 In addition, on low pressure systems the inspections should verify that:

- .1the pressure gauge is reading in the normal range;
- .2the liquid level indicator is reading within the proper level;
- .3 the manually operated storage tank main service valve is secured in the open position; and
- .4the vapour supply line valve is secured in the open position.

## 5 Annual inspections

The following minimum level of maintenance and inspections should be carried out in accordance with the system manufacturer's instructions and safety precautions:

- .1 the boundaries of the protected space should be visually inspected to confirm that no modifications have been made to the enclosure that have created uncloseable openings that would render the system ineffective;
- .2 all storage containers should be visually inspected for any signs of damage, rust or loose mounting hardware. Cylinders that are leaking, corroded, dented or bulging should be hydrostatically retested or replaced;
- .3 system piping should be visually inspected to check for damage, loose supports and corrosion. Nozzles should be inspected to ensure they have not been obstructed by the storage of spare parts or a new installation of structure or machinery;
- .4 the manifold should be inspected to verify that all flexible discharge hoses and fittings are properly tightened; and

الرمز: ق ش ب / د ت س / ت ع / ١٠ الإصدار: ٠٠ التاريخ: ١٠ أكتوبر ٢٠١٦	<b>تعلية</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

.5 all entrance doors to the protected space should close properly and should have warning signs, which indicate that the space is protected by a fixed carbon dioxide system and that personnel should evacuate immediately if the alarms sound. All remote releasing controls should be checked for clear operating instructions and indication as to the space served.

## 6 Minimum recommended maintenance

6.1 At least biennially (intervals of 2 years  $\pm$  3 months) in passenger ships or at each intermediate, periodical or renewal survey\* in cargo ships, the following maintenance should be carried out (to assist in carrying out the recommended maintenance, examples of service charts are set out in the appendix):

.1 all high pressure cylinders and pilot cylinders should be weighed or have their contents verified by other reliable means to confirm that the available charge in each is above 90% of the nominal charge. Cylinders containing less than 90% of the nominal charge should be refilled. The liquid level of low pressure storage tanks should be checked to verify that the required amount of carbon dioxide to protect the largest hazard is available;

.2 the hydrostatic test date of all storage containers should be checked. High pressure cylinders should be subjected to periodical tests at intervals not exceeding 10 years. At the 10 -year inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test\*\*. If one or more cylinders fail, a total of 50% of the onboard cylinders should be tested. If further cylinders fail, all cylinders

	<b>تعليمية</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

should be tested. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years; and

.3 the discharge piping and nozzles should be tested to verify that they are not blocked. The test should be performed by isolating the discharge piping from the system and flowing dry air or nitrogen from test cylinders or suitable means through the piping.

6.2 At least biennially (intervals of 2 years  $\pm$  3 months) in passenger ships or at each renewal survey\* in cargo ships, the following maintenance should be carried out by service technicians/specialists trained to standards accepted by the Administration:

.1 where possible, all activating heads should be removed from the cylinder valves and tested for correct functioning by applying full working pressure through the pilot lines.

In cases where this is not possible, pilot lines should be disconnected from the cylinder valves and blanked off or connected together and tested with full working pressure from the release station and checked for leakage.

In both cases this should be carried out from one or more release stations when installed.

If manual pull cables operate the remote release controls, they should be checked to verify the cables and corner pulleys are in good condition and freely move and do not require an excessive amount of travel to activate the system;

.2 all cable components should be cleaned and adjusted as necessary, and the cable connectors should be properly tightened. If the remote release controls are operated by pneumatic pressure, the tubing should be checked for leakage, and the proper charge of the remote releasing station pilot gas cylinders should be verified. All controls and warning devices should function normally, and the time delay, if fitted should prevent the discharge of gas for the required time period; and

	<b>تعلیمة</b>
	<b>GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE- EXTINGUISHING SYSTEMS</b>

.3 after completion of the work, the system should be returned to service. All releasing controls should be verified in the proper position and connected to the correct control valves. All pressure switch interlocks should be reset and returned to service. All stop valves should be in the closed position.