

	<b>CIRCULAR 2012-011</b>		
	<b>DEPARTMENT OF MARINE SERVICES AND MERCHANT SHIPPING (ADOMS)</b>		
	<b>Maintenance and Inspection for Fire Fighting Appliances and Equipment</b>	Ref	SOLAS II-2 MSC.1/Circ 1432 Res.A.951(23) MSC.1/Circ 1318 MSC.1/Circ1312

**Companies operating ships under the flag of Antigua and Barbuda.**

**Ships registered under the flag of Antigua and Barbuda.**

**Recognised Organisations conducting statutory services on behalf of Antigua and Barbuda**

### **Introduction.**

In May 2012 the IMO adopted MSC.1/Circ 1432. This replaces previous guidance from the IMO on the maintenance of fixed and portable firefighting equipment carried in ships in compliance with SOLAS. The revised guidance is considerably more comprehensive than that issued previously. It also contains a number of areas where the standard is “to the satisfaction of the administration”. This Circular is intended to advise owners, managers, and seafarers of the new guidelines and to clarify, where necessary, the standard that will be accepted as “to the satisfaction of the administration”.

The new IMO Circular will take effect from 31<sup>st</sup> May 2013 and from that date ADOMS expects that all maintenance, servicing and testing of fire-fighting equipment in Antigua and Barbuda ships will be in accordance with the new requirements. Until 31<sup>st</sup> May 2013 owners may continue to be guided by MSC . Circ.850 but should start taking early steps to ensure that ISM systems and on-board procedures are amended where necessary before 31<sup>st</sup> May 2013 to ensure that the new standards are being followed by then.

### **Previous ADOMS Circular.**

The previous Circular on this subject, No 02-012-2005 is withdrawn on publication of this Circular.

### **General**

These Guidelines apply to all ships and describe the minimum level of maintenance and inspections for fire protection systems and appliances. This information should be used as a basis for the ship's onboard maintenance plan required by SOLAS regulation II-2/14.

The IMO has also published Guidance in Assembly Resolution A.951(23) (2003) on portable extinguishers and in MSC.1/Circ 1318 on fixed Carbon Dioxide systems. In order to provide a single and effective source for owners, managers and seafarers the essential guidance from both of these is incorporated in this Circular. For the full text of the IMO Guidance in each case, however, reference should be had to the two IMO documents.

All fire protection systems and appliances must at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements must be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

### **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.

### **Maintenance and testing**

Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan.

Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, 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 are to be completed by trained personnel.

Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship, and may be computer-based. In cases where the inspections and maintenance tasks are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing and retained.

In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

## Testing and Inspection Regime

### Weekly testing and inspections

Fixed fire detection and alarm systems,

- Verify all fire detection and fire alarm control panel indicators are functional by operating the lamp/indicator test switch.

Fixed gas fire-extinguishing systems

- verify all fixed fire-extinguishing system control panel indicators are functional by operating the lamp/indicator test switch; and
- verify all control/section valves are in the correct position.

Fire doors

- Verify all fire door control panel indicators, if provided, are functional by operating the lamp/indicator switch.

Public address and general alarm systems.

- Verify all public address systems and general alarm systems are functioning properly

Breathing apparatus

- Examine all breathing apparatus and EEBD cylinder gauges to confirm they are in the correct pressure range.

Low-location lighting

- Verify low-location lighting systems are functional by switching off normal lighting in selected locations.

Water mist, water spray and sprinkler systems,

- verify all control panel indicators and alarms are functional;
- visually inspect the pump unit and its fittings; and
- check the pump unit valve positions, if valves are not locked, as applicable.

### Monthly testing and inspections

Fire mains, fire pumps, hydrants, hoses and nozzles,

- verify all fire hydrants, hose and nozzles are in place, properly arranged, and are in serviceable condition;
- operate all fire pumps to confirm that they continue to supply adequate pressure; and,
- verify that the emergency fire pump fuel supply is adequate, and any heating system is in satisfactory condition, if applicable.

Fixed gas fire-extinguishing systems,

- Verify containers/cylinders fitted with pressure gauges are in the proper range and the installation is free from leakage.

#### Fixed CO2 Extinguishing systems,

A general visual inspection should be made of the overall system condition for obvious signs of damage, and should include verification that:

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

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

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

#### Foam fire-extinguishing systems,

- Verify all control and section valves are in the proper open or closed position, and all pressure gauges are in the proper range.

#### Water mist, water spray and sprinkler systems,

- verify all control, pump unit and section valves are in the proper open or closed position;
- verify sprinkler pressure tanks or other means have correct levels of water;
- test automatic starting arrangements on all system pumps so designed;
- verify all standby pressure and air/gas pressure gauges are within the proper pressure ranges; and
- test a selected sample of system section valves for flow and proper initiation of alarms.

**(Note –** The valves selected for testing should be chosen to ensure that all valves are tested during the course of a one-year period.)

#### Firefighter's outfits,

- Verify that the lockers providing storage for fire-fighting equipment contain their full inventory and equipment is in serviceable condition.

#### Fixed dry chemical powder systems,

- Verify all control and section valves are in the proper open or closed position, and all pressure gauges are in the proper range.

#### Fixed aerosol extinguishing systems,

- verify all electrical connections and/or manual operating stations are properly arranged, and are in proper condition; and
- verify the actuation system/control panel circuits are within manufacturer's specifications.

#### Portable foam applicators,

- Verify all portable foam applicators are in place, properly arranged, and are in proper condition.

Wheeled (mobile) fire extinguishers,

- Verify all extinguishers are in place, properly arranged, and are in proper condition.

Fixed fire detection and alarm systems,

- Test a sample of detectors and manual call points so that all devices have been tested within five years. For very large systems the sample size should ensure that a selection from each zone is checked each month and which includes a variety of detector types so that a sample set of detectors of each type in each zone is tested monthly with the proviso that all are checked over a five year period.

### **Quarterly testing and inspections**

Fire mains, fire pumps, hydrants, hoses and nozzles,

- Verify international shore connection(s) is in serviceable condition.

Foam fire-extinguishing systems,

- Verify the proper quantity of foam concentrate is provided in the foam system storage tank.

Ventilation systems and fire dampers,

- Test all fire dampers for local operation.

Fire doors,

- Test all fire doors located in main vertical zone bulkheads for local operation.

### **Annual testing and inspections**

Fire mains, fire pumps, hydrants, hoses and nozzles,

- visually inspect all accessible components for proper condition;
- flow test all fire pumps for proper pressure and capacity. Test the emergency fire pump with isolation valves closed;
- test all hydrant valves for proper operation;
- pressure test a sample of fire hoses at the maximum fire main pressure, so that all fire hoses are tested within five years;
- verify all fire pump relief valves, if provided, are properly set;
- examine all filters/strainers to verify they are free of debris and contamination; and
- check that nozzle size/type is correct, maintained and working.

Fixed fire detection and fire alarm systems,

- test all fire detection systems and fire detection systems used to automatically release fire-extinguishing systems for proper operation, as appropriate;
- visually inspect all accessible detectors for evidence of tampering obstruction, etc., so that all detectors are inspected within one year; and
- test emergency power supply switchover.

Fixed gas fire-extinguishing systems,

- visually inspect all accessible components for proper condition;
- externally examine all high pressure cylinders for evidence of damage or corrosion or loose mounting hardware. Cylinders that are leaking, corroded, dented or bulging should be hydrostatically retested or replaced;
- check the hydrostatic test date of all storage containers;
- functionally test all fixed system audible and visual alarms;
- visually inspect system piping 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;
- verify all control/section valves are in the correct position;
- check the connections of all pilot release piping and tubing for tightness;
- examine all flexible hoses in accordance with manufacturer's recommendations;
- test all fuel shut-off controls connected to fire-protection systems for proper operation;
- the boundaries of the protected space should be visually inspected to confirm that no modifications have been made to the enclosure that have created non-closable openings that would render the system ineffective; and
- if cylinders are installed inside the protected space, verify the integrity of the double release lines inside the protected space, and check low pressure or circuit integrity monitors on release cabinet, as applicable.
- Check that all entrance doors to the protected space close properly and 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.
- Check all remote releasing controls for clear operating instructions and indication as to the space served

Foam fire-extinguishing systems,

- visually inspect all accessible components for proper condition;
- functionally test all fixed system audible alarms;
- flow test all water supply and foam pumps for proper pressure and capacity, and confirm flow at the required pressure in each section (Ensure all piping is thoroughly flushed with fresh water after service.);
- test all system cross connections to other sources of water supply for proper operation;
- examine all filters/strainers to verify they are free of debris and contamination;
- verify all control/section valves are in the correct position;
- blow dry compressed air or nitrogen through the discharge piping or otherwise confirm the pipework and nozzles of high expansion foam systems are clear of any obstructions, debris and contamination. This may require the removal of nozzles, if applicable;
- take samples from all foam concentrates carried on board and subject them to the periodical control tests in MSC.1/Circ.1312, for low expansion foam, or MSC/Circ.670 for high expansion foam.

(**Note:** Except for non-alcohol resistant foam, the first test need not be conducted until 3 years after being supplied to the ship and portable containers or portable tanks containing foam concentrate, excluding protein based concentrates, which are less than 10 years old and that remain factory sealed can be accepted without the periodical foam control tests required in MSC.1/Circ.1312 being carried out provided they remain within the manufacturer's stated shelf life.)

- test all fuel shut-off controls connected to fire-protection systems for proper operation,
- verify all pump relief valves, if provided, are properly set;

#### Water mist, water spray and sprinkler systems,

- verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;
- visually inspect all accessible components for proper condition;
- externally examine all high pressure cylinders for evidence of damage or corrosion;
- check the hydrostatic test date of all high pressure cylinders;
- functionally test all fixed system audible and visual alarms;
- flow test all pumps for proper pressure and capacity;
- test all antifreeze systems for adequate freeze protection;
- test all system cross connections to other sources of water supply for proper operation;
- verify all pump relief valves, if provided, are properly set;
- examine all filters/strainers to verify they are free of debris and contamination;
- verify all control/section valves are in the correct position;
- blow dry compressed air or nitrogen through the discharge piping of dry pipe systems, or otherwise confirm the pipework and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable;
- test emergency power supply switchover, where applicable;
- visually inspect all sprinklers focusing in areas where sprinklers are subject to aggressive atmosphere (like saunas, spas, kitchen areas) and subject to physical damage (like luggage handling areas, gyms, play rooms, etc.) so that all sprinklers are inspected within one year;
- check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;
- test a minimum of one section in each open head water mist system by flowing water through the nozzles. The sections tested should be chosen so that all sections are tested within a five-year period; and
- test a minimum of two automatic sprinklers or automatic water mist nozzles for proper operation.

#### Ventilation systems and fire dampers,

- test all fire dampers for remote operation;
- verify galley exhaust ducts and filters are free of grease build-up; and
- test all ventilation controls interconnected with fire-protection systems for proper operation.

#### Fire doors,

- Test all remotely controlled fire doors for proper release.

#### Breathing apparatus,

- check breathing apparatus air recharging systems, if fitted, for air quality;
- check all breathing apparatus face masks and air demand valves are in serviceable condition; and
- check EEBDs according to maker's instructions.

Fixed dry chemical powder systems,

- visually inspect all accessible components for proper condition;
- verify the pressure regulators are in proper order and within calibration; and
- agitate the dry chemical powder charge with nitrogen in accordance with system manufacturer's instructions.

**(Note:** Due to the powder's affinity for moisture, any nitrogen gas introduced for agitation must be moisture free.)

Fixed aerosol extinguishing systems.

- Verify condensed or dispersed aerosol generators have not exceeded their mandatory replacement date. Pneumatic or electric actuators should be demonstrated working, as far as practicable.

Portable foam applicators,

- verify all portable foam applicators are set to the correct proportioning ratio for the foam concentrate supplied and the equipment is in proper order;
- verify all portable containers or portable tanks containing foam concentrate remain factory sealed, and the manufacturer's recommended service life interval has not been exceeded.

**(Note;** portable containers or portable tanks containing foam concentrate, excluding protein based concentrates, which are less than 10 years old and that remain factory sealed can be accepted without the periodical foam control tests required in MSC.1/Circ.1312 being carried out provided they remain within the manufacturer's stated shelf life.

- protein based foam concentrate portable containers and portable tanks should be thoroughly checked and, if more than five years old, the foam concentrate should be subjected to the periodical foam control tests required in MSC.1/Circ.1312, or renewed; and,
- the foam concentrates of any non-sealed portable containers and portable tanks, and portable containers and portable tanks where production data is not documented, should be subjected to the periodical foam control tests required in MSC.1/Circ.1312.

Wheeled (mobile) fire extinguishers,

- perform periodical inspections in accordance with the manufacturer's instructions;
- visually inspect all accessible components for proper condition;
- check the hydrostatic test date of each cylinder; and
- for dry powder extinguishers, invert extinguisher to ensure powder is agitated.

Galley and deep fat cooking fire-extinguishing systems

- Check galley and deep fat cooking fire-extinguishing systems in accordance with the manufacturer's instructions.



## Two-year testing and inspections

Fixed gas fire-extinguishing systems,

- all high pressure extinguishing agents 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 95 per cent of the nominal charge. Cylinders containing less than 95 per cent of the nominal charge should be refilled; and
- blow dry compressed air or nitrogen through the discharge piping or otherwise confirm the pipe work and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable.
- 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 should be tested. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years;

For fixed CO<sub>2</sub> systems the following maintenance should be carried out by service technicians/specialists familiar with the system installed and approved by the manufacturer for service of their installations:

- 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;
- 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
- 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.

Fixed dry chemical powder systems,

- blow dry nitrogen through the discharge piping to confirm that the pipe work and nozzles are clear of any obstructions;
- operationally test local and remote controls and section valves;
- verify the contents of propellant gas cylinders (including remote operating stations);
- test a sample of dry chemical powder for moisture content; and
- subject the powder containment vessel, safety valve and discharge hoses to a full working pressure test.

## **Five-year service**

Fixed gas fire-extinguishing systems.

- Perform internal inspection of all control valves.

Foam fire-extinguishing systems,

- perform internal inspection of all control valves;
- flush all high expansion foam system piping with fresh water, drain and purge with air;
- check all nozzles to prove they are clear of debris; and
- test all foam proportioners or other foam mixing devices to confirm that the mixing ratio tolerance is within +30 to -10% of the nominal mixing ratio defined by the system approval.

Water mist, water spray and sprinkler systems,

- flush all Ro-Ro deck deluge system piping with water, drain and purge with air;
- perform internal inspection of all control/section valves; and
- check condition of any batteries, or renew in accordance with manufacturer's recommendations.

Breathing apparatus

- Perform hydrostatic testing of all steel self-contained breathing apparatus cylinders.
- For Antigua and Barbuda ships Aluminium cylinders should be tested at the same intervals as steel cylinders.
- Composite cylinders carried in Antigua and Barbuda ships should be tested at the manufacturer's recommended intervals.

Low-location lighting,

- Test the luminance of all systems in accordance with the procedures in resolution A.752(18).

Wheeled (mobile) fire extinguishers,

- Visually examine at least one extinguisher of each type manufactured in the same year and kept on board.

## **10 Ten-year service**

Fixed gas fire-extinguishing systems,

- perform a hydrostatic test and internal examination of 10 per cent of the system's extinguishing agent and pilot cylinders. If one or more cylinders fail, a total of 50 per cent of the onboard cylinders should be tested. If further cylinders fail, all cylinders should be tested;
- flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years; and
- A close visual inspection coupled with non-destructive testing is permitted by the Antigua and Barbuda administration in lieu of hydrostatic testing for Halon cylinders.

Water mist, water spray and sprinkler systems,

- Perform a hydrostatic test and internal examination for gas and water pressure cylinders.

Fixed dry chemical powder systems,

- Subject all powder containment vessels to hydrostatic or non-destructive testing carried out by an accredited service agent.

Fixed aerosol extinguishing systems,

- Condensed or dispersed aerosol generators to be renewed in accordance with manufacturer's recommendations.

Wheeled (mobile) fire extinguishers,

- All extinguishers together with propellant cartridges should be hydrostatically tested by specially trained persons in accordance with recognized standards or the manufacturer's instructions.

#### **Particular requirements for portable fire extinguishers.**

- Extinguishers should be subject to periodical inspections in accordance with the manufacturer's instructions and serviced at intervals not exceeding one year.
- At least one extinguisher of each type manufactured in the same year and kept on board a ship should be test discharged at five yearly intervals (as part of a fire drill).
- All extinguishers together with propellant cartridges should be hydraulically tested in accordance with the recognized standard or the manufacturer's instruction at intervals not exceeding ten years.
- Service and inspection should only be undertaken by, or under the supervision of, a person with demonstrable competence.
- Records of inspections should be maintained. The records should show the date of inspection, the type of maintenance carried out and whether or not a pressure test was performed.

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