

CCS Circular

China Classification Society
(2012) Circ. No.49 Total No.211
April 27, 2012 (Total pages: 15+17)

To: CCS surveyors, relevant shipyards

Maintenance and Inspection of Fire Protection Systems and Appliances

- References:**
- (a) Maritime Regulation 2.11
 - (b) SOLAS Chapter II-2, as amended
 - (c) International Code for Fire Safety Systems (FSS Code), as amended
 - (d) MSC/Circ.849, adopted 8 June 1998
 - (e) MSC/Circ.850, adopted 8 June 1998
 - (f) MSC.1/Circ.1275, adopted 3 June 2008
 - (g) MSC.1/Circ.1312, adopted 10 June 2009
 - (h) MSC.1/Circ.1312/Corr.1, adopted 22 November 2011
 - (i) MSC.1/Circ.1313, adopted 10 June 2009
 - (j) MSC.1/Circ.1318, adopted 11 June 2009
 - (k) MSC.1/Circ.1395, adopted 15 June 2011
 - (l) Marshall Islands Marine Notice 2-011-11

PURPOSE:

This Notice addresses areas where the Republic of the Marshall Islands Maritime Administrator (the “Administrator”) has determined that additional clarification or requirements are necessary for the proper maintenance and inspection of fire protection systems, appliances and emergency equipment. It is not intended as an exhaustive listing of applicable requirements. It addresses general maintenance and inspection as well as the testing and examination of:

- fixed fire extinguishing systems;
- foam concentrates;
- portable fire extinguishers;
- Self-Contained Breathing Apparatus (SCBA); and
- Emergency Escape Breathing Devices (EEBDs).

Importantly, this Notice reflects an addition in the Administrator’s policy with regard to

the inspection and testing requirements of Fixed Dry Chemical Powder Fire-Extinguishing Systems and the number and arrangements of Portable Fire Extinguishers on board ships. It also articulates the Administrator's policy on acceptable alternatives when ships carry cargoes for which the fixed gas fire-extinguishing system is ineffective.

This Notice supersedes Rev. 2/12 and reflects the addition of MSC.1/Circ.1312/Corr.1 as new reference (h) with the rest re-lettered.

APPLICABILITY:

This Notice applies to all ships, mobile offshore drilling units (MODUs) and mobile offshore units (MOUs).

REQUIREMENTS:

1.0 General

Ships' owners and officers shall be familiar with and follow the equipment manufacturers recommendations, Classification Society requirements and applicable requirements of the International Convention for Safety at Life at Sea, 1974, (SOLAS '74), as amended, the International Code for Fire Safety Systems (FSS Code), as amended, and MODU Code (1979, 1989 and 2009 editions) with respect to the maintenance and inspection of fire protection systems and appliances, except where such recommendations or requirements are superseded by this Notice.

1.1 Safety Management

- .1 Maintenance and inspection 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.
- .2 Certain maintenance procedures and inspections may be performed by competent crewmembers, while others should be performed by persons specifically 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.
- .3 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 on-duty crew.

2.0 Requirements for the Maintenance and Inspection of Fire Protection Systems and Appliances

The general requirements contained in this section are extracted from the Guidelines for the Maintenance and Inspection of Fire Protection Systems and Appliances

(reference (e) above). They provide a basic maintenance and inspection framework and should not be considered an all inclusive list of items to be maintained or inspected.

2.1 Operational readiness

All fire protection systems and appliances should at all times be in good order and available for immediate use while the ship is in service. If a fire protection system is under repair, then suitable arrangements acceptable to the ship's Classification Society and the Administrator shall be made to ensure fire protection capability is not diminished. Prior to sailing or in the case of MODUs and MOUs engaging in operations with a fire protection system under repair, a dispensation must be obtained from the Administrator.

2.2 Maintenance and testing

Instructions for on-board maintenance, not necessarily by the ship's crew, and testing of active and passive fire protection systems and appliances should be easily understood, illustrated wherever possible, and, as appropriate, should include the following for each system or appliance:

- .1 maintenance and repair instructions;
- .2 schedule of periodic maintenance;
- .3 list of replaceable parts; and
- .4 log for records of inspections and maintenance, listing identified non-conformities and their targeted completion dates.

2.3 Weekly testing and inspections

Weekly inspections should be carried out as part of the regular emergency training to ensure that:

- .1 all public address systems and general alarm systems are functioning properly;
- .2 all fireman's outfits and EEBDs are appropriately supplied, arranged, and in proper condition; and
- .3 breathing apparatus cylinders do not present leakages.

2.4 Monthly examinations and inspections

Ship's officers are responsible for performing monthly examinations of firefighting system equipment and recording the examinations in the ship's official log book. Monthly inspections should be carried out to ensure that:

- .1 all fire extinguishers, fire hydrants, hoses and nozzles are in place, properly arranged, and are in proper condition;
- .2 all fixed fire-fighting system stop valves are in the proper open or closed position, dry pipe sprinkler systems have appropriate pressures as indicated by gauges;

- .3 sprinkler system pressure tanks have correct levels of water as indicated by glass gauges;
- .4 all sprinkler system pumps automatically operate on reduction of pressure in the systems;
- .5 all fire pumps are operated; and
- .6 all fixed fire-extinguishing installations using extinguishing gas are free from leakage.

2.5 Quarterly examinations and inspections

Ship's officers are responsible for performing quarterly tests and examinations of the following firefighting system equipment and recording the test and examinations in the ship's official log book. Quarterly inspections should be carried out to ensure that:

- .1 all automatic alarms for the sprinkler systems are tested using the test valves for each section;
- .2 the international shore connection is in proper condition;
- .3 fire stations and lockers providing storage for fire-fighting equipment contain proper inventory and that missing or unserviceable equipment is replaced¹;
- .4 all fire doors and fire dampers are tested for local operation; and
- .5 all CO2 bottle connections for cable operating system clips should be checked for tightness on fixed fire-extinguishing installations.

2.6 Annual testing and inspections

As part of the annual statutory survey for the Safety Equipment Certificate (SEC), the following inspections and tests should be carried out to ensure that:

- .1 all fire extinguishers are checked for proper location, charging pressure, and condition;
- .2 fire detection systems are tested for proper operation, as appropriate;
- .3 all fire doors and dampers are tested for remote operation;
- .4 all foam-water and water-spray fixed fire-fighting systems are tested for operation;
- .5 all accessible components of fixed fire-fighting systems are visually inspected for proper condition;
- .6 all fire pumps, including sprinkler system pumps, are flow tested for proper pressures and flows;
- .7 all hydrants are tested for operation;
- .8 all antifreeze systems are tested for proper solutions;
- .9 sprinkler system connections from the ship's fire main are tested for operation;
- .10 all fire hoses are hydrostatically tested;

Note: 1 The minimum fire hose length is 10 meters. The length should not exceed 15 meters in machinery spaces and 20 meters in other compartments and on open decks (except that hoses of 25 meters in length may be used on open decks when the breadth of the ship is greater than 30 meters).

- .11 breathing apparatus air recharging systems checked for air quality;
- .12 control valves of fixed fire-fighting systems should be inspected; and
- .13 air should be blown through the piping of extinguishing gas systems.

The verification of the examinations and tests described in Sections 2.2 thru 2.6 above are an integral part of the annual statutory surveys for the SOLAS SEC. The inspection and/or verification of the applicable items in Section 2.2 thru 2.7 shall be to the satisfaction of the attending Classification Society surveyor.

2.7 Five-year service

At least once every five (5) years, the control valves of fixed fire-fighting systems should be internally inspected.

3.0 Fixed Gas Fire-Extinguishing Systems

3.1 General

Shipbuilders/shipyards, Classification Societies, insurers, owners/operators, system service personal and all others involved shall carefully and critically review, routinely inspect and maintain, and verify and test their fixed gas fire-extinguishing systems to ensure that they will operate correctly during an emergency.

3.2 Fixed CO₂ Fire Extinguishing Systems

3.2.1 Maintenance

Fixed CO₂ fire-extinguishing systems should be maintained and inspected in accordance with the guidelines contained in MSC.1/Circ.1318 (reference (j) above), which are intended to demonstrate that the system is kept in good working order and readily available for use as specified in SOLAS "74, regulation II-2/14.2.1.2. These Guidelines supplement the fire-extinguishing system manufacturer's approved maintenance instructions.

3.2.2 CO₂ Containers –Minimum Recommended Maintenance

- .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:
 - (a) 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.
 - (b) 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 that inspection, a 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 intervals recommended by the manufacturer, or if such recommendation is not provided, then at intervals not exceeding every 10 years;

Existing ships equipped with storage containers that are 10 years old or older shall have the storage containers hydrostatically tested at latest by the next intermediate or special survey; and

- (c) the discharge piping 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 the test cylinders or suitable means through the piping.

- .2 At least biennially (intervals of 2 years \pm 3 months) in passenger ships or at each renewal survey in cargo ships, maintenance should be carried out by trained service technicians/specialists in accordance with section 6.2 of MSC.1/Circ. 1318 (reference (j) above).

3.3 **Halon Systems**

3.3.1 Use of Halon Systems

SOLAS „74, regulation II-2/10 permits the use of Halons as fire extinguishing media on ships built before 1 October 1994. The Administrator has not established a phase-out date for existing Halon systems. However, it should be noted that the release of Halons into the atmosphere when testing existing systems is prohibited. In addition, the European Commission considers that supply of a non-EU flagged ship in an EU-port with Halon an illegal export. Therefore, in a case where Halon is discharged for whatever reason, refilling of such systems on non-EU flagged ships with Halon is not possible and that ship will be detained until a new fixed fire-fighting system is installed on board. See reference (l) above, for additional information.

3.3.2 Minimum Recommended Maintenance

.1 Verification of Cylinder Contents

At least biennially (intervals of 2 years \pm 3 months) as part of the survey for issuance of the SOLAS SEC, the contents of the Halon 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.

.2 Hydrostatic Testing

(a) All Halon cylinders must be hydrostatically tested as follows:

- after each 20 years of service;
- prior to recharging a discharged cylinder; or
- when visual inspection reveals a potential defect.

(b) Hydrostatic test dates must be stamped on the cylinders. Hydrostatic testing must be performed by an authorized servicing facility which has been certified by a government agency, or Classification Society, and by extinguisher manufacturer to perform this type of work. The facility must be acceptable to the attending Classification Society surveyor. The same facility should recharge the cylinders after testing to demonstrate serviceability.

3.3.3 Relaxed Maintenance Schedule

- .1 Based on the logistical difficulties associated with locating servicing facilities and suppliers for the testing and maintenance of existing fixed Halon fire suppression systems and components, the Administrator will consider a relaxed maintenance schedule with regard to the hydrostatic testing of the Halon storage cylinders.
- .2 Consideration for the application of the relaxed hydrostatic testing requirements for the fixed Halon system storage cylinders will be given on a case-by-case basis, and must be approved in writing by the Administrator.
- .3 Under the relaxed maintenance schedule, the hydrostatic testing interval of 20 years for the Halon storage may be extended by five (5) years provided the following conditions are met:
 - a cylinder has not been discharged during its service history;
 - cylinder contents are verified by weighing or isotropic measurement;
 - cylinder pressure/levels are verified to be acceptable;
 - a thorough visual inspection of cylinders reveal no potential defects; and
 - cylinders are gauged to the extent considered necessary, and the wall thickness readings kept on board for future comparative reference.
- .4 In addition, a thorough examination shall be made of all accessible component parts of the Halon system, including control valves and connections, to verify satisfactory condition and freedom from leakage: and selected control valves shall be opened out for internal examination to the extent necessary.
- .5 Any suspect cylinders that do not meet the provisions stated above must be tested, or taken out of service.
- .6 The cylinder inspection and thickness gauging shall then be repeated annually as part of the annual servicing requirement of the system, until the end of the five (5) year period of extension.

3.4 Alternative Fixed Gas Fire-Fighting Media

The Administrator recognizes that there are other media (e.g., NOVEC™ 1230 fluid, INERGEN®, FM 200®, etc.) that can be used in fixed gas fire-extinguishing systems for machinery spaces and cargo pump rooms. Use of such alternatives shall be subject to approval with any attached conditions, as appropriate, by the Administrator and in accordance with SOLAS Chapter II-2 requirements for alternative fire-fighting systems and relevant guidance².

3.5 Alternative to Ineffective Fixed Gas Fire-Fighting Systems

Water supplies as defined in SOLAS II-2/Reg.19.3.1.2 are considered as an acceptable alternative for the ineffective fixed gas fire-extinguishing system, for ships when allowed to carry any of the cargoes contained in table 2 of MSC.1/Circ.1395. Such an arrangement when provided for the carriage of any of the above cargoes should be verified for compliance by the vessel's Classification Society.

4.0 Fixed Dry Chemical Powder Fire-Extinguishing Systems

- 4.1 Such system is to be serviced and tested by an approved service supplier in accordance with the Manufacturer's requirements and the Classification Society's requirements, should it have any. Particular attention is to be paid to the condition of the powder for any sign of moisture ingress and that its properties remain as per type approval.
- 4.2 At each annual, periodical, renewal survey, the attending Class Surveyor(s) is(are) to perform a general examination of the distribution piping and installation of the dry chemical powder fire-extinguishing system to confirm that the system has not been modified from its original installation. Part of such verification should include also the following minimum requirements:
- The piping distribution system is to be blown through with Nitrogen (N₂) or dry air to ensure it is free of any obstruction. The nozzles, if any, are to be removed to ensure that they are free and not blocked during the blow-through operation.
 - Operational test of local and remote controls and section valves.
 - The contents verification of propellant gas cylinders containing Nitrogen (N₂) including remote operating stations is to be confirmed.
 - Flexible discharge hoses are to be inspected to confirm that they are maintained in good condition and have not perished, especially when located on open decks. In case of any doubt the hoses are to be subjected to a full working pressure test.
 - The dry chemical powder containment tank and its associate safety valves are to be inspected for signs of corrosion or deterioration which may affect the safety of the system. In case of any doubt the tank is to be tested and safety valve set points adjusted and confirmed at the shop.

Note: 2 Such guidance includes, but is not limited to: Revised Guidelines for the Approval of Equivalent Fixed Gas Fire-Extinguishing Systems, as Referred to in SOLAS "74, for Machinery Spaces and Cargo Pump-Rooms (MSC/Circ.848, adopted 8 June 1998 and as amended by MSC.1/Circ.1267, adopted 4 June 2008); Guidelines for the Approval of Fixed Aerosol Fire-Extinguishing Systems Equivalent to Fixed Gas Fire-Extinguishing Systems, as Referred to in SOLAS "74, for Machinery Spaces (MSC/Circ. 1007, adopted 26 June 2001) and Revised Guidelines for the Approval of Equivalent Water-Based Fire Systems for Machinery Spaces and Cargo Pump-Rooms (MSC.1/Circ. 1165 , adopted 10 June 2005 and as amended by MSC.1/Circ.1386, adopted 10 December 2010).

- 4.3 N2 high pressure cylinders shall be subjected to periodical tests at intervals as IMO recommends for CO2 cylinders, in paragraph 6.1.2 of MSC.1/Circ.1318.

5.0 Foam Concentrates for Fixed Fire-Extinguishing Systems and Portable Foam Applications

5.1 Applicability

The revised guidelines contained in MSC.1/Circ.1312, Performance and Testing Criteria, and Surveys of Foam Concentrates for Fixed Fire-Extinguishing Systems (reference (g) above), with reference to MSC.1/Circ.1312/Corr.1 (reference (h) above), should be applied to the foam concentrates used for:

- .1 fixed deck foam fire-extinguishing systems required for:
 - tankers by SOLAS "74, regulations II-2/10.8 and chapter 14 of the FSS Code;
 - chemical tankers as specified by SOLAS regulation II-2/1.6.2.1.2 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk; and
- .2 fixed foam fire-extinguishing systems in:
 - machinery spaces according to chapter 6 of the FSS Code; and for
 - portable foam applications according to chapter 4 of the FSS Code.

5.2 Type Approval of Foam Concentrates

- 5.2.1 Foam concentrates for all fixed systems and for portable foam applicators placed on ships should be type approved. Tests, including fire tests, should be performed in accordance with reference (g) above (paragraphs 3.1 to 3.14) by the foam concentrate manufacturer at laboratories acceptable to the Classification Society.
- 5.2.2 Type approvals conducted in accordance with the Guidelines in MSC/Circ.582 and MSC/Circ.582/Corr.1, and MSC/Circ.799 should remain valid until 1 July 2012.

5.3 Periodical Controls of Foam Concentrates Stored on Board

- 5.3.1 Certain installation conditions such as excessive ambient storage temperature, contamination of the foam concentrate and incomplete filling of the tank may lead to abnormal ageing of the concentrates. As a result, periodic testing of concentrates is necessary.
- 5.3.2 The first periodical control of foam concentrates (except for protein-based alcohol resistant foam concentrates) should be performed not more than three (3) years after being supplied to the ship, and after that, every year. These tests should be performed by the shipowner or operator via laboratories or authorized service suppliers deemed acceptable to the Classification Society.

- 5.3.3 Protein-based alcohol-resistant foam concentrates should be subjected to a chemical stability test prior to delivery to the ship and annually thereafter.

5.4 Records

A record of the age of the foam concentrates and of subsequent controls should be kept on board.

6.0 Portable Fire Extinguishers

6.1 Annual Survey

The examination of the fire extinguishers is an integral part of the annual statutory surveys for the SOLAS SEC. The fire extinguishers should be examined and, if necessary, serviced annually. The annual servicing/examination of the portable fire extinguishers can be carried out by the crew, if the crew is properly trained and such servicing is acceptable to the ship's Classification Society, or by an authorized service facility. The Classification Society surveyor must be satisfied with the condition of the extinguishers.

6.2 Servicing of Fire Extinguishers by the Crew of a Ship

A ship's crew may service powder, foam, or water-type portable fire extinguishers subject to the following:

- .1 The equipment required to test, examine, and service the extinguishers is obtained and maintained in a calibrated and serviceable condition.
- .2 The crew is properly trained in the testing and examination, and servicing of fire extinguishers and the extinguisher manufacturer's servicing instructions are followed.
- .3 The testing and inspection is carried out to the satisfaction of the attending Classification Society surveyor, and if required by the surveyor, in the presence of the surveyor.

6.3 Verification of Fire Extinguishers Contents

Every two (2) years in conjunction with the issuance of the SOLAS SEC the contents of the cylinders must be verified. Weighing of the portable CO₂ cylinders in the presence of the Classification Society surveyor is an acceptable method of verification. Other methods of determining contents of the cylinders, such as isotropic measurement, may also be accepted provided the equipment is properly calibrated, the operator of the device is trained and qualified in its use, and the Classification Society surveyor is satisfied with the measurements. If an alternative method is used, spot checks of cylinder contents by weighing may be required to verify the accuracy and consistency of the measurement device.

6.4 Number and Arrangement of Portable Fire Extinguishers on Board Ships

Vessels constructed on or after 1 January 2009 should use the table shown in MSC.1/Circ.1275 as reference for determining the number and arrangement of portable fire extinguishers in accommodation spaces, service spaces, control spaces, control stations, machinery spaces of category A, other machinery spaces, cargo spaces, weather decks and other spaces onboard ships. Vessels which may not comply with the above should be brought into compliance by the first renewal or intermediate Safety Equipment survey coming after 1 November 2011.

For vessels constructed prior to 1 January 2009, Shipowners/Operators are encouraged to implement the unified interpretation of MSC.1/Circ.1275.

6.5 Spare Charges, Additional Fire Extinguishers, and Refilling of Extinguishers

- 6.5.1 For fire extinguishers of the same type, capable of being recharged on board, the spare charges should be provided as follows:

100% for the first 10 extinguishers and 50% for the remaining extinguishers but not more than 60 (fractions to be rounded off to next whole number).

- 6.5.2 For extinguishers which cannot be recharged by the crew, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in the paragraph above should be provided in lieu of spare charges.

- 6.5.3 Instructions for recharging the extinguishers should be carried on board. Periodic refilling of the cylinders should be in accordance with the manufacturer's recommendations. Lacking same, refill is required when the extinguishing media starts to lose effectiveness. Partially emptied extinguishers should also be recharged. Only refills approved for the fire extinguisher in question may be used for recharging.

6.6 Authorized Servicing Facilities

The Classification Society surveyor may also accept a servicing certificate from an authorized servicing facility acceptable to the Classification Society for both the annual and biannual examination, servicing and verification of the portable fire extinguishers.

6.7 Hydrostatic Testing of Portable Fire Extinguishers

All portable extinguishers shall be hydrostatically tested every 10 years; however, a hydrostatic test may also be required by the Classification Society surveyor or Marshall Islands Nautical Inspector if visual examination indicates a potential defect in the cylinder. The hydrostatic test date must be permanently marked on the bottles.

6.8 Hydrostatic Testing Facilities

Hydrostatic testing must be performed by a servicing facility which has been certified by a government agency or Classification Society, and by the extinguisher manufacturer to perform this type of work. The facility must be acceptable to the attending Classification Society surveyor. This same facility should recharge the cylinder after testing to demonstrate serviceability.

7.0 Self-Contained Breathing Apparatus (SCBA)

7.1 Weekly Inspections

SCBA should be inspected weekly to ensure that they do not present leakages (see section 2.3.3 above).

7.2 Monthly Inspections

For ships subject to the International Gas Carrier Code and International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, SCBAs, should be inspected at least once a month by a responsible officer and inspected and tested by an expert at least once a year.

7.3 Annual Examination

All SCBAs shall be examined at least annually as part of the annual statutory survey for the SEC or MODU Code Certificate. If applicable, the SCBAs air recharging systems should be checked for air quality as part of the annual statutory survey for the SEC or MODU Code Certificate.

7.4 Hydrostatic Testing of SCBA Cylinders

Hydrostatic testing of SCBA cylinders shall be carried out once every five (5) years. The hydrostatic test date must be permanently marked on the bottles. Intervals for hydrostatically testing cylinders of the ultra lightweight type may vary and will depend upon the requirements of the cylinder manufacturer and the ship's Classification Society. Servicing of the cylinders must be performed to the satisfaction of the Classification Society surveyor.

7.5 Spare Charges and Recharging of SCBA Cylinders

7.5.1 Two spare charges suitable for use with the SCBA should be provided for each required apparatus.

7.5.2 Passenger ships carrying not more than 36 passengers and cargo ships equipped with suitable located means for fully recharging the air cylinders free from contamination, only one spare charge is required for each required apparatus.

7.5.3 Passenger ships carrying more than 36 passengers constructed on or after 1 July 2010

shall be fitted with a suitably located means for fully recharging breathing air cylinders, free from contamination. The means for recharging shall be either:

- .1 breather air compressors supplied from the main and emergency switchboard, or independently driven, with a minimum capacity of 60 l/min per required breathing apparatus, not to exceed 420 l/min; or
- .2 self-contained high-pressure storage systems of suitable pressure to recharge the breathing apparatus used on board, with a capacity of at least 1,200/per required breathing apparatus, not to exceed 50,000 l of free air.

8.0 Emergency Escape Breathing Devices (EEBDs)

8.1 Number and Locations

- 8.1.1 SOLAS "74 requires at least two (2) EEBDs to be located in the accommodations and additional EEBDs to be placed in the machinery spaces. The Administrator considers "machinery spaces" to mean Category A Machinery Spaces such as engine rooms and boiler rooms. Auxiliary Machinery Spaces such as Steering Gear Compartments, Refrigeration Machinery Rooms, Bow Thruster Compartments, and alike do not have to be fitted with EEBDs.
- 8.1.2 Inasmuch as MSC/Circ.849, Guidelines for the Performance, Location, Use and Care of Emergency Escape Breathing Devices (reference (d) above), is referenced in SOLAS II-2/13.3.4 and 13.4.3, the Administrator is treating the guidelines contained in the Circular as mandatory.
- 8.1.3 For compliance with the last sentence in Paragraph 4.6 of MSC/Circ.849, only those control spaces and workshops that are remotely located from the machinery space escape routes need be considered.
- 8.1.4 In achieving compliance with paragraph 4.6 of MSC/Circ.849, a minimum of two (2) EEBDs should be located on each level of the machinery space. If a machinery space contains an enclosed primary escape trunk having a door at each level, only one (1) EEBD need be located on each level³.

8.2 Maintenance and Care

- 8.2.1 The EEBD should be examined and maintained in accordance with the manufacturer's instructions, including any instructions for hydrostatic testing. It should be noted that when an EEBD is fitted with a small capacity oxygen cartridge (two (2) inches or less in diameter), some manufacturers specify a fixed service life without scheduled hydrostatic pressure testing. In the absence of manufacturer's instructions, hydrostatic testing should be carried out at intervals not exceeding five (5) years, unless specifically prohibited by the manufacturers.

Note: 3 The term "level" should be interpreted as meaning a deck where watchstanding personnel reside, workshops and control stations are located, or the crew may be employed during routine maintenance. In essence, two (2) EEBDs are required only on those deck "levels" where people are likely to be employed. Platform decks that serve to divide long ladders into segments and partial decks where personnel are not likely to be employed for any significant period of time are not considered as "levels" and do not require EEBDs.

- 8.2.2 Sufficient spare EEBDs should be kept on board to replace units that are used, reach their expiry date, or otherwise become unserviceable.
- 8.2.3 Maintenance requirements, trademark of manufacturer and serial number, shelf life with accompanying manufacture date and name of approving authority should be printed on each EEBD.

9.0 Records

- 9.1 Records shall be maintained on board of:
 - .1 Weekly inspections;
 - .2 Monthly inspections;
 - .3 Annual inspections;
 - .4 Other maintenance and testing, including whether a pressure test was performed; and
 - .5 Deficiencies identified and corrective actions taken.

According to the requirements of Maritime administration of the Republic of Marshall Island above, The report for additional statutory requirements (Form SFc(MHL)) was renewed with new revision of Ver.1.3 201204. The Annual / Periodic/Renewal/Initial survey of safety equipment for Marshall Island vessels should be carried out according to the this circular from the beginning of the date of this circular issued.

Attachments: Marine Notice No.2-011-14(Rev.3/12) of the Republic of THE MARSHALL ISLANDS.

This Circular is published on CCS website (www.ccs.org.cn) and is to be forwarded by CCS branches to relevant shipyards, shipyards and designers in relevance to their business area.

Please contact Classed Ship in Service Dept. of the Headquarters in case of any unclarity during the implementation of this Circular.



**REPUBLIC OF
THE MARSHALL ISLANDS**

**OFFICE OF THE
MARITIME ADMINISTRATOR**

Marine Notice

No. 2-011-14

Rev. 3/12

**TO: ALL SHIPOWNERS, OPERATORS, MASTERS AND OFFICERS OF
MERCHANT SHIPS, AND RECOGNIZED ORGANIZATIONS**

SUBJECT: Maintenance and Inspection of Fire Protection Systems and Appliances.

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Ships' owners and officers shall be familiar with and follow the equipment manufacturers recommendations, Classification Society requirements and applicable requirements of the International Convention for Safety at Life at Sea, 1974, (SOLAS '74), as amended, the International Code for Fire Safety Systems (FSS Code), as amended, and MODU Code (1979, 1989 and 2009 editions) with respect to the maintenance and inspection of fire protection systems and appliances, except where such recommendations or requirements are superseded by this Notice.

1.1 Safety Management

- .1 Maintenance and inspection 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.
- .2 Certain maintenance procedures and inspections may be performed by competent crewmembers, while others should be performed by persons specifically 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.
- .3 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 on-duty crew.

2.0 Requirements for the Maintenance and Inspection of Fire Protection Systems and Appliances

The general requirements contained in this section are extracted from the Guidelines for the Maintenance and Inspection of Fire Protection Systems and Appliances (reference (e) above).

They provide a basic maintenance and inspection framework and should not be considered an all inclusive list of items to be maintained or inspected.

2.1 Operational readiness

All fire protection systems and appliances should at all times be in good order and available for immediate use while the ship is in service. If a fire protection system is under repair, then suitable arrangements acceptable to the ship's Classification Society and the Administrator shall be made to ensure fire protection capability is not diminished. Prior to sailing or in the case of MODUs and MOUs engaging in operations with a fire protection system under repair, a dispensation must be obtained from the Administrator.

2.2 Maintenance and testing

Instructions for on-board maintenance, not necessarily by the ship's crew, and testing of active and passive fire protection systems and appliances should be easily understood, illustrated wherever possible, and, as appropriate, should include the following for each system or appliance:

- .1 maintenance and repair instructions;
- .2 schedule of periodic maintenance;
- .3 list of replaceable parts; and
- .4 log for records of inspections and maintenance, listing identified non-conformities and their targeted completion dates.

2.3 Weekly testing and inspections

Weekly inspections should be carried out as part of the regular emergency training to ensure that:

- .1 all public address systems and general alarm systems are functioning properly;
- .2 all fireman's outfits and EEBDs are appropriately supplied, arranged, and in proper condition; and
- .3 breathing apparatus cylinders do not present leakages.

2.4 Monthly examinations and inspections

Ship's officers are responsible for performing monthly examinations of firefighting system equipment and recording the examinations in the ship's official log book. Monthly inspections should be carried out to ensure that:

- .1 all fire extinguishers, fire hydrants, hoses and nozzles are in place, properly arranged, and are in proper condition;

- .2 all fixed fire-fighting system stop valves are in the proper open or closed position, dry pipe sprinkler systems have appropriate pressures as indicated by gauges;
- .3 sprinkler system pressure tanks have correct levels of water as indicated by glass gauges;
- .4 all sprinkler system pumps automatically operate on reduction of pressure in the systems;
- .5 all fire pumps are operated; and
- .6 all fixed fire-extinguishing installations using extinguishing gas are free from leakage.

2.5 Quarterly examinations and inspections

Ship's officers are responsible for performing quarterly tests and examinations of the following firefighting system equipment and recording the test and examinations in the ship's official log book. Quarterly inspections should be carried out to ensure that:

- .1 all automatic alarms for the sprinkler systems are tested using the test valves for each section;
- .2 the international shore connection is in proper condition;
- .3 fire stations and lockers providing storage for fire-fighting equipment contain proper inventory and that missing or unserviceable equipment is replaced¹;
- .4 all fire doors and fire dampers are tested for local operation; and
- .5 all CO₂ bottle connections for cable operating system clips should be checked for tightness on fixed fire-extinguishing installations.

2.6 Annual testing and inspections

As part of the annual statutory survey for the Safety Equipment Certificate (SEC), the following inspections and tests should be carried out to ensure that:

- .1 all fire extinguishers are checked for proper location, charging pressure, and condition;
- .2 fire detection systems are tested for proper operation, as appropriate;

¹ The minimum fire hose length is 10 meters. The length should not exceed 15 meters in machinery spaces and 20 meters in other compartments and on open decks (except that hoses of 25 meters in length may be used on open decks when the breadth of the ship is greater than 30 meters).

- .3 all fire doors and dampers are tested for remote operation;
- .4 all foam-water and water-spray fixed fire-fighting systems are tested for operation;
- .5 all accessible components of fixed fire-fighting systems are visually inspected for proper condition;
- .6 all fire pumps, including sprinkler system pumps, are flow tested for proper pressures and flows;
- .7 all hydrants are tested for operation;
- .8 all antifreeze systems are tested for proper solutions;
- .9 sprinkler system connections from the ship's fire main are tested for operation;
- .10 all fire hoses are hydrostatically tested;
- .11 breathing apparatus air recharging systems checked for air quality;
- .12 control valves of fixed fire-fighting systems should be inspected; and
- .13 air should be blown through the piping of extinguishing gas systems.

The verification of the examinations and tests described in Sections 2.2 thru 2.6 above are an integral part of the annual statutory surveys for the SOLAS SEC. The inspection and/or verification of the applicable items in Section 2.2 thru 2.7 shall be to the satisfaction of the attending Classification Society surveyor.

2.7 Five-year service

At least once every five (5) years, the control valves of fixed fire-fighting systems should be internally inspected.

3.0 Fixed Gas Fire-Extinguishing Systems

3.1 General

Shipbuilders/shipyards, Classification Societies, insurers, owners/operators, system service personal and all others involved shall carefully and critically review, routinely inspect and maintain, and verify and test their fixed gas fire-extinguishing systems to ensure that they will operate correctly during an emergency.

3.2 Fixed CO₂ Fire Extinguishing Systems

3.2.1 Maintenance

Fixed CO₂ fire-extinguishing systems should be maintained and inspected in accordance with the guidelines contained in MSC.1/Circ.1318 (reference (j) above), which are intended to demonstrate that the system is kept in good working order and readily available for use as specified in SOLAS '74, regulation II-2/14.2.1.2. These Guidelines supplement the fire-extinguishing system manufacturer's approved maintenance instructions.

3.2.2 CO₂ Containers –Minimum Recommended Maintenance

.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:

- (a) 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.
- (b) 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 that inspection, a 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 intervals recommended by the manufacturer, or if such recommendation is not provided, then at intervals not exceeding every 10 years;

Existing ships equipped with storage containers that are 10 years old or older shall have the storage containers hydrostatically tested at latest by the next intermediate or special survey; and

- (c) the discharge piping 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 the test cylinders or suitable means through the piping.
- .2 At least biennially (intervals of 2 years \pm 3 months) in passenger ships or at each renewal survey in cargo ships, maintenance should be carried out by trained service technicians/specialists in accordance with section 6.2 of MSC.1/Circ. 1318 (reference (j) above).

3.3 Halon Systems

3.3.1 Use of Halon Systems

SOLAS '74, regulation II-2/10 permits the use of Halons as fire extinguishing media on ships built before 1 October 1994. The Administrator has not established a phase-out date for existing Halon systems. However, it should be noted that the release of Halons into the atmosphere when testing existing systems is prohibited. In addition, the European Commission considers that supply of a non-EU flagged ship in an EU-port with Halon an illegal export. Therefore, in a case where Halon is discharged for whatever reason, refilling of such systems on non-EU flagged ships with Halon is not possible and that ship will be detained until a new fixed fire-fighting system is installed on board. See reference (l) above, for additional information.

3.3.2 Minimum Recommended Maintenance

.1 Verification of Cylinder Contents

At least biennially (intervals of 2 years \pm 3 months) as part of the survey for issuance of the SOLAS SEC, the contents of the Halon 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.

.2 Hydrostatic Testing

(a) All Halon cylinders must be hydrostatically tested as follows:

- after each 20 years of service;
- prior to recharging a discharged cylinder; or
- when visual inspection reveals a potential defect.

(b) Hydrostatic test dates must be stamped on the cylinders. Hydrostatic testing must be performed by an authorized servicing facility which has been certified by a government agency, or Classification Society, and by extinguisher manufacturer to perform this type of work. The facility must be acceptable to the attending Classification Society surveyor. The same facility should recharge the cylinders after testing to demonstrate serviceability.

3.3.3 Relaxed Maintenance Schedule

.1 Based on the logistical difficulties associated with locating servicing facilities and suppliers for the testing and maintenance of existing fixed Halon fire suppression systems and components, the Administrator will consider a relaxed maintenance schedule with regard to the hydrostatic testing of the Halon storage cylinders.

- .2 Consideration for the application of the relaxed hydrostatic testing requirements for the fixed Halon system storage cylinders will be given on a case-by-case basis, and must be approved in writing by the Administrator.
- .3 Under the relaxed maintenance schedule, the hydrostatic testing interval of 20 years for the Halon storage may be extended by five (5) years provided the following conditions are met:
 - a cylinder has not been discharged during its service history;
 - cylinder contents are verified by weighing or isotropic measurement;
 - cylinder pressure/levels are verified to be acceptable;
 - a thorough visual inspection of cylinders reveal no potential defects; and
 - cylinders are gauged to the extent considered necessary, and the wall thickness readings kept on board for future comparative reference.
- .4 In addition, a thorough examination shall be made of all accessible component parts of the Halon system, including control valves and connections, to verify satisfactory condition and freedom from leakage: and selected control valves shall be opened out for internal examination to the extent necessary.
- .5 Any suspect cylinders that do not meet the provisions stated above must be tested, or taken out of service.
- .6 The cylinder inspection and thickness gauging shall then be repeated annually as part of the annual servicing requirement of the system, until the end of the five (5) year period of extension.

3.4 **Alternative Fixed Gas Fire-Fighting Media**

The Administrator recognizes that there are other media (e.g., NOVEC™ 1230 fluid, INERGEN®, FM 200®, etc.) that can be used in fixed gas fire-extinguishing systems for machinery spaces and cargo pump rooms. Use of such alternatives shall be subject to approval with any attached conditions, as appropriate, by the Administrator and in accordance with SOLAS Chapter II-2 requirements for alternative fire-fighting systems and relevant guidance².

² Such guidance includes, but is not limited to: Revised Guidelines for the Approval of Equivalent Fixed Gas Fire-Extinguishing Systems, as Referred to in SOLAS '74, for Machinery Spaces and Cargo Pump-Rooms (MSC/Circ.848, adopted 8 June 1998 and as amended by MSC.1/Circ.1267, adopted 4 June 2008); Guidelines for the Approval of Fixed Aerosol Fire-Extinguishing Systems Equivalent to Fixed Gas Fire-Extinguishing Systems, as Referred to in SOLAS '74, for Machinery Spaces (MSC/Circ. 1007, adopted 26 June 2001) and Revised Guidelines for the Approval of Equivalent Water-Based Fire Systems for Machinery Spaces and Cargo Pump-Rooms (MSC.1/Circ. 1165 , adopted 10 June 2005 and as amended by MSC.1/Circ.1386, adopted 10 December 2010).

3.5 Alternative to Ineffective Fixed Gas Fire-Fighting Systems

Water supplies as defined in SOLAS II-2/Reg.19.3.1.2 are considered as an acceptable alternative for the ineffective fixed gas fire-extinguishing system, for ships when allowed to carry any of the cargoes contained in table 2 of MSC.1/Circ.1395. Such an arrangement when provided for the carriage of any of the above cargoes should be verified for compliance by the vessel's Classification Society.

4.0 Fixed Dry Chemical Powder Fire-Extinguishing Systems

4.1 Such system is to be serviced and tested by an approved service supplier in accordance with the Manufacturer's requirements and the Classification Society's requirements, should it have any. Particular attention is to be paid to the condition of the powder for any sign of moisture ingress and that its properties remain as per type approval.

4.2 At each annual, periodical, renewal survey, the attending Class Surveyor(s) is(are) to perform a general examination of the distribution piping and installation of the dry chemical powder fire-extinguishing system to confirm that the system has not been modified from its original installation. Part of such verification should include also the following minimum requirements:

- The piping distribution system is to be blown through with Nitrogen (N₂) or dry air to ensure it is free of any obstruction. The nozzles, if any, are to be removed to ensure that they are free and not blocked during the blow-through operation.
- Operational test of local and remote controls and section valves.
- The contents verification of propellant gas cylinders containing Nitrogen (N₂) including remote operating stations is to be confirmed.
- Flexible discharge hoses are to be inspected to confirm that they are maintained in good condition and have not perished, especially when located on open decks. In case of any doubt the hoses are to be subjected to a full working pressure test.
- The dry chemical powder containment tank and its associate safety valves are to be inspected for signs of corrosion or deterioration which may affect the safety of the system. In case of any doubt the tank is to be tested and safety valve set points adjusted and confirmed at the shop.

4.3 N₂ high pressure cylinders shall be subjected to periodical tests at intervals as IMO recommends for CO₂ cylinders, in paragraph 6.1.2 of MSC.1/Circ.1318.

5.0 Foam Concentrates for Fixed Fire-Extinguishing Systems and Portable Foam Applications

5.1 Applicability

The revised guidelines contained in MSC.1/Circ.1312, Performance and Testing Criteria, and Surveys of Foam Concentrates for Fixed Fire-Extinguishing Systems (reference (g) above), with reference to MSC.1/Circ.1312/Corr.1 (reference (h) above), should be applied to the foam concentrates used for:

- .1 fixed deck foam fire-extinguishing systems required for:
 - tankers by SOLAS '74, regulations II-2/10.8 and chapter 14 of the FSS Code;
 - chemical tankers as specified by SOLAS regulation II-2/1.6.2.1.2 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk; and
- .2 fixed foam fire-extinguishing systems in:
 - machinery spaces according to chapter 6 of the FSS Code; and for
 - portable foam applications according to chapter 4 of the FSS Code.

5.2 Type Approval of Foam Concentrates

- 5.2.1 Foam concentrates for all fixed systems and for portable foam applicators placed on ships should be type approved. Tests, including fire tests, should be performed in accordance with reference (g) above (paragraphs 3.1 to 3.14) by the foam concentrate manufacturer at laboratories acceptable to the Classification Society.
- 5.2.2 Type approvals conducted in accordance with the Guidelines in MSC/Circ.582 and MSC/Circ.582/Corr.1, and MSC/Circ.799 should remain valid until 1 July 2012.

5.3 Periodical Controls of Foam Concentrates Stored on Board

- 5.3.1 Certain installation conditions such as excessive ambient storage temperature, contamination of the foam concentrate and incomplete filling of the tank may lead to abnormal ageing of the concentrates. As a result, periodic testing of concentrates is necessary.
- 5.3.2 The first periodical control of foam concentrates (except for protein-based alcohol resistant foam concentrates) should be performed not more than three (3) years after being supplied to the ship, and after that, every year. These tests should be performed by the shipowner or operator via laboratories or authorized service suppliers deemed acceptable to the Classification Society.
- 5.3.3 Protein-based alcohol-resistant foam concentrates should be subjected to a chemical stability test prior to delivery to the ship and annually thereafter.

5.4 Records

A record of the age of the foam concentrates and of subsequent controls should be kept on board.

6.0 Portable Fire Extinguishers

6.1 Annual Survey

The examination of the fire extinguishers is an integral part of the annual statutory surveys for the SOLAS SEC. The fire extinguishers should be examined and, if necessary, serviced annually. The annual servicing/examination of the portable fire extinguishers can be carried out by the crew, if the crew is properly trained and such servicing is acceptable to the ship's Classification Society, or by an authorized service facility. The Classification Society surveyor must be satisfied with the condition of the extinguishers.

6.2 Servicing of Fire Extinguishers by the Crew of a Ship

A ship's crew may service powder, foam, or water-type portable fire extinguishers subject to the following:

- .1 The equipment required to test, examine, and service the extinguishers is obtained and maintained in a calibrated and serviceable condition.
- .2 The crew is properly trained in the testing and examination, and servicing of fire extinguishers and the extinguisher manufacturer's servicing instructions are followed.
- .3 The testing and inspection is carried out to the satisfaction of the attending Classification Society surveyor, and if required by the surveyor, in the presence of the surveyor.

6.3 Verification of Fire Extinguishers Contents

Every two (2) years in conjunction with the issuance of the SOLAS SEC the contents of the cylinders must be verified. Weighing of the portable CO₂ cylinders in the presence of the Classification Society surveyor is an acceptable method of verification. Other methods of determining contents of the cylinders, such as isotropic measurement, may also be accepted provided the equipment is properly calibrated, the operator of the device is trained and qualified in its use, and the Classification Society surveyor is satisfied with the measurements. If an alternative method is used, spot checks of cylinder contents by weighing may be required to verify the accuracy and consistency of the measurement device.

6.4. Number and Arrangement of Portable Fire Extinguishers on Board Ships

Vessels constructed on or after 1 January 2009 should use the table shown in MSC.1/Circ.1275 as reference for determining the number and arrangement of portable fire extinguishers in accommodation spaces, service spaces, control spaces, control stations, machinery spaces of category A, other machinery spaces, cargo spaces, weather decks and other spaces onboard ships. Vessels which may not comply with the above should be brought into compliance by the first renewal or intermediate Safety Equipment survey coming after 1 November 2011.

For vessels constructed prior to 1 January 2009, Shipowners/Operators are encouraged to implement the unified interpretation of MSC.1/Circ.1275.

6.5. Spare Charges, Additional Fire Extinguishers, and Refilling of Extinguishers

6.5.1 For fire extinguishers of the same type, capable of being recharged on board, the spare charges should be provided as follows:

- 100% for the first 10 extinguishers and 50% for the remaining extinguishers but not more than 60 (fractions to be rounded off to next whole number).

6.5.2 For extinguishers which cannot be recharged by the crew, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in the paragraph above should be provided in lieu of spare charges.

6.5.3 Instructions for recharging the extinguishers should be carried on board. Periodic refilling of the cylinders should be in accordance with the manufacturer's recommendations. Lacking same, refill is required when the extinguishing media starts to lose effectiveness. Partially emptied extinguishers should also be recharged. Only refills approved for the fire extinguisher in question may be used for recharging.

6.6 Authorized Servicing Facilities

The Classification Society surveyor may also accept a servicing certificate from an authorized servicing facility acceptable to the Classification Society for both the annual and biannual examination, servicing and verification of the portable fire extinguishers.

6.7 Hydrostatic Testing of Portable Fire Extinguishers

All portable extinguishers shall be hydrostatically tested every 10 years; however, a hydrostatic test may also be required by the Classification Society surveyor or Marshall Islands Nautical Inspector if visual examination indicates a potential defect in the cylinder. The hydrostatic test date must be permanently marked on the bottles.

6.8 Hydrostatic Testing Facilities

Hydrostatic testing must be performed by a servicing facility which has been certified by a government agency or Classification Society, and by the extinguisher manufacturer to perform this type of work. The facility must be acceptable to the attending Classification Society surveyor. This same facility should recharge the cylinder after testing to demonstrate serviceability.

7.0 Self-Contained Breathing Apparatus (SCBA)

7.1 Weekly Inspections

SCBA should be inspected weekly to ensure that they do not present leakages (see section 2.3.3 above).

7.2 Monthly Inspections

For ships subject to the International Gas Carrier Code and International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, SCBAs, should be inspected at least once a month by a responsible officer and inspected and tested by an expert at least once a year.

7.3 Annual Examination

All SCBAs shall be examined at least annually as part of the annual statutory survey for the SEC or MODU Code Certificate. If applicable, the SCBAs air recharging systems should be checked for air quality as part of the annual statutory survey for the SEC or MODU Code Certificate.

7.4 Hydrostatic Testing of SCBA Cylinders

Hydrostatic testing of SCBA cylinders shall be carried out once every five (5) years. The hydrostatic test date must be permanently marked on the bottles. Intervals for hydrostatically testing cylinders of the ultra lightweight type may vary and will depend upon the requirements of the cylinder manufacturer and the ship's Classification Society. Servicing of the cylinders must be performed to the satisfaction of the Classification Society surveyor.

7.5 Spare Charges and Recharging of SCBA Cylinders

7.5.1 Two spare charges suitable for use with the SCBA should be provided for each required apparatus.

7.5.2 Passenger ships carrying not more than 36 passengers and cargo ships equipped with suitable located means for fully recharging the air cylinders free from contamination, only one spare charge is required for each required apparatus.

7.5.3 Passenger ships carrying more than 36 passengers constructed on or after 1 July 2010 shall be fitted with a suitably located means for fully recharging breathing air cylinders, free from contamination. The means for recharging shall be either:

- .1 breather air compressors supplied from the main and emergency switchboard, or independently driven, with a minimum capacity of 60 l/min per required breathing apparatus, not to exceed 420 l/min; or

- .2 self-contained high-pressure storage systems of suitable pressure to recharge the breathing apparatus used on board, with a capacity of at least 1,200/per required breathing apparatus, not to exceed 50,000 l of free air.

8.0 Emergency Escape Breathing Devices (EEBDs)

8.1 Number and Locations

- 8.1.1 SOLAS '74 requires at least two (2) EEBDs to be located in the accommodations and additional EEBDs to be placed in the machinery spaces. The Administrator considers "machinery spaces" to mean Category A Machinery Spaces such as engine rooms and boiler rooms. Auxiliary Machinery Spaces such as Steering Gear Compartments, Refrigeration Machinery Rooms, Bow Thruster Compartments, and alike do not have to be fitted with EEBDs.
- 8.1.2 Inasmuch as MSC/Circ.849, Guidelines for the Performance, Location, Use and Care of Emergency Escape Breathing Devices (reference (d) above), is referenced in SOLAS II-2/13.3.4 and 13.4.3, the Administrator is treating the guidelines contained in the Circular as mandatory.
- 8.1.3 For compliance with the last sentence in Paragraph 4.6 of MSC/Circ.849, only those control spaces and workshops that are remotely located from the machinery space escape routes need be considered.
- 8.1.4 In achieving compliance with paragraph 4.6 of MSC/Circ.849, a minimum of two (2) EEBDs should be located on each level of the machinery space. If a machinery space contains an enclosed primary escape trunk having a door at each level, only one (1) EEBD need be located on each level³.

8.2 Maintenance and Care

- 8.2.1 The EEBD should be examined and maintained in accordance with the manufacturer's instructions, including any instructions for hydrostatic testing. It should be noted that when an EEBD is fitted with a small capacity oxygen cartridge (two (2) inches or less in diameter), some manufacturers specify a fixed service life without scheduled hydrostatic pressure testing. In the absence of manufacturer's instructions, hydrostatic testing should be carried out at intervals not exceeding five (5) years, unless specifically prohibited by the manufacturers.
- 8.2.2 Sufficient spare EEBDs should be kept on board to replace units that are used, reach their expiry date, or otherwise become unserviceable.

³ The term "level" should be interpreted as meaning a deck where watchstanding personnel reside, workshops and control stations are located, or the crew may be employed during routine maintenance. In essence, two (2) EEBDs are required only on those deck "levels" where people are likely to be employed. Platform decks that serve to divide long ladders into segments and partial decks where personnel are not likely to be employed for any significant period of time are not considered as "levels" and do not require EEBDs.

- 8.2.3 Maintenance requirements, manufacturer's trademark and serial number, shelf life with accompanying manufacture date and name of approving authority should be printed on each EEBD.

9.0 Records

- 9.1 Records shall be maintained on board of:

- .1 Weekly inspections;
- .2 Monthly inspections;
- .3 Annual inspections;
- .4 Other maintenance and testing, including whether a pressure test was performed; and
- .5 Deficiencies identified and corrective actions taken.

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