



# Kiribati Ship Registry

Singapore Operations Office:

10 Anson Road #25-02, International Plaza, Singapore 079903

Tel: +65 6225 0555 Fax: +65 6225 0550 Email: info@kiribaship.com Website: www.kiribaship.com

## MARINE CIRCULAR No. 16/2012

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**TO : Ship Owners, Managers, Charterers, Ship Master and the Shipping Community**

**SUBJECT : MAINTENANCE, TESTING, INSPECTION AND SURVEY REQUIREMENTS OF  
FIRE-FIGHTING SYSTEMS FOR KIRIBATI VESSELS**

This circular serves to provide guidance on the maintenance and inspection of all fire protection systems and appliances and specific guidelines applicable to maintenance, testing and examination of fire extinguishers (gas, foam, dry-powder), self-contained breathing apparatus (SCBA), emergency escape breathing devices (EEBDs) and compressed air cylinders for survival craft air systems.

The guidelines in this circular, is applicable to all vessels.

In the list of systems that follow, it should be noted that this Administration has no objection for certain maintenance procedures and inspections to be carried out by crewmembers so long as they are competent to do so, while some systems will require specialised personnel to carry out their maintenance.

In general, any aspect of the testing and maintenance of the system which is assessed by the Company (as defined in the ISM Code) to be beyond the competence of the Company's and ship's personnel, it shall be carried out by a competent specialist maintenance firm

It is the duty of the Company to ensure that the inspection and maintenance of the whole system meets the recommendations and requirements of the Manufacturers and the Recognised Organisation (RO).

### 1. General Guidelines for Maintenance and Inspection:

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 fire protection systems are under repair, then suitable arrangements should be made to ensure safety is not diminished.

1.1. WEEKLY TESTING & INSPECTION shall include, but not limited to, the verification that:

- 1.1.1. All public address systems and general alarm systems are functioning properly;
- 1.1.2. Breathing apparatus cylinders maintain charged pressure.

1.2. MONTHLY TESTING & INSPECTION shall include, but not limited to, the verification that:

- 1.2.1. All firemen's outfits, fire extinguishers, fire hydrants, hose and nozzles are in place, properly arranged, in good condition and all pressure gauges checked;
- 1.2.2. All fixed fire-fighting system stop valves are in the correct open or closed position and sprinkler systems have appropriate pressures as indicated by gauges;

- 1.2.3. Sprinkler system pressure tanks have correct levels of water as indicated by glass gauges;
  - 1.2.4. All sprinkler system pumps automatically operate on reduction of pressure in the system;
  - 1.2.5. All fire pumps are operated;
  - 1.2.6. All fixed fire-extinguishing installations using extinguishing gas are inspected for leakage.
- 1.3. QUARTERLY TESTING & INSPECTION shall include, but not limited to, the verification that:
- 1.3.1. All automatic alarms for the sprinkler systems are tested using the test valves for each section;
  - 1.3.2. The international shore connection is in good condition;
  - 1.3.3. Lockers providing storage for fire-fighting equipment contain proper inventory and equipment is in proper condition;
  - 1.3.4. All fire doors and fire dampers are tested for local operation;
  - 1.3.5. On fixed fire-extinguishing installations all CO2 cylinders are secure and connections for cable operating system clips are checked for tightness.
- 1.4. ANNUAL TESTING & INSPECTION shall include, but not limited to, the verification that:
- 1.4.1. All fire extinguishers are checked for proper location, charging pressure and condition;
  - 1.4.2. Fire detection systems are tested for proper operation;
  - 1.4.3. All fire doors and dampers are tested for remote operation;
  - 1.4.4. All foam-water and water-spray fixed fire-fighting systems are tested for operation;
  - 1.4.5. All accessible components of fixed fire-fighting systems are visually inspected for proper condition;
  - 1.4.6. All fire pumps, including sprinkler system pumps, are flow tested for proper pressures and flows;
  - 1.4.7. All hydrants are tested for operation;
  - 1.4.8. All anti-freeze systems are tested for proper solutions;
  - 1.4.9. Sprinkler system connections from the ship's fire main are tested for operation;
  - 1.4.10. All fire hoses are hydrostatically tested;
  - 1.4.11. Breathing apparatus air-recharging systems are checked for air quality;
  - 1.4.12. Control valves of fixed fire-extinguishing systems are inspected.
- 1.5. At least BIENNIALY in passenger ships, and at each intermediate, periodical or renewal survey in cargo ships, the following minimum maintenance should be carried out:
- 1.5.1. All high pressure cylinders and pilot cylinders should be weighed or have their cylinder contents verified by reliable means;
  - 1.5.2. Cylinders containing less than 90% of the nominal charge should be refilled;

- 1.5.3. 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.
  - 1.5.4. The hydrostatic test date of all storage containers should be checked;
  - 1.5.5. High pressure cylinders should be subjected to periodical tests at intervals not exceeding 10 years;
  - 1.5.6. Every 10 years, 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;
  - 1.5.7. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years.
  - 1.5.8. The discharge piping and nozzles should be tested to verify that they are not blocked, and the test should be performed by isolating the discharge piping from the system and blowing dry air or nitrogen from test cylinders or suitable means through the piping.
- 1.6. At least BIENNIALY in passenger ships, and at each renewal survey in cargo ships, the following minimum maintenance should be carried out:
- 1.6.1. 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;
  - 1.6.2. In cases where the guideline in 1.6.1. 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;
  - 1.6.3. In both cases this should be carried out from one or more release stations when installed.
  - 1.6.4. If manual pull cables operate the remote release controls, they should be checked to verify that the cables and corner pulleys are in good condition and are able to move freely without requiring an excessive amount of travel to activate the system;
  - 1.6.5. All cable components should be cleaned and adjusted as necessary, and the cable connectors should be properly tightened;
  - 1.6.6. 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;
  - 1.6.7. All controls and warning devices should function normally, and if the time delay is fitted, it should be able to prevent the discharge of gas for the required time period.
- 1.7. FIVE-YEAR SERVICE shall include the following:
- 1.7.1. Hydrostatic testing for all SCBAs' cylinders should be carried out;
  - 1.7.2. Control valves of fixed fire-fighting systems should be internally inspected.
- 1.8. For the requirements of 1.5 and 1.6 above, this Administration may provide consideration for passenger ships to harmonise these activities with the requirements of Res.A997(25) - Survey Guidelines under the Harmonised System of Survey and Certification, 2007, as amended.
- 1.9. Alternative arrangements shall be available to deal with fires in protected spaces when the fixed installations are under maintenance and non-operational. Any proposed alternative arrangements shall require approval from the RO and this Administration.

## **2. Guidelines for Maintenance and Inspection of Fire Extinguishers (includes Portable and Semi-Portable Units of all types – Gas / Foam / Dry-Powder):**

### 2.1. ANNUAL MAINTENANCE shall include the following:

- 2.1.1. The extinguishers should be examined annually by a competent person. During these examinations plastic collars etc. which may conceal the condition of steel underneath should be removed;
- 2.1.2. The competent person may be either a member of the ship's crew who is trained and assigned to carry out this work or an accredited service company;
- 2.1.3. Each extinguisher should be provided with a sign indicating it has examined;
- 2.1.4. Test Certificates, test records, deficiencies and corrective actions must be provided and retained on board for inspection;
- 2.1.5. Charges of portable fire extinguishers should be renewed if, on checking, there is any indication of deterioration in the contents, but in any case after five years;
- 2.1.6. Carbon dioxide extinguishers and gas expellant cartridges should be recharged or renewed if gas loss by weight exceeds 10% of original charge;
- 2.1.7. Dry powder extinguishers may suffer from compaction when subject to vibration. At least one should be discharged annually and the retention of contents checked. When the retention is found to be in excess of 15% of the initial charge further extinguishers should be discharged to determine if compaction is occurring;
- 2.1.8. Any extinguisher or bottle which has excessive corrosion shall be replaced.

### 2.2. FIVE-YEARLY MAINTENANCE shall include the following:

- 2.2.1. At least one extinguisher of each type manufactured in the same year and kept onboard may be test discharged at five intervals (as part of a fire drill)

### 2.3. HYDROSTATIC TESTING requirements:

- 2.3.1. Containers of permanently and non-permanently pressurised fire extinguishers should be hydrostatically pressure-tested every 10 years;
- 2.3.2. Hydrostatic testing must be carried out by an accredited service company or test facility;
- 2.3.3. Following the hydrostatic testing, a thorough inspection and internal examination must be carried out prior to recharging;
- 2.3.4. The test pressure and test date must be marked clearly on each extinguisher (hard-stamping" is only acceptable for CO2 extinguishers and propellant bottles);
- 2.3.5. Test Certificates or test records must be provided and retained on board for inspection

## **3. Additional Fire Extinguishers, Refilling of Extinguishers, and Spare Charges**

- 3.1. The number of portable fire extinguishers required by SOLAS Chapter II-2 is the number required to satisfy Classification Society rules but in no case less than five (5) for ships of 1000 gross tonnage and upwards.
- 3.2. The minimum number of spare charges carried on board for portable & semi portable extinguishers, that are capable of being recharged on board, shall be in accordance with SOLAS Chapter II-2, namely:

- 3.2.1. 100% for the first 10 extinguishers; and
- 3.2.2. 50% for the remaining extinguishers up to a maximum of 60.
- 3.3. Additional extinguishers of the same type and capacity shall be carried in lieu of spare charges for any extinguishers which cannot be recharged on board the ship.
- 3.4. Instructions for recharging extinguishers shall be carried on board ship and refills shall be of a type approved by the manufacturer of the extinguisher.

#### **4. Guidelines for Maintenance and Inspection of Fixed Gas Fire Extinguishing systems:**

- 4.1. BIENNIAL INSPECTION shall be carried out on the cylinders and system by an accredited service agent ashore. This inspection should be conducted in conjunction with the service for the entire system and shall include:
  - 4.1.1. Visual inspection of each cylinder, fitting and securing arrangements;
  - 4.1.2. Accurate determination of the contents and comparison with original readings e.g. liquid level gauging, test weighing etc;
  - 4.1.3. Any cylinders showing signs of mechanical damage, excessive corrosion, or loss of contents exceeding 10% of installed quantity for CO<sub>2</sub> should be withdrawn from service and sent ashore for pressure testing and full periodic service and inspection;
  - 4.1.4. Blow-through with air to ensure associated pipes and nozzles are clear;
  - 4.1.5. Operation test of local and remote controls and section valves.
- 4.2. HYDROSTATIC TESTING requirements:
  - 4.2.1. First pressure test within 20 years of initial pressure test at manufacture, provided annual tests have been carried out with satisfactory results;
  - 4.2.2. Subsequent pressure tests of 25% of the storage cylinders every 5 years thereafter; if any one cylinder fails whilst under test all remaining cylinders are to be tested;
  - 4.2.3. If annual visual inspections are not carried out or there is no record, all cylinders are to be hydraulically tested after ten (10) years and twenty (20) years from date of manufacture and every 5 years thereafter;
  - 4.2.4. Each cylinder is to be marked with a unique number and referenced on the pressure test certificate;
  - 4.2.5. In order to extend the cylinder test period beyond 20 years, this Administration requires an accredited service company to carry out a thorough examination of all cylinders. Where storage rooms are found in good condition and each cylinder is found to be in a satisfactory condition with no significant signs of pitting, corrosion, fretting or cracking, this Administration may permit the hydrostatic test of all the cylinders to be postponed for a further 5 years, i.e. 25 years from the initial test date.
- 4.3. HALON SYSTEMS - Additional requirements:
  - 4.3.1. Halon systems must be inspected and tested annually by an accredited service company. During inspection a leak test must be completed and any cylinders showing signs of leakage, loss of contents exceeding 5% from installed quantity, signs of mechanical damage or excessive corrosion must be withdrawn from service.

## **5. Guidelines for Maintenance and Inspection of Fixed Foam Fire Extinguishing systems:**

- 5.1. BIENNIALY INSPECTION shall be carried out on Fixed Foam extinguishing systems by an accredited service agent ashore.
- 5.2. FOAM ANALYSIS –
  - 5.2.1. The first periodical test and analysis of foam concentrates stored on board should be performed after a period of three (3) years and after that every year;
  - 5.2.2. Foam concentrates are subject to type tests in accordance to guidelines specified in IMO circulars MSC.1/Circ.1312 (which replaced MSC/Circ.582) for low-expansion foam, MSC/Circ.798 for medium-expansion foam, and MSC/Circ.670 for high expansion foam.
  - 5.2.3. Type tests of foam concentrates for low-expansion foam performed in accordance to the guidelines specified in MSC.1/Circ.582/Corr.1 remain valid till 1 July 2012.
  - 5.2.4. The surveyor may require test and analysis at other times if there is cause to question the suitability of the foam or condition of the storage tank.
  - 5.2.5. A record of the age of the foam concentrates and of subsequent tests should be kept on board. (This requirement applies to portable units as well).

## **6. Guidelines for Maintenance and Inspection of Fixed Dry-Powder Fire Extinguishing systems:**

- 6.1. ANNUAL INSPECTION shall be carried out and the dry powder charge should be agitated with moisture free Nitrogen, using “bubbling” connections where provided.
- 6.2. BIENNIALY INSPECTION shall be carried out, in addition to the regular shipboard inspections, on the fixed dry-powder extinguishing systems by an accredited service company. This inspection shall include:
  - 6.2.1. Blow-through with air to ensure associated pipes and nozzles are clear;
  - 6.2.2. Operation test of local and remote controls and section valves; and
  - 6.2.3. Verification of contents of propellant gas cylinders containing Nitrogen. (**Note:** The replenishment and test regime for these high-pressure Nitrogen cylinders is identical to that for CO2 cylinders for fixed-gas fire extinguishing systems.)
  - 6.2.4. Sample dry powder test for moisture absorption.

## **7. Guidelines for Self-contained Breathing apparatus (SCBA), Emergency Escape Breathing Devices (EEBD's) and Compressed Air Cylinders for Survival Craft Air Systems:**

- 7.1. ANNUAL INSPECTION:
  - 7.1.1. All SCBA and compressed air cylinders for survival craft shall be examined at least annually by an accredited company ashore. If applicable, the breathing apparatus air-recharging systems should be checked for air quality as part of the annual statutory survey for the Cargo Ship Safety Equipment Certificate.
  - 7.1.2. EEBDs shall be examined at least annually by suitably qualified crew or by an accredited service company.

## 7.2. HYDROSTATIC TESTING of SCBA and EEBD Air Cylinders:

- 7.2.1. Hydrostatic testing of SCBA and survival craft compressed-air cylinders shall be carried out once every five years or when recommended by the manufacturer;
- 7.2.2. The hydrostatic test date must be permanently marked on the bottles;
- 7.2.3. The hydrostatic testing of cylinders of the ultra lightweight type should be carried out at least every five years unless other inspections show evidence of any mechanical damage or corrosion is observed on the bottle. In such cases, the bottle should be hydrostatically tested before being returned to service.

## 7.3. SPARE CHARGES & RECHARGING of SCBA Air Cylinders:

- 7.3.1. Two spare charges suitable for use with the breathing apparatus should be provided for each SCBA;
- 7.3.2. If cargo ships are equipped with suitably located means for fully recharging the air cylinders free from contamination, only one spare charge is required for each required SCBA.

## 8. Considerations for Exemption of Hydrostatic Pressure Testing

### 8.1. LOW PRESSURE CO<sub>2</sub> SYSTEMS may be exempted from hydrostatic pressure testing subject to the following:

- 8.1.1. The tank is to be constructed of a material which is not ordinarily prone to corrosion (e.g. Stainless Steel, Aluminium or similar), and
- 8.1.2. Fittings and inspection of the tank are in accordance with Classification Society requirements, and
- 8.1.3. Documentary evidence to show that the tank and associated systems have been inspected and serviced annually. Annual inspection should include removal of insulation and sample inspection in way of pipes and fittings. The insulation and vapour barrier is to be properly reinstated, and
- 8.1.4. The tank shall not be exposed to extremes of temperature or pressure. Such exposure will require the inspection and testing regime to be reviewed and this Administration should be notified in such cases.

### 8.2. HALON GAS CYLINDERS may, upon application, be exempted from the periodical hydrostatic testing due to the potential leakage and losses to atmosphere in the course of Halon transfer, and the limited availability of Halon reception facilities. Approval of exemption by this Administration shall be subject to a satisfactory alternative inspection which is to be proposed by the RO.

## 9. Additional Notes for Halon Gas Systems & Chlorofluorocarbons (CFC)

The United Nations' Environment Program through its Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, which entered into force in January 1989; stipulates that owing to the ozone-depleting potential of chlorofluorocarbons and Halons, the production and consumption of chlorofluorocarbons and Halon, including CFC-11, CFC 12, CFC-113, CFC-114, CFC-115, Halon-1211, 1301 and 2402 should be kept at their 1986 levels and phased out by 1 January 2000.

Though the International Maritime Organisation (IMO) has not defined any target date for the phasing out of Halons, it has recommended and encouraged all sectors of the maritime industry to limit the use of Halons and CFCs aboard ships, and by amendment of SOLAS 1974 via MSC Resolution 27(61) to use alternative fire extinguishing systems and media on new buildings after 1 October 1994, prohibit any new installations

on existing vessels, and prohibit the release of Halons into the atmosphere when testing existing systems. IMO Assembly Resolution A.719(17) prohibits the use of CFCs in any new installation on vessels after 6 November 1992.

This Administration recognises that there are existing ships which have Halon installed for fire extinguishing purposes and this guidance note takes into account the contents of the Montreal Protocol, IMO Resolutions A.655(16) and A.719(17) and guidance in IMO MSC Circulars 600 and 775.

- 9.1. New installations of fire extinguishing systems using Halon 1211, 1301 and 2402 and CFCs are prohibited in all new buildings and existing vessels from 1 October 1994 onwards.
- 9.2. In the event of the discharge or loss of pressure of the Halon Gas cylinders, this Administration accepts the replenishment of the used cylinders which remain in satisfactory condition. However, if Halon Gas is not readily available, the ship will be required to ensure that the affected space has adequate fire fighting capability (via temporary arrangement) prior to departure from port. Approval for the temporary arrangement shall be obtained from RO and the Flag taking into account the relevant guidance in IMO MSC Circular.775.
- 9.3. This Administration has not established a phase out date for existing Halon installations and systems and interprets IMO rules regarding the use of Halon systems to mean that only new installations are prohibited. As such, existing systems installed prior to 1 October 1994 can still be used provided these systems remain serviceable.
- 9.4. However, this Administration would like to remind Owners of vessels with existing Halon systems that the worldwide stock of Halon (see IMO Circular FP.1/Circ.42, as amended for details of the available facilities) is diminishing and it is strongly recommended that a plan is implemented for the replacement the Halon system onboard. Details of any proposed replacement of a system containing Halon must be forwarded to the Recognised Organisation.

## **10. Alternative Fixed Gas Fire Fighting Media**

- 10.1. Alternative fire fighting systems referred to in SOLAS Chapter II-2, and the IGC Code for protection of machinery and accommodation spaces, pump rooms and cargo spaces may be fitted on board ships, subject to the approval, including any attached conditions, of a RO or Contracting Government.
- 10.2. This Administration accepts the use of NOVEC 1230 and FM 200 (non-asphyxiating) fire extinguishing agents in machinery spaces for which no specific provisions for fire-extinguishing appliances are prescribed under the provisions of SOLAS Chapter II-2 requirements, subject to conditions (to be agreed on a case by case basis) appropriate to the space in question and provided that the space is not connected to an accommodation space.
- 10.3. In the case of alternative fire extinguishing arrangements in cargo spaces under the provisions of SOLAS Chapter II-2 requirements, arrangements may be evaluated and an exemption certificate may be issued, subject to relevant conditions and in conjunction with a list of specified cargoes as appropriate.

## **11. Additional Survey Requirements for Safety Equipment onboard**

- 11.1. In surveying the safety equipment on a vessel, ROs shall take care to verify that:
  - 11.1.1. all fire fighting equipment has been inspected and maintained in accordance with the manufacturer's instructions and the foregoing requirements;
  - 11.1.2. the manufacturer's maintenance instructions are on board;
  - 11.1.3. records of inspections, maintenance and pressure tests are maintained; and
  - 11.1.4. spare charges are provided in accordance with paragraphs 3.2, 3.3, and 7.3.



- 11.2. ROs shall refer, with the relevant recommendations, any vessel that does not satisfy any of the above requirements to this Administration prior to the issue or endorsement of a Cargo Ship Safety Equipment Certificate, Passenger Ship Safety Certificate, Fishing Vessel Safety Certificate, or any other statutory certificate that relates to safety equipment (e.g. MODU/MOU certificates).

**REFERENCES:**

IMO MSC/Circ.582/Corr.1, MSC/Circ.670, MSC/Circ.798, MSC/Circ.847 (Para 6), MSC/Circ.850, MSC.1/Circ.1312, MSC.1/Circ.1318, IMO FP.1/Circ.42, IMO Res A.655(16), A.719(17) and A.951(23).

Yours sincerely,

Deputy Registrar  
Kiribati Ship Registry