Subject

Maintenance, inspection and test of Fire-Protection Systems and Appliances on board the Panama-registered ships

ClassNK
Technical Information

No. TEC-0869
Date 14 October 2011

To whom it may concern

The Panama Government has informed ClassNK of Merchant Marine Circular No.226, "Guidelines for the Maintenance and Inspection of Fire-Protection Systems and Appliances", which is in reference to maintenance, inspection and test of Fire-Protection System and Appliances on board the Panama-registered ships. The essential points of the Guidelines are shown below. The previous ClassNK Technical Information No.TEC-0511 is now superseded. The requirements only are shown below. As necessary, please refer to the original text of the Guideline which is available on Panama Government Internet Homepage (http://www.segumar.com).

Main points of changes are as follows;

1. Fixed CO_2 Fire-Extinguishing Systems
   - Hydrostatic testing of high pressure cylinders
     [Old] All cylinders before 20 years
     [New] 10% cylinders at 10 years interval
   - Flexible hoses
     To be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years
2. New requirements for Fixed Dry-Powder Fire-Extinguishing Systems
3. Automatic Sprinkler and Fixed Pressure Water Spray Systems
   - Additional requirement at Monthly, Quarterly, Annual
   - Internal inspection of pressure tank, all check and control valves at 5 yearly interval.

The requirements of Guideline are as follows;

1. General
   (1) All fire protection systems and appliances shall at all times be in good order and available for immediate use while the ship is in service.
   (2) "A service agent or facility" described below means one be subject to approval by the Administration or IACS members or equal Organizations to perform maintenance, inspection and tests of fire-protection systems and appliances.

(To be continued)

(3) All self-contained breathing apparatus (SCBA's) means one for fire-fighter's outfit and for safety equipment specified in IBC/IGC Code.

2. Application
This "Guidelines" applies to all ships.

3. General Requirements for the Maintenance and Inspection of Fire-protection Systems and Appliances.
(1) 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:
(i) maintenance and repair instructions;
(ii) schedule of periodic maintenance;
(iii) list of replaceable parts; and
(iv) log for records of inspections and maintenance, listing identified non-conformities and their targeted completion dates.

(2) Weekly Testing and Inspections
(i) all public address systems and general alarm systems are functioning properly; and
(ii) breathing apparatus cylinders do not present leakages.

(3) Monthly testing and inspections
(i) all fireman's outfits, fire extinguishers, fire hydrants, hose and nozzles are in place, properly arranged, and are in proper condition;
(ii) 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; and
(iii) all fire pumps are operated.

(4) Quarterly testing and inspections
(i) the international shore connection is in proper condition;
(ii) lockers providing storage for fire-fighting equipment contain proper inventory and equipment is in proper condition; and
(iii) all fire doors and fire dampers are tested for local operation.

(5) Annual inspections
(i) fire detection systems are tested for proper operation, as appropriate;
(ii) all fire doors and dampers are tested for remote operation;
(iii) all accessible components of fixed fire-fighting systems are visually inspected for proper condition;
(iv) all hydrants are tested for operation;

(To be continued)

(v) all antifreeze systems are tested for proper solutions;
(vi) all fire hoses are hydrostatically tested; and
(vii) control valves of fixed fire-fighting systems should be inspected.

(6) Five-year service
(i) control valves of fixed fire-fighting systems should be internally inspected.

4. Specific Requirements for the Maintenance and Inspection of Fire Extinguishers, including portable and semi-portable units of all types
(1) Annual Maintenance:
(i) all fire extinguishers must be checked for proper location, charging pressure, and condition; according to the ship's fire plan.
(ii) extinguishers should be subject to periodical inspections in accordance with the manufacturer's instructions and serviced at intervals not exceeding one year. During these examinations plastic collars etc., which may conceal the condition of steel underneath, should be removed.
(iii) service and inspection should only be undertaken by, or under the supervision of, a person with demonstrable competence or an accredited service company, based on the inspection guide in table 9.1.3 of the Resolution A 951(23). 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.
(iv) all the extinguisher should be provided with a sign indicating it has been examined and a visual indication of discharge.
(v) 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.
(vi) instructions for recharging extinguishers should be supplied by the manufacturer and be available for use on board.
(vii) 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.
(viii) carbon dioxide extinguishers and gas expellant cartridges should be recharged or renewed if gas loss by weight exceeds 10% of original charge.
(ix) 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 the compaction is occurring.
(x) Any extinguisher or bottle which has excessive corrosion shall be replaced.

(To be continued)

(2) Two year service:
   (i) Every two years, portable fire extinguishers shall be checked by a service agent or facility certified by the manufacturer to perform this type of work. Every other year, these checks shall be carried out either by a service agent or facility (certified and accepted) or by a deck or engine officer trained and assigned to this duty.

(3) Five year service:
   (i) At least one extinguisher of each type manufactured in the same years and kept on board a ship should be test discharged at five year intervals (as part of a fire drill)

(4) Ten year service:
   (i) Containers of permanently pressurized and non-permanently pressurized portable fire extinguishers together with propellant cartridges should be hydraulically pressure tested in accordance with the recognized standard or the manufacturer at intervals not exceeding ten (10) years.
   (ii) The hydrostatic testing shall be carried out by an accredited service company or test facility. Test pressure and test date must be marked clearly on each extinguisher (hard-stamping is only acceptable for CO_2 extinguishers and propellant bottles. This test shall not be carried out on board.
   (iii) Following the hydrostatic testing, a thorough inspection and internal examination must be carried out prior to recharging.
   (iv) Test records or certificate must be provided and retained on board for Inspection.

5. Specific Guidelines for Maintenance and Inspection of Fixed Gas Fire-Extinguishing Systems
(1) Monthly inspections:
At least every 30 days a general visual inspection should be made of the overall system condition for obvious signs of damage, and should include verification that:
   (i) all releasing controls are in the proper position and readily accessible for immediate use;
   (ii) all discharge piping and pneumatic tubing is intact and has not been damaged;
   (iii) all high pressure cylinders are in place and properly secured;
   (iv) the alarm devices are in place and do not appear damaged;
   (v) all the installation using extinguishing gas are free from leakage; and
   (vi) all stop valves are in the closed position.

In addition, on low pressure systems the inspections should verify that:
   (i) the pressure gauge is reading in the normal range;
   (ii) the liquid level indicator is reading within the proper level;
   (iii) the manually operated storage tank main service valve is secured in the open position; and
   (iv) the vapor supply line valve is secured in the open position.

(To be continued)

(2) Quarterly inspections:
   (i) all CO_2 bottle connections for cable operating system clips should be checked for tightness on fixed fire-extinguishing installations.

(3) Annual inspections:
   The following minimum level of maintenance and inspections should be carried out in accordance with the system manufacturer's instructions and safety precautions:
   (i) the boundaries of the protected space should be visually inspected to confirm that no modifications have been made to the enclosure that has created uncloseable openings that would render the system ineffective;
   (ii) all storage containers should be visually inspected for any signs of damage, rust or loose mounting hardware. Cylinders that are leaking, corroded, dented or bulging should be hydrostatically retested or replaced;
   (iii) system piping should be visually inspected to check for damage, loose supports and corrosion. Nozzles should be inspected to ensure they have not been obstructed by the storage of spare parts or a new installation of structure or machinery;
   (iv) the manifold should be inspected to verify that all flexible discharge hoses and fittings are properly tightened; and
   (v) all entrance doors to the protected space should close properly and should have warning signs, which indicate that the space is protected by a fixed carbon dioxide system and that personnel should evacuate immediately if the alarms sound. All remote releasing controls should be checked for clear operating instructions and indication as to the space served.

(4) Two Yearly Inspections:
   At least biennially (intervals of 2 years ± 3 months) in passenger and cargo ships, the following maintenance should be carried out
   (i) 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;
   (ii) the hydrostatic test date of all storage containers should be checked; and
   (iii) the discharge piping and nozzles should be tested to verify that they are not blocked. The test should be performed by isolating the discharge piping from the system and flowing dry air or nitrogen from test cylinders or suitable means through the piping.

   In addition, the following maintenance should be carried out by service technicians/specialists trained to standards accepted by the Administration:

(To be continued)

(i) 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;

(ii) 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

(iii) 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.

(5) Ten Year Service:

(i) High pressure cylinders should be subject 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;

(ii) Hydrostatic testing for the fixed CO_2 system shall be carried out by a servicing facility or agent which has been certified by the manufacturer to perform this type of work. Test certificates must be provided and kept on board for inspections. Test date and pressure must be stamped on each bottle. This test shall not be carried on board;

(iii) For subsequent 10-year services, alternation of the inspected cylinders must be carried out, i.e. different cylinders must be inspected from those done in the previous services if 100% of them were not inspected; and

(iv) Ships of 10 years or older coming into Panama registry will be required to carry this test at the next scheduled dry-docking.

(6) Additional Requirements for Halon Systems:

(i) An annual leakage check shall be carried out as per as MSC/Circ. 600. The Chief Engineer can carry out this test if provided with the proper equipment and training;

(ii) During the annual leakage check, if any cylinder showing signs of leakage, loss of contents exceeding 5% from the installed quantity, signs of mechanical damage or excessive corrosion, must be withdrawn from service.

(To be continued)

6. Specific Guidelines for Maintenance and Inspection for Fixed Foam Fire-Extinguishing Systems
   (1) The first periodical control of foam concentrates stored on board should be performed not more than 3 years (from the original installation date), after that, every year;
   (2) However, paragraph a. the chemical stability test for protein-based alcohol-resistant foam concentrate should be performed prior to delivery to the ship and annually thereafter.
   (3) A record of the age of the foam concentrates and of subsequent control should be kept on board, readily available for inspection; and
   (4) In accordance to MSC.1/Circ. 1312, MSC/Circ. 670 and MSC/Circ.798 the tests, control or analysis of foam will be performed by an independent or manufacturer's laboratory, which is accepted by the Recognized Organization issuing the pertinent Safety Certificate.

7. Specific Guidelines for Maintenance and Inspection of Fixed Dry-Powder Fire-Extinguishing Systems
   (1) Annual Inspections:
      (i) The system should be inspected and the dry powder charge should be agitated with moisture free nitrogen, using "bubbling" connections where provided.
      Note: due to the powder's affinity for moisture, any nitrogen gas introduced for agitation must be moisture free.

   (2) Two Yearly Inspections:
      (i) In addition to the regular shipboard inspections, the systems should be inspected at least once every two years by an accredited service agent. This inspection should include:
      - blow-through with nitrogen to ensure associated pipes and nozzles are clear;
      - operation test of local and remote controls and section valves; and
      - contents verification of propellant gas cylinders containing nitrogen(including remote operating stations).
      (ii) Sample dry powder test for moisture absorption should be carried out by an accredited company ashore.
      (iii) The powder containment vessels safety valves and discharge hosed should be subject to a full working pressure test every two (2) years.

   (3) Ten Yearly Test:
      (i) Powder containment vessels and associated piping should be subject to hydraulic testing carried out by an accredited service agent at intervals not exceeding 10 years.
      Note: The replenishment and test regime for these high-pressure nitrogen cylinders is identical to that for CO_2 cylinders for fixed-gas fire extinguishing systems.

8. Specific Guidelines for Maintenance and Inspection of Automatic Sprinkler and Fixed Pressure Water Spray Systems

(To be continued)

These systems should be regularly inspected to ensure that all valves are in the correct position for operation. Level and pressures should be maintained in pressurized storage tanks and there should be no obvious leakage. It should be tested by a competent person as per the manufacturer's instructions, and as a minimum should include the following:

(1) Monthly Inspections and Test:
  (i) auto start function of sprinkler system pumps should be tested to ensure they automatically operate on system pressure loss.
  (ii) sprinkler system pressure tanks have correct levels of water as indicated by glass gauges;
  (iii) all sprinkler system pumps automatically operate on reduction of pressure in the systems;

(2) Quarterly Tests:
  (i) All automatic alarms and control gear for the sprinkler systems should be tested using the test valves and procedures for each section.

(3) Annual Tests:
  (i) water spray fixed fire-fighting systems should be tested for correct operation;
  (ii) all fire pumps, including sprinkler system pumps should be flow tested to ensure design pressures and flows;
  (iii) sprinkler system connections from the ship's fire main are tested for operation;
  (iv) Alarms, pressure switches and control gear settings should be verified; and
  (v) All associated relief valves should be tested.

(4) Five Yearly Test:
  (i) In addition to the annual tests indicated above, the pressure tank and all check and control valves should be internally inspected. Also checks to be carried out to confirm that distribution pipe work is free from corrosion and blockage.

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

Weekly testing inspections shall be carried out to ensure that breathing apparatus cylinders maintain charged pressure.

(1) Annual inspections:
  (i) 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.
  (ii) EEBD's shall be examined at least annually by suitably qualified ship's staff, or by an accredited service company.

(To be continued)

(2) Two Yearly inspections:
   (i) All SCBA's cylinders shall be checked by a service agent or facility certified by the manufacturer to perform this type of work. Every other year, these checks shall be carried out either by a service agent or facility or by a deck or engine officer trained and assigned to this duty.

(3) Five yearly tests of SCBA Air Cylinder:
   (i) Hydrostatic testing for all SCBA's and survival craft compressed-air cylinders shall be carried out by a servicing facility or agent certified by the manufacturer to perform this type of work and accepted by the Recognized Organization issuing the pertinent Safety certificate once every five years or when recommended by the manufacturer if less than five years.
   (ii) Test certificates must be provided and kept on board for inspections. Test date and pressure must be stamped or tagged on each cylinder. This test shall not be carried on board.

For any questions about the above, please contact:

NIPPON KAIJI KYOKAI (ClassNK)
Survey Department, Administration Center, Head Office
Address: 4-7 Kioi-cho, Chiyoda-ku, Tokyo 102-8567, Japan
Tel.: +81-3-5226-2027
Fax: +81-3-5226-2029
E-mail: svd@classnk.or.jp