

Subject

Periodic Inspection, Testing and Maintenance of Compressed Gas Cylinders, Fire Extinguishers and Fixed Fire-Fighting Systems on board the Isle of Man Flag Ships

ClassNK

Technical Information

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To whom it may concern

The Isle of Man Government has notified ClassNK of Industry Circular No. 6 (Last Updated: July 2003) for periodic inspection, testing and maintenance of compressed gas cylinders, fire extinguishers and fixed fire-fighting systems including the amendments regarding Propellant Bottles and Foam Systems on board the Isle of Man flag ships as per attached.

This ClassNK Technical Information supersedes the previous ClassNK Technical Information No. TEC-0425 dated 12 November 2001.

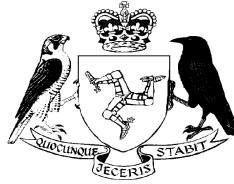
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Attachment: Industry Circular revised No. 6 (Last Updated: July 2003) and No. 2

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Government of the Isle of Man
Department of Trade and Industry

Notice to Surveyors, Shipowners, Managers and Classification Societies

**Periodic Inspection, Testing and Maintenance of Compressed Gas Cylinders,
Fire Extinguishers and Fixed Fire-fighting Systems.**

This Industry Circular sets out the requirements for periodic servicing and testing of fire extinguishers, compressed gas cylinders and components of fixed fire-extinguishing systems on board Isle of Man registered vessels.

For ease of reference, a table of service and test periods has been set out in Appendix 1 to this Circular.

1. Fire Extinguishers

Fire extinguisher includes portable and semi-portable units of all types.

Inspection

- all extinguishers should be examined annually by a competent person.
- 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 agent.
- each extinguisher should be marked clearly to indicate the date upon which it has been examined.

Testing

- The hydraulic test period for **all types** of fire extinguishers is **5 years**.
- hydraulic testing must be carried out by an accredited service agent or test facility.
- following the hydraulic testing, a thorough inspection and internal examination must be carried out prior to recharging.

- the test pressure and test date must be marked clearly on each extinguisher. Note: 'hard-stamping' is only acceptable for CO₂ extinguishers and propellant bottles.
- test certificates or test records must be provided and retained on board for inspection.

Note: Propellant bottles for fire extinguishers (e.g. CO₂ cartridges) do not require hydraulic testing. The shelf life is 20 years although it is recommended they are not refilled after 15 years. The cartridges should be inspected annually and weight-checked –any bottles showing signs of wastage or deterioration or weight loss in excess of 10% should be replaced.

2. Cylinders for SCBA , Medical Oxygen and Compressed Air Cylinders for survival craft air systems.

SCBA cylinders includes compressed air cylinders for all breathing apparatus, escape sets and rescue equipment.

Inspection

- all cylinders should be externally examined annually by a competent person.
- 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 agent.

Testing

- the maximum interval between hydraulic tests for solid drawn steel cylinders is **5 years**. Composite cylinders may require more frequent testing - stipulated by manufacturers instructions.
- hydraulic testing must be carried out by an accredited service agent or test facility.
- following the hydraulic test, a thorough inspection and internal examination must be carried out prior to recharging.
- the test pressure and test date must be stamped clearly on each steel cylinder. Composite cylinders will require a permanent marking or tag.
- test certificates must be provided and retained on board for inspection.

3. Cylinders for high-pressure fixed gas fire-extinguishing systems (for bulk CO₂ systems – refer to Industry Circular No. 2)

Inspection

Annually the cylinders should be subject to a contents or level check by a competent person. The competent person may be either a member of the ship's crew who is trained and assigned to carry out the task or an accredited service agent.

At least once every **2 years** the cylinders should be subject to an inspection by an accredited service agent, this inspection should be conducted in conjunction with the service for the entire system and will include:

- visual inspection of each cylinder, fittings and securing arrangements.
- accurate determination of the contents and comparison with original readings e.g. liquid level gauging, test weighing etc.

Any cylinders showing signs of mechanical damage, excessive corrosion, or loss of contents exceeding 10% of installed quantity for CO₂ or 5% for Halon should be withdrawn from service and sent ashore for full periodic service and inspection. If more than 10 years have elapsed since initial pressure test at manufacture, they will require to be hydraulically tested before refilling.

Note: On board inspection or test required by an accredited service agent, with the exception of pressure testing, may be carried out by a senior member of the ship's staff who has been successfully trained to carry out this work. In all cases, calibrated equipment must be used and all procedures and documentation must be in accordance with shipboard safety management systems.

Testing

The hydraulic pressure test period for these high-pressure cylinders:

- first pressure test within **20 years** of initial pressure test at manufacture, provided annual tests have been carried out with satisfactory results.
- subsequent pressure tests every **5 years** thereafter.

Note: Testing for High-Pressure Halogenated Hydrocarbon (Halon) systems - The Isle of Man Marine Administration strongly advises owners to consider replacing their existing Halon systems before the hydrostatic test of the cylinders is due. However, where problems arise the following may be considered for which special application must be made on a ship-by-ship basis.

Due to the environmental implications of emptying, testing and re-charging of these cylinders and the reduced risk of internal corrosion due to the absorption of moisture by the Nitrogen pressurisation gas, the Isle of Man will accept postponement of pressure testing providing the external condition of the cylinders remains acceptable. In order to extend the cylinder test period beyond 20 years, the Isle of Man require a thorough examination of all cylinders be carried out by an accredited service agent. Where each cylinder is found to be in a satisfactory condition with no significant signs of pitting, corrosion, fretting or cracking, this Administration will permit the hydraulic test of all the cylinders to be postponed for a further 5 years, i.e. 25 years from initial test date for which a letter will be issued to the vessel upon receipt of the inspection report.

4. Cylinders containing refrigerant gases and gases for burning equipment

These cylinders are not normally considered to be part of the ship's safety equipment. They are generally supplied full and exchanged or returned when empty. Ship's staff should, prior to accepting the cylinder on board, check the date stamp on the cylinders and ensure that no more than 5 years have elapsed since the last hydraulic pressure test.

For cylinders remaining on board, arrangements should be made for an exchange cylinder from ashore if more than 5 years have elapsed since the last hydrostatic test.

5. Foam Systems

To include all foam types: FP; AFFF; FFFP; ARFF

In addition to the regular shipboard inspections and where practicable the system should be tested to produce foam as often as possible in a drill scenario. Used concentrate should be replenished as required.

Foam sampling

Fixed systems:

An analysis of foam samples must be undertaken **after 2 Years** from date of manufacture and **annually thereafter**. Samples should be:

- as representative as practical, e.g. taken from top, middle and bottom of tanks where arrangement permits.
- analysed by an independent or manufacturer's laboratory and the results of analyses must be kept on board and readily available for inspection.

Portable Systems:

Check the batch numbers and establish the age of the compound. If within the manufacturers' recommended shelf life, then the compound does not need to be tested provided the drums remain sealed with no visible signs of degradation.

If the drum has been opened or records of manufacture not available then the ship's staff can complete on board testing on an annual basis per batch, in accordance with manufacturers' instructions to ensure the foam compound remains effective. The drums should be replaced when they exceed the manufacturers recommended shelf life.

6. Fixed Dry Powder Systems

Annually, the system should be inspected and the dry powder charge should be agitated with 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.* 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 air to ensure associated pipes and nozzles are clear.
- operation test of local and remote controls and section valves.
- contents verification of propellant gas cylinders containing Nitrogen (including remote operating stations).

Note: On board inspection or test required by an accredited service agent, with the exception of pressure testing, may be carried out by a senior member of the ship's staff who has been successfully trained to carry out this work. In all cases, calibrated equipment must be used and all procedures and documentation must be in accordance with shipboard safety management systems.

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.

7. Sprinkler and Fixed Pressure Water Spray Systems

No specific inspection or test regime exists for these systems outside of normal shipboard testing and statutory survey requirements. In the case of sprinkler systems protecting passenger accommodation, our surveyors will inspect and test the system as necessary during Passenger Ship Safety Certificate Renewal surveys.

8. Hydraulic Pressure Testing

The test pressure applied for all cylinders and extinguishers should be 1.5 x maximum working pressure, which should be held for at least one minute. The test pressure should be clearly stamped on each compressed gas cylinder and clearly marked on each extinguisher.

Where cylinders are sent ashore for re-charging, the pressure test requirements for the Local Authority may override, but should not be less stringent, than the above requirements.

9. Rejection

Extinguishers or cylinders failing any inspection or test shall be rendered unserviceable and disposed of accordingly. An entry in the records must be made to show when any extinguisher or cylinder has been rejected.

10. Records

Records of inspection, maintenance and testing of all extinguishers and cylinders must be maintained and readily available on board for inspection. These records should clearly identify each individual extinguisher or cylinder and its inspection status.

Appendix 1

System or Appliance	Shipboard Inspection	Periodic Inspection and Service	Hydraulic Pressure Test	Marking and Documentation
Fire Extinguishers (all types)	In accordance with SMS procedures and manufacturer's instructions	Annually by a competent person (see Note 1)	5 Years (includes propellant gas bottles)	Pressure Test date to be clearly marked (see Note 2). Inspection and PT certificates on board
SCBA and Medical O₂ cylinders	In accordance with SMS procedures and manufacturer's instructions	Annually by a competent person. (see Note 1)	Steel - 5 years Composites - see manufacturer	Pressure Test date to be hard-stamped on cylinder. PT certificates on board
Air Cylinders for Survival Craft (TEMPSC)	In accordance with SMS procedures and manufacturer's instructions.	Annually by a competent person (see Note 1)	5 years	Pressure Test date to be hard-stamped on cylinder .PT certificates on board
CO₂ High Pressure Cylinders - Fixed Installations	Annual level check and function checks In accordance with SMS procedures	Every 2 years by an accredited service agent (see Note 3)	Within 20 years and every 5 years thereafter	Pressure Test date to be hard-stamped on cylinder. Inspection and PT certificates on board
Halon High Pressure Cylinders - Fixed Installations	Annual level check and function checks In accordance with SMS procedures	Every 2 years by an accredited service agent (see Note 3)	External examination at 20 years to extend to 25 years (see note 4)	Pressure Test date to be hard-stamped on cylinder. Inspection and PT certificates on board
Cylinders for Refrigerant Gas and Burning Equipment	Periodically check condition		5 years (see note 5)	Pressure test date to be hard-stamped on cylinder.
Foam Systems (fixed and portable)	In accordance with SMS procedures and manufacturer's instructions	Foam sample after 2 years then annually thereafter. (see Note6)		Foam sample certificates on board.
Dry Powder systems	Powder charge agitated annually (N ₂ blow-through) & system inspected	Sample of dry powder and test for moisture absorption every 2 years (see Note 6)	N ₂ Propellant cylinders -20 years then 5 years thereafter	Last sample date marked clearly. Powder sample certificates on board

Notes:

1. The competent person may be a member of the ship's crew who is trained and assigned to this task or an accredited service agent.
2. Pressure test dates must be clearly marked. Hard-stamping is only permitted on CO₂ extinguisher cylinders and propellant bottles.
3. On board inspection or test required by an accredited service agent, with the exception of pressure testing, may be carried out by a senior member of the ship's staff who has been fully trained to carry out this work. In all cases, calibrated equipment must be used and all procedures and documentation must be in accordance with shipboard safety management systems.
4. This relaxation from the 20 years test period is permitted on a ship by ship basis for which application must be made to the Administration. Any extension is granted subject to thorough examination (including NDT) by an accredited service agent , the details of which will be provided upon application.
5. These cylinders are generally supplied full and exchanged when empty and as such are not considered as part of the ships safety equipment. Ship's staff should , prior to acceptance, ensure no more than 5 years have elapsed since the last pressure test. Cylinders remaining on board should be exchanged ashore if more than 10 years have elapsed since last Pressure Test.
6. Sample analyses must be carried out by an accredited service agent ashore.



Government of the Isle of Man
Department of Trade and Industry

Notice to Surveyors, Shipowners, Managers, and Classification Societies.

**Bulk CO₂ Fire fighting Systems,
Survey requirements for Isle of Man ships.**

The investigation of a recent fire casualty during which the ship's bulk CO₂ system was used revealed that the system did not operate as intended due to a failure of one of the supply pipes. This pipe had suffered heavy localised corrosion under fitted insulation and failed when the gas was discharged.

As a consequence of this investigation recommendations were made and the Isle of Man Administration would now advise all owners, managers, surveyors and Classification Societies of the present Isle of Man requirements for survey and inspection of bulk CO₂ systems.

1. Bulk CO₂ system containment tanks should be examined annually during the ship's Safety Equipment survey and the examination should include;
 - (a) close examination of all pipe connections to the tank where they join with the tank which will include the removal of selected areas of insulation as necessary.
 - (b) removal of selected areas of insulation on other connecting pipes and delivery pipes and examination of the pipe condition to include non destructive testing to determine residual wall thickness where any extensive corrosion or other evidence of deterioration exists.
 - (c) examination of selected areas of the tank shell under insulation to determine the shell condition using appropriate means if necessary to determine wall thickness.

- (d) removal of insulation and examination of underlying steelwork in any area where there is evidence of corrosion through staining or other signs.
- 2. Annual inspections as detailed in (1) should be programmed to examine, in so far as possible, different areas of the system at each annual inspection.
- 3. Any examination which reveals evidence of deterioration in pipework or in the tank should be followed up to determine the extent of deterioration, including an internal examination if necessary and any required repairs or replacements should be made.
- 4. Provided that the above inspection regime is adhered to and records maintained to demonstrate that it is so, then bulk CO₂ systems may remain in service for a maximum period of 20 years without internal examination.

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