



भारत सरकार / GOVERNMENT OF INDIA
पत्तन, पोत परिवहन और जलमार्ग मंत्रालय
MINISTRY OF PORTS, SHIPPING AND WATERWAYS



नौवहन महानिदेशालय, मुंबई
DIRECTORATE GENERAL OF SHIPPING, MUMBAI

Engineering Circular No. 01 of 2022

File No. [13-16011/14/2021-O/o DGS_DGS](#)

Date: 27th, January, 2022

Subject: Corrigendum to Engineering Circular No.6 of 2013, dated 19th August 2013 (Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems)

IMO has published revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems vide MSC.1/Circ.1318/Rev.1 dated 25/05/2021 and this revised circular has superseded the MSC1/Circ.1318 dated 11/06/2009 (*referred in Engineering Circular No. 6 of 2013 dated 19th August 2013*). These revised IMO guidelines are to be complied with by all the stakeholders viz., ship owners, seafarers, shipping companies, service providers, etc.,

As a consequent to the aforesaid revision the relevant paragraphs, table (Appendix-1 and Appendix-2) and guidelines of Engineering Circular No.6 of 2013, dated 19th August 2013 are herewith replaced and they are as follows: (*The remaining guidelines /paragraphs specified in Engineering Circular No.6 of 2013 are unchanged and continue to remain in force*).

I) Paragraph 6.7 of Engineering Circular No.6 of 2013 is replaced, as follows:

6.7 Hydrostatic testing of pressure cylinders:

All pressurised cylinders carried onboard for various Fire fighting requirements shall be periodically subjected to Hydrostatic stretch test in accordance with **ISO 18119:2018** – “Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes –Periodic inspection and testing” or equivalent national or international standard as applicable.

The minimum periodicity of such testing varies according to the type / material of construction of the cylinders and carriage material, a summary of which is provided in the following table

Minimum frequency for Hydrostatic test of pressure cylinders.		
No	Type of Pressure Cylinder	Minimum frequency
1	All steel cylinders of self-contained breathing apparatus (SCBA).	Five yearly.
2	All aluminium and composite cylinders of self contained breathing apparatus (SCBA).	Five yearly.
3	All gas and water pressure cylinders of water mist, water spray and sprinkler systems	Ten yearly.
4	All powder containment vessels of Fixed dry chemical powder systems	Ten yearly.
5	Fixed CO2 System storage cylinders	Ten yearly.
6	All type of Portable/Semi-Portable/Mobile extinguisher containers except CO2 (Ref. BIS 2190:2010)	Three yearly
7	All Portable/Semi-Portable/Mobile CO2 fire extinguisher containers (Ref. BIS 2190:2010)	Five yearly.

Note:

a) The above mentioned frequency is minimum, subject to any reduced frequency as specified by applicable national / international standards or the manufacturer and to be suitably recorded in writing with justifiable reasons, by the concerned Company as defined in the ISM Code.

b) In India, all the above test facilities (except for Sr.No.6) shall be approved by the Chief Controller of Explosives (PESO) in accordance with the Gas Cylinder Rules 2016, as amended, promulgated by the GOI. Outside India, such facility shall be approved by any Recognised Organization authorized by the GOI.

II) Paragraph 8 of Engineering Circular No.6 of 2013 is replaced, as follows:

8. Fixed Gas Fire Extinguishing System:

8.1 Maintenance guideline:

8.1.1 The periodical inspection and maintenance of *Fixed Gas* Fire Extinguishing systems shall be broadly guided by the **IMO Circular MSC.1/Circ.1432**-“Revised guidelines for the maintenance and inspection of fire protection systems and appliances.”

8.1.2 However, in case of *Fixed Carbon Dioxide* Fire extinguishing systems, the **IMO Circular MSC.1/Circ.1318/Rev.1**, “Guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems” shall be additionally referred to for specific guidance.

8.2 Weekly, Monthly, Quarterly and Annual inspections & maintenance:

8.2.1 The weekly, monthly, 3-monthly and annual routine maintenance and inspections as specified in MSC.1/ Circ.1432 shall be ensured, as minimum, for all systems of Fixed Gas fire extinguishing systems, including for the Fixed CO₂ systems. This Guideline is intended to supplement the fire extinguishing system manufacturer’s approved maintenance instructions and may be performed by competent crew members.

8.2.2 However, in case of Fixed CO₂ systems, the following additional Periodic inspections / maintenance, as provided under MSC.1/Circ.1318/Rev.1 shall be undertaken by persons specially trained in the maintenance of such systems, from an authorised service agency.

8.3 Two – yearly maintenance/ inspections:

In addition to the above mentioned routine maintenance requirements, at least biennially (i.e. intervals of 2 years \pm 3 months) in passenger ships or at each intermediate / **periodical or renewal Safety equipment (SEQ)** survey in cargo ships, the following maintenance should be carried out (to assist in carrying out the recommended maintenance, examples of service charts are set out in the **Appendix-2**):

- 8.3.1 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;
- 8.3.2 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 blowing dry air or nitrogen from test cylinders or suitable means through the piping

8.4 Five -yearly maintenance / inspections:

In addition to the above, at least biennially (intervals of 2 years \pm 3 months) in passenger ships or at each **renewal Safety Equipment (SEQ)** survey in cargo ships, the following maintenance should be carried out by service technicians/specialists trained to standards accepted by the Administration:

- 8.4.1 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. 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, move freely and, do not require excessive amount of travel to activate the system;
- 8.4.2 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 necessary 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

- 8.4.3 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.

8.5 Ten-yearly maintenance/ inspections:

- 8.5.1** 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. *Before the 20-year anniversary and every 10-year anniversary thereafter, all cylinders should be subjected to a hydrostatic test. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are removed for testing, the cylinders should be replaced such that the quantity of fire-extinguishing medium continues to satisfy the requirements of 2.2.1 of chapter 5 of the FSS Code, subject to SOLAS regulation II-2/14.2; and*

- 8.5.2 Hydrostatic testing for the fixed CO₂ system shall be carried out at test facilities approved by the Chief Controller of Explosives (PESO) in accordance with the Gas Cylinder Rules 2016, as amended, and as promulgated by the GOI. The hydrostatic test certificate shall be issued by the test facility (PESO approved) that actually carried out the hydrostatic test. The hydrostatic test shall be witnessed and hydrostatic test certificate shall be endorsed by a Surveyor of the Administration or Recognized Organisation and the “Competent Person”. This Hydrostatic test shall not be carried out on board ship;

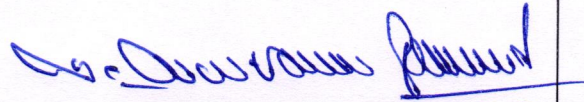
- 8.5.3 Test certificates, duly endorsed by the concerned surveyor must be provided and kept on board for inspections. Test date and pressure must be stamped on each bottle.
- 8.5.4 As discussed and agreed during the meeting conducted on 21/08/2020 with stakeholders, a video recording of five years' and ten years' maintenance of Fire fighting appliance are to be kept readily available at Fire Fighting Appliance servicing station. Such video recording may be verified by the surveyor during next inspection by MMD/DGS.
- 8.5.5 Ships of 10 years or older coming into Indian flag will be required to carry this test at the next scheduled dry-docking.
- 8.5.6 All Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years;
- 8.5.7 All discharge pipe lines shall be tested to a pressure of a maximum working pressure of the respective sections or as specified by the manufacturer, whichever is higher.

III). The Table showing the periodicity of various on board maintenance and inspection of Fire Protection System and Appliances is attached as **Appendix-1**; Example of service charts are attached as **Appendix-2**.

(Note: These requirements shall not override if the manufacturers prescribes more stringent maintenance plan).

IV). DGS Certificate of Registration issued to the FFA servicing stations does not absolve them from obtaining necessary licence/permission under any other statues / national regulations like the Petroleum and Explosives Safety Organization (PESO) (formerly known as Department of Explosives). It is to be noted that the PESO issues licence for filling of compressed gas in cylinders (CO₂/Air/ Nitrogen, etc.); licence to store compressed gas in cylinders and permission for periodic examination and testing (hydrostatic test) of gas cylinders and such requirements are to be complied with.

This circular is issued with the approval of the competent authority and comes into effect from the date of issue of this circular.



(A. Srinivasa Prasad)
E&SS-cum-Dy. DG (Tech)

To,
All stakeholders (viz., ship owners, seafarers, shipping companies, service providers, etc.,) through DGS Website.

Appendix-1

On-board Maintenance and Inspection of Fire Protection System and Appliances							
Fire Protection System or Appliance	Intervals						
	Weekly	Monthly	3-Monthly	Annually	2-Yearly	5-Yearly	10-Yearly
Breathing Apparatus (MSC Circ. 1432)	X			X		X	
Emergency Escape Breathing Devices (EEBD) (MSC Circ.1432)	X			X			
Fire Doors (MSC Circ. 1432)	X		X	X			
Fire Mains, fire pumps, hydrants, hoses and nozzles (MSC Circ. 1432)		X	X	X			
Fire-fighters' Outfits (MSC Circ. 1432)		X					
Fixed Carbon Dioxide (CO ₂) Fire Extinguishing Systems (MSC Circ. 1318/Rev.1)		X		X	X	X	X
Other fixed Gas Fire-Extinguishing Systems (MSC Circ. 1432)	X	X		X	X	X	X
Fixed aerosol Extinguishing Systems		X		X			X
Fixed Dry Chemical Powder Fire-Extinguishing Systems (MSC Circ. 1432)		X		X	X		X
Fixed Fire Detection and Fire Alarm Systems (MSC Circ. 1432)	X	X		X			
Fixed Foam Fire-Extinguishing Systems (MSC Circ. 1432)		X	X	X		X	
Gallery and deep fat cooking fire-extinguishing systems (MSC Circ. 1432)				X			
Low Location Lighting (LLL) Systems (MSC Circ. 1432)	X					X	
Portable Fire-Extinguishers (Res. A. 951(23))				X		X	X
Portable Foam Applicators (MSC Circ. 1432)		X		X			
Public address and general alarm systems (MSC Circ. 1432)	X						
Ventilation systems and fire dampers (MSC Circ. 1432)			X	X			
Water mist, water spray and sprinkle systems (MSC Circ. 1432)	X	X		X		X	X
Wheeled (mobile) Fire-Extinguishers (MSC Circ.1432)		X		X		X	X

Appendix-2

EXAMPLE SERVICE CHARTS

HIGH PRESSURE CO2 SYSTEM

Date:	Name of ship/unit:	IMO No:	
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Technical description

No.	Text	Value
1.	Manufacturer	
2.	Number of main cylinders	
3.	Main cylinders capacity (each)	
4.	Number of pilot cylinders	
5.	Pilot cylinders capacity (each)	
6.	Number of distribution lines	
7.	Oldest cylinder pressure test date	
8.	Protected space (s)	
9.	Date flexible hoses fitted/renewed	

Description of inspection/Tests

No.	Description	Carried Out	Not Carried Out	Not applicable	Comment
1	Release controls and distribution valves secured to prevent accidental discharge				
2	Contents in main cylinders checked by weighing				
3	Contents in main cylinders checked by liquid level indicator				
4	Contents of pilot cylinders checked				
5	All cylinder valves visually inspected				
6	All cylinder clamps and connections checked for tightness				
7	Manifold visually inspected				
8	Manifold tested for leakage, by applying dry working air				
9	Main valve and distribution valves visually inspected				
10	Main valve and distribution valves tested for operation				

11	Time delay devices tested for correct setting*				
12	Remote release system visually inspected				
13	Remote release system tested				
14	Servo tubing/pilot lines pressure tested at maximum working pressure and checked for leakages and blockage				

15	Manual pull cables, pulleys, gang releases tested, serviced and tightened/adjusted as necessary				
16	Release stations visually inspected				
17	Warning alarms (audible/visual) tested				
18	Fan stop tested*				
19	10% of cylinders and pilot cylinder/s pressure tested every 10 years. All cylinders and pilot cylinder/s pressure tested before the 20-year anniversary and every 10-year anniversary thereafter				
20	Internal inspection of all control valves performed at least once every five years				
21	Distribution lines and nozzles blown through, by applying dry working air				
22	All doors, hinges and locks inspected*				
23	All instruction and warning signs on installation inspected				
24	All flexible hoses renewed and check valves in manifold visually inspected every 10 years				
25	Release controls and distribution valves reconnected and system put back in service				
26	Inspection date tags attached				

*If fitted as part of the CO2 system

LOW PRESSURE CO2 SYSTEM

Date:	Name of ship/unit:	IMO No.:	
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Technical description

No	Text	Value
1	Manufacturer	
2	No. of tanks	
3	Tank capacity (tonnes)	

4	Number of pilot cylinders	
5	Pilot cylinder capacity (each)	
6	Number of distribution lines	
7	Protected space (s)	

Description of inspection/Tests

No.	Description	Carried out	Not carried out	Not applicable	Comment
1	Tank main service valve closed and secured to prevent accidental discharge				
2.	Distribution valves verified closed				
3	Check correct function of level indicator				
4	Contents of CO ₂ tank checked by tank level indicator				
5	Contents of CO ₂ tank checked by riser tube reading				
6	Contents of CO ₂ tank checked by level control valve				
7	Supports of tank inspected				
8	Insulation on tank inspected				
9	Safety valves of tank inspected				
10	Safety valves of tank tested				
11	Contents of pilot cylinders checked				
12	Start/stop function of cooling compressors tested				
13	All connected electrical alarms and indicators tested				
14	Main manifold valve inspected				
15	Internal inspection of all control valves performed at least once every five years				
16	Main manifold valve tested				
17	Distribution valves inspected				
18	Distribution valves tested				
19	Release stations inspected				
20	Total flooding release mechanism inspected				
21	Total flooding release mechanism tested				
22	Time delay devices tested for correct setting*				
23	Warning alarms tested				
24	Fan stop tested*				
25	Distribution lines and nozzles inspected				
26	Distribution lines and nozzles tested				

27	Distribution lines and nozzles blown through				
28	All doors, hinges and locks inspected*				
29	All instruction plates inspected				
30	Tank main service valve reopened and secured open				
31	System put back in service				
32	Inspection date tags attached				

*If fitted as part of the CO2 system