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SHIP SYSTEMS AND EQUIPMENT

Comments on document MSC 112/9 relating to the revision of MSC.1/Circ.1318/Rev.1

Submitted by China, Panama, IACS, ICS and INTERCARGO

SUMMARY

Executive summary:	This document provides comments on paragraph 3.2 of document MSC 112/9 relating to the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (i.e. the revision of MSC.1/Circ.1318/Rev.1) to ensure consistent implementation and avoid unintended regulatory consequences.
Strategic direction, if applicable:	7
Output:	7.25
Action to be taken:	Paragraph 21
Related documents:	SSE 12/21; MSC 112/9; resolution A.1207(34); MSC-MEPC.1/Circ.5/Rev.7 and MSC.1/Circ.1318/Rev.1

Introduction

1 The document is submitted in accordance with paragraph 6.12.5 of MSC-MEPC.1/Circ.5/Rev.7 on the *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* and provides comments on documents SSE 12/21 and MSC 112/9 relating to the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems*.

Background

2 SSE 12 developed and finalized the revision of MSC.1/Circ.1318/Rev.1, as found in annex 1 to document SSE 12/21, to clarify the testing and inspection provisions for CO_2 cylinders and other components of fixed CO_2 fire-extinguishing systems. If approved by the Committee at this session, the revised guidelines are expected to be applied from mid-December 2027 (i.e. 12 months after the approval) for inspections of fixed CO_2 fire-extinguishing systems.

Interval of hydrostatic tests for high-pressure CO_2 cylinders

3 Draft amendments to paragraph 6.1.2 of the annex to MSC.1/Circ.1318/Rev.1 state as follows:

"6.1 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each periodical and~~or~~ renewal survey[1] 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 the hydrostatic test date of all high-pressure cylinders (including pilot cylinder) ~~storage containers~~ should be checked~~.~~ and the ~~H~~high-pressure cylinders (including pilot cylinder) should be subjected to periodical tests ~~at intervals not exceeding 10 years~~. At the 10-year anniversary[2] inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test.[3] 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[2] ~~and every 10-year anniversary thereafter~~, all cylinders should be subjected to a hydrostatic test at least once after installation. Thereafter, each cylinder should be subjected to periodical hydrostatic tests at intervals not exceeding 10 years from the date of previous test. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are tested and replaced ~~removed for testing~~, the re-installed 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~~

1 Refer to the *Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2025* (resolution A.1207(34)), as amended.

2 "Anniversary" means the date corresponding to the manufacturing date of the cylinder(s).

3 Refer to standard ISO 18119:2018 – Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing."

4 Under the existing paragraph 6.1.2 of the annex to MSC.1/Circ.1318/Rev.1, at least 10% of the high-pressure CO_2 cylinders are required to undergo internal inspection and hydrostatic testing at the 10-year anniversary, while all cylinders not previously tested are required to undergo hydrostatic testing before the 20-year anniversary. In practice, the 10-year and 20-year inspections could be aligned with a ship's second and fourth renewal surveys, respectively, since the term "anniversary" was not clearly defined. To address this lack of clarity, some flag Administrations have permitted hydrostatic testing to be aligned with a ship's renewal survey, provided that the CO_2 cylinders were manufactured or previously hydrostatically tested within a specified period before completion of the ship's initial survey. By contrast, the draft amendments to paragraph 6.1.2 introduce a definition of "anniversary" based on the manufacturing date of the cylinder or cylinders, without providing equivalent flexibility.

5 In view of paragraph 4 above, the hydrostatic tests of onboard high-pressure CO_2 cylinders should be carried out initially at the 10-year anniversary inspection and before the 20-year anniversary inspection based on the manufacturing date of the cylinders; and thereafter should be subject to periodical hydrostatic tests at an interval not exceeding 10 years from the previous one.

6 In addition, while such tests need not be aligned with renewal surveys for passenger ships, they should be performed at the time of periodical and renewal surveys for cargo ships. In this regard, it should be noted that, in accordance with SOLAS regulation I/8(b)(i) and the HSSC Survey Guidelines, as amended by resolution A.1207(34), the confirmation of fixed carbon dioxide fire-extinguishing systems for cargo ships is classified as the survey item under the cargo ship safety equipment certificate, whereby the term "periodical survey" means the surveys conducted within three months before and after the second or third anniversary date after an initial survey or a renewal survey.

7 Based on paragraphs 5 and 6 above, the hydrostatic tests for high-pressure CO_2 cylinders on cargo ships would need to be scheduled so as to satisfy both the maximum 10-year testing interval and the applicable periodical or renewal survey windows.

8 Having considered the draft amendments to paragraph 6.1.2, the co-sponsors have identified two concerns that may impose substantial burdens on shipowners, operators and Administrations. The first concerns the interpretation of the words "At the 10-year anniversary" in the draft revised paragraph 6.1.2. Where the CO_2 cylinders were manufactured more than three months before completion of the ship's initial survey, the 10-year anniversary may fall outside both the applicable periodical survey window and the subsequent renewal survey window. Although the draft text does not expressly specify the survey at which the inspection should be completed in such circumstances, the requirement that the testing interval should not exceed 10 years would preclude deferral until the subsequent renewal survey. Consequently, the inspection would have to be brought forward and completed in conjunction with the preceding periodical survey, as illustrated in figure 1 below.

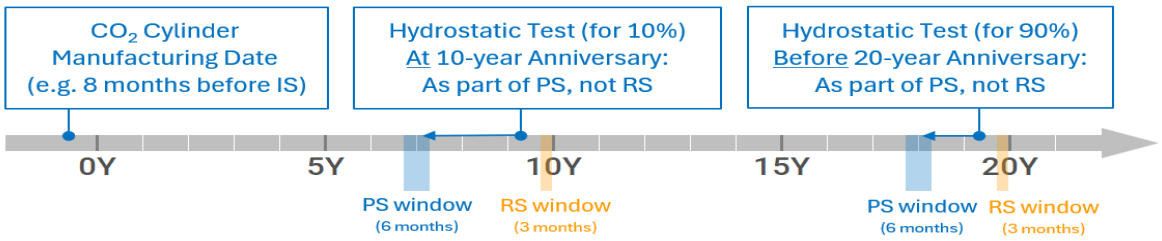


Figure 1 – Alignment of the 10-year anniversary inspection and 20-year anniversary inspection with a ship's periodical survey or renewal survey

9 The second concern is the resulting reduction in the actual interval between hydrostatic tests. Where the tests are repeatedly brought forward to align with the applicable survey windows, the practical testing interval for cargo ships may be reduced to substantially less than 10 years, potentially to as little as 6.75 years. One of the most onerous scenarios is illustrated in figure 2 below.

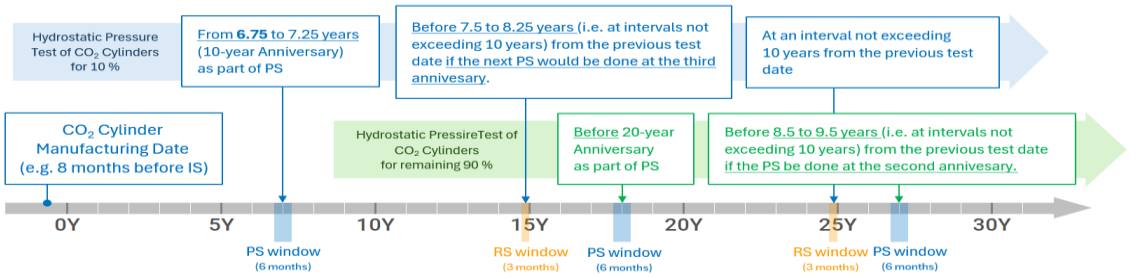


Figure 2 – Example of a shortened hydrostatic testing interval

10 In this regard, it is observed that the HSSC Survey Guidelines, as amended by resolution A.1207(34), do not identify the hydrostatic testing of high-pressure CO_2 cylinders for fixed fire-extinguishing systems as a survey item under the cargo ship safety equipment certificate. Rather, such testing is normally undertaken ashore by service suppliers or specialist facilities independent of the conduct of statutory surveys.

11 The co-sponsors therefore consider that linking the hydrostatic testing requirements in paragraph 6.1.2 to the timing of periodical and renewal surveys may not be necessary to achieve the safety objectives of the revised guidelines. Furthermore, such linkage appears inconsistent with the corresponding survey scope under the cargo ship safety equipment certificate and could result in unintended implementation difficulties, including a substantial reduction in the practical interval of hydrostatic testing for cargo ships. Accordingly, the matter should be carefully considered before approval of the revision of MSC.1/Circ.1318/Rev.1.

Working pressure test of pressure relief valves fitted in closed piping

12 Paragraph 2.1.2.4 of chapter 5 of the FSS Code specifies as follows:

> "2.1.2.4 In piping sections where valve arrangements introduce sections of closed piping, such sections shall be fitted with a pressure relief valve and the outlet of the valve shall be led to open deck."

13 In practice, approved fixed CO_2 fire-extinguishing systems may be fitted with different types of pressure-relief arrangements, including reusable pressure relief valves (figure 3) and non-reclosing pressure-relief devices incorporating bursting discs (figure 4), which require replacement after activation.

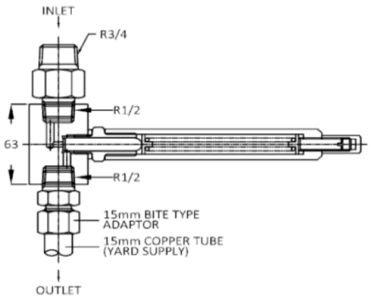


Figure 3 – Reusable PRV

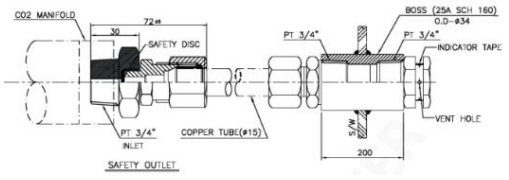


Figure 4 – Disposable PRV

14 However, draft new paragraph 6.1.4 of the annex to MSC.1/Circ.1318/Rev.1, as quoted below, requires a working pressure test of pressure relief valves. As currently drafted, paragraph 6.1.4 may not be suitable for non-reclosing pressure-relief devices incorporating bursting discs (figure 4), since the prescribed pressure test could activate or damage such devices and necessitate their replacement.

> "6.1 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each periodical and~~or~~ renewal survey[1] 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):
>
> …
>
> .4 the pressure relief valve fitted in sections of closed piping should undergo working pressure test, to satisfy the requirements of 2.1.2.4 of chapter 5 of the FSS Code."

15 Paragraph 2.1.2.4 of chapter 5 of the FSS Code requires sections of closed piping to be protected by a pressure relief valve but does not prescribe a working pressure test as the means of verifying its continued functionality. In this regard, the co-sponsors conducted an industry survey among specialist service suppliers, the results of which are available at the following summary link: Industry Survey on Working Pressure Tests of PRVs in Fixed CO_2 Fire-Extinguishing Systems. The survey identified practical difficulties arising from the application of a single test requirement to different types and arrangements of pressure relief devices, as summarized below.

16 A working pressure test may activate or damage a non-reclosing pressure relief device incorporating a bursting disc, thereby requiring replacement of the bursting disc or the complete device solely as a consequence of the test. The suitability of dismantling, inspecting, reassembling or reusing such devices also depends on their design and the manufacturer's instructions. Consequently, the indiscriminate application of a working pressure test to non-reclosing devices could result in unnecessary replacement, difficulties in sourcing suitable parts and increased servicing time and cost without providing a consistently reliable means of verifying their condition.

17 For reusable pressure relief valves, a working pressure test generally requires the valve or the relevant piping section to be removed or safely isolated and tested using suitable equipment and procedures. Testing the valve in its installed condition may expose cylinder discharge heads or other system components to the test pressure, particularly where non-return valves are not fitted, with a consequent risk of damage or an uncontrolled release of CO_2. Removal and reinstallation may also disturb connections or seals, requiring subsequent leakage testing and verification that the system has been safely restored. However, draft paragraph 6.1.4 does not specify the intended test arrangement, applicable test pressure and acceptance criteria, verification of opening and reseating, or post-test restoration requirements.

Proposals

18 Taking into account paragraphs 3 to 11, the co-sponsors invite the Committee to clarify that the inspections and hydrostatic tests currently set out in paragraph 6.1.2 should be completed within the prescribed intervals but need not coincide with a ship's periodical or renewal survey, and that the relevant test dates and records should be verified during the applicable surveys.

19 Should the Committee agree with this approach, the co-sponsors propose that paragraph 6.1.2 be limited to the verification of the relevant test dates and records, and that the substantive requirements for internal inspection and hydrostatic testing be relocated to a new section 8 entitled "Ten-yearly service", as set out in this document.

20 To address the practical implications discussed in paragraphs 12 to 15, the co-sponsors propose that draft new paragraph 6.1.4 be deleted. Should the Committee not agree to its deletion, the co-sponsors propose, as an alternative, that draft new paragraph 6.1.4 be amended as set out in the annex to this document, while noting that deletion remains their preferred option.

Action requested of the Committee

21 The Committee is invited to consider the proposals in paragraphs 18, 19, and 20 above, and take action, as appropriate.

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ANNEX

Proposals to further modify draft amendments to 6.1.2, 6.1.4, 6.1.5 and to establish new section 8

1 Draft amendments to paragraph 6.1.2, 6.1.4 and 6.1.5 to be further modified as follows:

"6.1 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each periodical and renewal survey[1] 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):

… omitted …

.2 the hydrostatic test date and records of all high-pressure cylinders (including pilot cylinder) should be checked;

… omitted …

.4 the reusable pressure relief valve if fitted in sections of closed piping should undergo a working pressure test, to satisfy the requirements of 2.1.2.4 of chapter 5 of the FSS Code; and

.5 the condition of non-reclosing pressure relief valves, if fitted in sections of closed piping, should be verified in accordance with the manufacturer's instructions, without subjecting the devices to a test that would activate or damage them. If non-destructive tests may not be possible, the non-closing pressure relief valves or their components should be replaced as appropriate.

1 Refer to the *Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2025* (resolution A.1207(34)), as amended."

2 Draft new section 8 to be added as follows:

"**8 Ten-year service**

High-pressure cylinders (including pilot cylinders) should be subjected to periodical tests. At the 10-year anniversary[2] inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test.[3] 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[2], all cylinders should be subjected to a hydrostatic test at least once after installation. Thereafter, each cylinder should be subjected to periodical hydrostatic tests at intervals not exceeding 10 years from the date of the previous test. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are tested and replaced, the re-installed cylinders should be 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.

2 "Anniversary" means the date corresponding to the manufacturing date of the cylinder(s).

3 Refer to standard ISO 18119:2018 – Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing."