AMENDMENTS TO THE REVISED GUIDELINES FOR THE MAINTENANCE AND INSPECTION OF FIRE PROTECTION SYSTEMS AND APPLIANCES (MSC.1/CIRC.1432)

1 The Maritime Safety Committee, at its ninety-fifth session (3 to 12 June 2015), approved amendments to the Revised guidelines for the maintenance and inspection of fire protection systems and appliances (MSC.1/Circ.1432), as set out in the annex, concerning testing of automatic sprinkler systems, prepared by the Sub-Committee on Ship Systems and Equipment, at its second session.

2 Member Governments are invited to use the amendments when applying MSC.1/Circ.1432 and to bring the amendments to the attention of ship designers, shipyards, shipowners, systems manufactures and all parties concerned.

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ANNEX

AMENDMENTS TO THE REVISED GUIDELINES FOR THE MAINTENANCE AND INSPECTION OF FIRE PROTECTION SYSTEMS AND APPLIANCES (MSC.1/CIRC.1432)

1 Paragraph 3.4 is amended to read as follows:

"3.4 In addition to the onboard maintenance and inspections stated in these guidelines, manufacturer's maintenance and inspection guidelines should be followed. The quality of water in automatic sprinkler systems is of particular importance and should be maintained in accordance with manufacturer guidelines. Records of water quality should be maintained on board in accordance with the manufacturer's guidelines."

2 A new paragraph 6.5 is added after the existing paragraph 6.4, as follows:

"6.5 Water mist, water spray and sprinkler systems

Assess system water quality in the header tank and pump unit against the manufacturer's water quality guidelines."

3 Paragraph 7.5 is amended to read as follows:

"7.5 Water mist, water spray and sprinkler systems

.1 verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;
.2 visually inspect all accessible components for proper condition;
.3 externally examine all high pressure cylinders for evidence of damage or corrosion;
.4 check the hydrostatic test date of all high pressure cylinders;
.5 functionally test all fixed system audible and visual alarms;
.6 flow test all pumps for proper pressure and capacity;
.7 test all antifreeze systems for adequate freeze protection;
.8 test all system cross connections to other sources of water supply for proper operation;
.9 verify all pump relief valves, if provided, are properly set;
.10 examine all filters/strainers to verify they are free of debris and contamination;
.11 verify all control/section valves are in the correct position;"
.12 blow dry compressed air or nitrogen through the discharge piping of dry pipe systems, or otherwise confirm the pipework and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable;

.13 test emergency power supply switchover, where applicable;

.14 visually inspect all sprinklers focusing in areas where sprinklers are subject to aggressive atmosphere (like saunas, spas, kitchen areas) and subject to physical damage (like luggage handling areas, gyms, play rooms, etc.) so that all sprinklers are inspected within one year. Sprinklers with obvious external damage, including paint, should be replaced and not included in the number of sprinklers tested in subparagraph .17;

.15 check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;

.16 test a minimum of one section in each open head water mist system by flowing water through the nozzles. The sections tested should be chosen so that all sections are tested within a five-year period;

.17 test automatic sprinklers and automatic water mist nozzles in accordance with the following flow chart:
Part 1 - Basic Testing

Start

Has the Automatic Sprinkler System been installed on the ship for 5 years or more?

Yes

Functional test\(^1\) of 2 randomly selected sprinkler heads/nozzles of each type\(^2\) installed on board.

Did one or more sprinkler heads/nozzles fail?

Yes

For each type\(^2\) of sprinkler head/nozzle installed on board functional test\(^1\) of 2 randomly selected sprinklers heads/nozzles per section in 10 sections (20 sprinkler heads/nozzles in total).

Are there any sections where both sprinkler heads/nozzles tested failed?

Yes

For the sections where both sprinkler heads/nozzles tested failed undertake additional testing of a further 10 sprinkler heads/nozzles per affected section.

No

For each type tested did 3 or more out of 20 sprinkler heads/nozzles fail? (i.e. failure rate, \(R_{FB} \geq 15\%\))

Yes

Replace all sprinkler heads/nozzles in Sections which failed and commission as necessary.

No

Are there any sections where 2 or more of the additional sprinkler heads/nozzles tested failed?

Yes

Extended testing of these sections is not required.

No

No further action required, situation will be monitored at next Annual Survey.

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\(^1\) Functional test

\(^2\) Each type
Part 2 - Extended testing

For each type that has failed Basic testing obtain the Failure rate, R_{FB}.

### Extended testing Case 1
(for failure rates between \( R_{FB} \leq 20\% \))

Function test 2 randomly selected sprinklers per sprinkler section. Sprinkler sections should be selected as follows:
- If number of sections <20, test all sections;
- If number of sections is between 20 and 40, test 20 sections;
- If number of sections >40, test 50\% of the sections.

**AND**

Are there any sections where both sprinkler heads/nozzles tested failed?

**Yes**

- For the sections where both sprinkler heads/nozzles tested failed undertake additional function testing of a further 10 sprinkler heads/nozzles per affected section.

**Yes**

- Are there any sections where 2 or more of the additional sprinkler heads/nozzles tested failed?

**Yes**

- For any section with a type failure rate greater than 10\% replace all sprinkler heads/nozzles of this type.

**No**

- No further action required, situation will be monitored at next Annual Survey.

**No**

- Are there any sections with a failure rate >15\%?

**Yes**

- If the number of sprinkler heads/nozzles tested in any particular section represents less than 10\% of all sprinkler heads/nozzles installed in this section a decision may be to conduct further function testing limited to 30\% of the total number of sprinkler heads/nozzles in that section and the results can be reassessed with all sprinkler heads/nozzles tested in that section being considered.

**Yes**

- After further testing are there any sections with a type failure rate >15\%?

**Yes**

- For any section with a type failure rate greater than 15\% replace all sprinkler heads/nozzles of this type. Remaining sections will be monitored at next Annual Survey.

**No**

- Extended testing Case 2
(for failure rates above 20\%)

Function test 7 randomly selected sprinklers from each sprinkler section. All sprinkler sections to be tested except where the decision has been made to replace all sprinklers at this stage.

**AND**

Did ≥10\% of all sprinkler heads/nozzles tested fail?

**Yes**

- Are there any sections where both sprinkler heads/nozzles tested failed?

**Yes**

- For each type that has failed Basic testing obtain the Failure rate, R_{FB}.

**No**

- Are there any sections with a failure rate >15\%?

**Yes**

- If the number of sprinkler heads/nozzles tested in any particular section represents less than 10\% of all sprinkler heads/nozzles installed in this section a decision may be to conduct further function testing limited to 30\% of the total number of sprinkler heads/nozzles in that section and the results can be reassessed with all sprinkler heads/nozzles tested in that section being considered.

**No**

- Are there any sections with a type failure rate >15\%?

**No**

- For any section with a type failure rate greater than 15\% replace all sprinkler heads/nozzles of this type. Remaining sections will be monitored at next Annual Survey.
Explanatory notes to the flow chart

1. **Functional test** is defined as a test that demonstrates the operation and flow of water from sprinkler head/nozzle.

2. **Type** is defined as each different manufacturer model of sprinkler head/nozzle.

3. **Static/standby pressure** is defined as the constant pressure maintained in the system at all times prior to activation.

4. All testing should be carried out at static/standby pressure.

5. **Failure rate** ($R_{FB}$) is the number of sprinkler heads/nozzles to fail testing divided by test sample size multiplied by 100; and

   during basic testing, and extended testing when applicable, of automatic sprinkler heads/nozzles as outlined in subparagraph .17, water quality testing should be conducted in each corresponding piping section. Note – should a tested sprinkler fail, assessing the corresponding water quality at that time would assist in determining the cause of failure.

4. Paragraph 9.3 is replaced by the following:

   "9.3 Water mist, water spray and sprinkler systems

   .1 flush all ro-ro deck deluge system piping with water, drain and purge with air;

   .2 perform internal inspection of all control/section valves; water quality testing should be conducted in all corresponding piping sections, if not previously tested as outlined in paragraph 7.5.18 within the last five years;

   .3 check condition of any batteries, or renew in accordance with manufacturer's recommendations; and

   .4 for each section where the water is refilled after being drained or flushed, water quality should meet manufacturer's guidelines. Testing of the renewed water quality should be conducted and recorded as a new baseline reference to assist future water quality monitoring for each corresponding section."

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