
**Ships and marine technology —
Lifesaving and fire protection — Point-
type resettable flame detectors for
ships**

*Navires et technologie maritime — Sauvetage et protection contre le
feu — Détecteurs de flamme ponctuels réglables pour navires*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Lifesaving and fire protection*.

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Introduction

The 1974 International Convention for the Safety of Life at Sea (SOLAS 1974), as amended, and its associated International Code for Fire Safety Systems (FSS Code) require certain ships to be fitted with fixed fire detection and fire alarm systems, and provide general requirements for such systems.

This International Standard has been developed to supplement the provisions of SOLAS 1974 and the FSS Code by specifying detailed performance criteria and test methods for point-type resettable flame detectors for use in fire detection on ships.

This International Standard has been prepared by Sub-committee ISO/TC 8/SC 1 for point-type, resettable flame detectors on board ships to replace Annex A of ISO 7240-10:2007. This International Standard is based on the performance standards for terrestrial flame detectors in ISO 7240-10 and provides alternative requirements for flame detectors for use in marine applications.

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Ships and marine technology — Lifesaving and fire protection — Point-type resettable flame detectors for ships

1 Scope

This International Standard specifies requirements, test methods, and performance criteria for point-type, resettable flame detectors that operate using radiation from a flame, for use in fire detection systems installed on ships. This International Standard references ISO 7240-10 for requirements common to both terrestrial and marine applications and adds the requirements applicable to installations in the shipboard environment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7240-1, *Fire detection and alarm systems — Part 1: General and definitions*

ISO 7240-10:2012, *Fire detection and alarm systems — Part 10: Point-type flame detectors*

IEC 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests — Test B: Dry heat*

IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

IEC 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*

IEC 60068-2-52, *Environmental testing — Part 2-52: Tests — Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 61000-4-2, *Ed. 1.2:2001 (b) Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test*

IEC 61000-4-6:2006, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields*

CISPR 16-1, *Specification for radio disturbance and immunity measurement apparatus and methods — Part 1-1: Radio disturbance and immunity measuring apparatus — Measuring apparatus*

CISPR 16-2, *Specification for radio disturbance and immunity measurement apparatus and methods — Part 2-1: Methods of measurement of disturbance and immunity — Conducted disturbance measurements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7240-1 and ISO 7240-10 apply.

4 General requirements

The apparatus shall comply with all of the requirements of ISO 7240-10:2012 with the exception of 5.7 to 5.17 and Annex D. In lieu of 5.7 to 5.17 of ISO 7240-10:2012, point-type flame detectors for ships shall meet the requirements of [Clause 5](#) of this International Standard.

5 Marine test requirements

5.1 General

Flame detectors classified for marine applications shall be tested according to the test schedule specified in [Table 1](#).

Table 1 — Test schedule for marine applications

Test	Subclause	Specimen number(s)
Reproducibility	ISO 7240-10:2012, 5.2	All specimens
Repeatability	ISO 7240-10:2012, 5.3	1
Directional dependence	ISO 7240-10:2012, 5.4	1
Fire sensitivity	ISO 7240-10:2012, 5.5	All specimens
Dazzling (operational)	ISO 7240-10:2012, 5.6	1
Dry heat (operational)	ISO 19292:2014 5.2	2
Cold (operational)	ISO 19292:2014 5.3 https://standards.iteh.ai/catalog/standards/sist/73e3fe5-4b11-4c97-8e7b-605af5a02072/iso-19292-2014	2
Damp heat	ISO 19292:2014 5.4	6
Salt mist	5.5	5
Vibration, sinusoidal (operational)	5.6	4
High voltage	5.7	7
Variation in supply parameters	5.8	1
Electrical power-supply failure	5.9	1
Insulation resistance ^a	5.10	2, 6
Electrostatic discharge immunity	5.11	1
Radiated radio-frequency immunity	5.12	3
Conducted low-frequency immunity	5.13	3
Conducted high-frequency immunity	5.14	3
Burst/fast response transient immunity	5.15	3
Surge immunity	5.16	8
Radiated emission	5.17	1

^a Measurements shall be performed before and after the relevant environmental tests.

5.2 Dry heat (operational)

5.2.1 Object of test

The object of the test is to demonstrate the ability of the specimen to function correctly at high ambient temperatures appropriate to the anticipated service environment.

5.2.2 Test procedure and apparatus

5.2.2.1 General

The test apparatus and procedure specified in IEC 60068-2-2, Test Bb, and by 5.2.2.2 to 5.2.2.4 below shall be used.

5.2.2.2 State of the specimen during conditioning

Mount the specimen as specified in ISO 7240-10:2012, 5.1.3 and connect it to supply and monitoring equipment as specified in ISO 7240-10:2012, 5.1.2.

5.2.2.3 Conditioning

Apply the following conditioning:

- temperature: Starting at an initial air temperature of (23 ± 5) °C, increase the air temperature to (70 ± 2) °C;
- duration: Maintain the temperature for 2 h.

NOTE Test Bb specifies rates of change of temperature of ≤ 1 °C/min for the transitions to and from the conditioning temperature.

5.2.2.4 Measurements during conditioning

Monitor the specimen during the conditioning period to detect any alarm or fault signals. During the last 30 min of the conditioning, subject the specimen to the reduced functional test in accordance with ISO 7240-10:2012, 5.1.7.

5.2.2.5 Final measurements

After the recovery period of at least 1 h at standard atmospheric conditions, measure the response point of the specimen in accordance with ISO 7240-10:2012, 5.1.6.

Designate the greater of the response points measured in this test and that measured for the same specimen in the reproducibility test as D_{\max} and the lesser as D_{\min} .

5.2.3 Requirements

No alarm or fault signals shall be given during the transition to the conditioning temperature or during the conditioning.

The specimen shall give an alarm signal in response to the reduced function test.

The ratio point values $D_{\max} : D_{\min}$ shall be not greater than 1,26.

5.3 Cold (operational)

5.3.1 Object of test

The object of the test is to demonstrate the ability of the specimen to function correctly at low ambient temperatures appropriate to the anticipated service temperature.

5.3.2 Test procedure

5.3.2.1 Reference

The test apparatus and procedure specified in IEC 60068-2-1, Test Ab, and by [5.3.2.2](#) to [5.3.2.4](#) below shall be used.

5.3.2.2 State of the specimen during conditioning

Mount the specimen as specified in ISO 7240-10:2012, 5.1.3 and connect it to supply and monitoring equipment as specified in ISO 7240-10:2012, 5.1.2.

Measure insulation resistance as specified in [5.10.2.3](#).

5.3.2.3 Conditioning

Apply the following conditioning:

- temperature: $(5 \pm 3) ^\circ\text{C}$;
- duration: 2 h.

For detectors intended for installation on open decks or exposure to the outside weather, apply the following conditioning:

- temperature: $(-25 \pm 3) ^\circ\text{C}$;
- duration: 2 h.

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NOTE Test Ab specifies rates of change of temperature of $\leq 1 ^\circ\text{C}/\text{min}$ for the transitions to and from the conditioning temperature.

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5.3.2.4 Measurements during conditioning

Monitor the specimen during the conditioning period to detect any alarm or fault signals. During the last 30 min of the conditioning, subject the specimen to the reduced functional test in accordance with ISO 7240-10:2012, 5.1.7.

5.3.2.5 Final measurements

After the recovery period of at least 1 h at standard atmospheric conditions, measure the response point of the specimen in accordance with ISO 7240-10:2012, 5.1.6.

Designate the greater of the response points measured in this test and that measured for the same specimen in the reproducibility test as D_{max} and the lesser as D_{min} .

Measure insulation resistance as specified in [5.10.2.3](#).

5.3.3 Requirements

No alarm or fault signals shall be given during the transition to or the period at the conditioning temperature.

The specimen shall give an alarm signal in response to the reduced functional test.

The ratio $D_{\text{max}} : D_{\text{min}}$ shall be not greater than 1,26.

The insulation resistance shall comply with [5.10.3](#).

5.4 Damp heat

5.4.1 Object of test

The object of the test is to demonstrate the ability of the specimen to function in an environment with high relative humidity where condensation on the equipment can occur.

5.4.2 Test procedure

5.4.2.1 Reference

The test apparatus and procedure specified in IEC 60068-2-30, Test Db, and by [5.4.2.2](#) to [5.4.2.4](#) below shall be used.

5.4.2.2 State of the specimen during conditioning

Mount the specimen as specified in ISO 7240-10:2012, 5.1.3.

During the first 12 h of the conditioning, connect the specimen to supply and monitoring equipment as specified in ISO 7240-10:2012, 5.1.2.

During the second 12 h of conditioning, do not supply the specimen with power.

NOTE Any self-test feature intended to monitor the transmission of the detector window can be disabled during this test.

Measure insulation resistance as specified in [5.10.2.3](#).

5.4.2.3 Conditioning

The following severity of conditioning shall be applied:

- temperature: (55 ± 2) °C;
- relative humidity: (95 ± 5) %;
- duration: 24 h;
- number of cycles: 2.

5.4.2.4 Measurements during conditioning

Monitor the specimen during the conditioning period to detect any alarm or fault signals. During the first 2 h of conditioning, subject the specimen to the reduced functional test described in ISO 7240-10:2012, 5.1.7.

During the last 2 h of conditioning, subject the specimen to the reduced functional test described in ISO 7240-10:2012, 5.1.7.

5.4.2.5 Final measurements

After the recovery period of at least 1 h at standard atmospheric conditions, measure the response point of the specimen in accordance with ISO 7240-10:2012, 5.1.6.

Designate the greater of the response points measured in this test and that measured for the same specimen in the reproducibility test as D_{\max} , and the lesser as D_{\min} .

Measure insulation resistance as specified in [5.10.2.3](#).