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Ships and marine technology — Deck covering

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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 document 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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Deck covering is a covering layer which is laid on the surface of a ship's steel deck with properties such as thermal resistance, fire resistance, vibration resistance, noise insulation and anti-skid.

In order to meet the requirements of IMO SOLAS, the decks of different spaces of ships should have certain requirements for fire-resisting division class. These requirements apply to laying deck covering.

The fire resistance capability is examined in a fire test specified in International Code for Application of Fire Test procedure (IMO FTP Code, 2010), and the acoustic insulation is specified in Code on Noise levels on Board Ships [IMO MSC.337 (91)].

This document strives to unify the requirements for production, use and inspection of deck covering for shipbuilding on a global scale and to provide technical references for shipbuilding and acceptance.

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Ships and marine technology — Deck covering

1 Scope

This document provides requirements for production, use and inspection of deck coverings for shipbuilding. This document is applicable to deck coverings (underlay, cement type). It is not applicable to overlay floor coverings such as ceramic tile, carpet and rubber sheet.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 679, *Cement — Test methods — Determination of strength*

ISO 8302, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus*

ISO 9597, *Cement — Test methods — Determination of setting time and soundness*

ISO 10140-2, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 2: Measurement of airborne sound insulation*

ISO 22262-1, *Air quality — Bulk materials — Part 1: Sampling and qualitative determination of asbestos in commercial bulk materials*

ISO 22262-3, *Air quality — Bulk materials — Part 3: Quantitative determination of asbestos by X-ray diffraction method*

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

International Convention for the Safety of Life at Sea (SOLAS), International Maritime Organization, 1974,

International Code for Application of Fire Test Procedures (FTP code), International Maritime Organization, Part 1, Part 2, Part 3 and Part 5, 2010

Code on Noise levels on Board Ships, Resolution MSC. 337(91), International Maritime Organization, 2012

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 deck covering

covering material formed by *bulk material* (3.2) cured after construction and laid on the deck of ship, with, for example, thermal resistance and anti-icing, fire resistance, vibration resistance, noise insulation or anti-skid

3.2

bulk material

material constituting *deck covering* (3.1) including organic and inorganic materials, liquid and solid materials

3.3

primary deck covering

PDC

non-flammable *deck covering* (3.1) that is laid directly on a steel deck

Note 1 to entry: It does not produce excessive smoke and toxic products at high temperature. It does not include any primers, preservatives, adhesives and interfacial agents on the steel deck.

3.4

fireproof deck covering

FDC

deck covering (3.1) with non-combustible and fire resistance which can constitute a certain fire-resisting division class

3.5

detached deck covering

DDC

floating deck covering

deck covering (3.1) with vibration resistance and noise insulation

4 Classification and construction

4.1 Classification

According to the main functional uses, deck coverings can be generally divided into primary deck coverings (PDC), fireproof deck coverings (FDC) and common detached deck coverings (DDC).

4.2 Construction

For examples of deck construction consisting of deck coverings, refer to [Annex A](#).

4.3 Materials

Deck coverings are made of bulk materials, which can be generally divided into organic and inorganic materials, liquid and solid materials. such as latex, polyester, and cement.

5 Requirements

5.1 The general performance requirements of the deck covering shall be in accordance with [Table 1](#).

Table 1 — General performance requirements of deck covering

No.	Item	Performance requirements
1	Density deviation	$\pm 10 \%$
2	Flexural strength (MPa)	≥ 3
3	Compression strength (MPa)	≥ 8
4	Initial setting time (min)	≥ 60
5	Final coagulation time (h)	≤ 24
6	Water absorption rate (%)	≤ 10
7	Oil absorption rate (%)	≤ 5
8	Thermal conductivity W/(m·K)	$\leq 1,6$
9	Impact resistance	No cracking, no shelling.
10	Vibration resistance	No cracking, no shelling.

5.2 The asbestos-free requirement of the deck covering shall meet the requirements of IMO SOLAS, 2014, chapter II-1.

5.3 The organic matter content of the deck covering shall meet the technical specification of the product.

5.4 The not-readily ignitable and low sooting flame of PDCs shall meet the requirements of IMO FTP Code, 2010, Part 5.

5.5 The smoke and toxicity of PDC shall meet the requirements of IMO FTP Code, 2010, Part 2.

5.6 The non-combustibility of FDC shall meet the requirements of IMO FTP Code, 2010, Part 1.

5.7 The fire resistance of FDC shall meet the requirements of IMO FTP Code, 2010, Part 3.

5.8 The sound insulation of DDC shall meet the requirements of IMO MSC.337(91).

6 Test methods

6.1 Sample preparation

The sample of the deck covering should be prepared in an indoor environment at room temperature of $(20 \pm 3) ^\circ\text{C}$ and relative humidity greater than 50 %. Unless otherwise noted, the sample shall be cured at room temperature $(20 \pm 3) ^\circ\text{C}$ and relative humidity greater than 90 % for 28 days.

6.2 Density

The density of the deck covering shall be tested after the mass keeps constant in an $(105 \pm 5) ^\circ\text{C}$ oven.

6.3 Flexural strength

The flexural strength of the deck covering shall be tested in accordance with ISO 679.

6.4 Compressive strength

The compressive strength of the deck covering shall be tested in accordance with ISO 679.

6.5 Initial setting time and final coagulation time

The initial setting time and final coagulation time of the deck covering shall be tested in accordance with ISO 9597.

6.6 Water absorption rate

The sample shall be weighed after the mass keeps constant in a (105 ± 5) °C oven, then immersed in (20 ± 3) °C tap water and weighed again after 24 h.

The water absorption rate of the deck covering is the arithmetic mean value of the three masses.

6.7 Oil absorption rate

The oil absorption rate of the deck covering shall be tested by using SAE 30 engine oil as an impregnating medium. The test method can be according to [6.6](#).

6.8 Thermal conductivity

The thermal conductivity of the deck covering shall be tested in accordance with ISO 8302.

6.9 Impact resistance

The impact resistance of the deck covering shall be tested by free-falling impact test on a fixed bracket 1 m above the surface of the covering with 500 g steel balls.

6.10 Vibration resistance

The vibration resistance of the deck covering shall be tested in accordance with standards recognized by ship owners and relevant stakeholders, for example IEC 60068-2-6.

6.11 Asbestos-free requirement

The asbestos-free requirement for the deck covering shall be tested in accordance with ISO 22262-1 and ISO 22262-3.

6.12 Organic matter content

The organic matter content of the deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 1.

6.13 Not readily ignitable

The not readily ignitable the of deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 5.

6.14 Low sowing flame

The low sowing flame of the deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 5.

6.15 Smoke and toxicity

The smoke and toxicity of the deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 2.

6.16 Non-combustibility

The non-combustibility of the deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 1.

6.17 Fire resistance

The fire resistance of the deck construction consisting of the deck covering shall be tested in accordance with the IMO FTP Code, 2010, Part 3.

6.18 Sound insulation index

The sound insulation index of the deck construction consisting of the deck covering shall be tested in accordance with ISO 10140-2.

7 Marking

Products which refer to this document should be marked clearly on the product, label or packaging, with the following information:

- product name or other identifying characteristic;
- name or identifying mark and address of the manufacturer or their authorized representative;
- time of production or traceability code.