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Large yachts — Strength, weathertightness and watertightness of glazed openings —

Part 1: Design criteria, materials, framing and testing of independent glazed openings

Grands yachts — Résistance, étanchéité aux intempéries et étanchéité à l'eau des ouvertures vitrées —

Partie 1: Critères de conception, matériaux, encadrement et essais des ouvertures vitrées indépendantes

Reference number
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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 12, *Ships and marine technology — Large yachts*.

This second edition cancels and replaces the first edition (ISO 11336-1:2012), which has been technically revised.

The main changes are as follows:

— the Scope has been expanded to include length, number of passengers and glazing materials;

— the design pressure model has been parameterized and adapted to cover larger yachts;

— more advanced scantling calculation methods have been added;

— a new approach on robustness of superstructure and hull glazing has been added;

— Annex H has been replaced with information on the main changes since the first edition;

— Annexes I and J have been added.

A list of all parts in the ISO 11336 series can be found on the ISO website.

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.

Large yachts — Strength, weathertightness and watertightness of glazed openings —

Part 1: Design criteria, materials, framing and testing of independent glazed openings

1 Scope

This document specifies technical requirements for independent glazed openings on large yachts, taking into account navigation conditions, the location of the opening and the materials, framing and testing.

Large yachts are yachts with length of the hull, L_H, higher or equal to 24 m, used for sport or pleasure and commercial operations.

This document is suitable for the design of glazed openings on all large yachts. However, where yachts carry more than 12 passengers, the additional requirements (set by the appropriate marine administration) for fire integrity and damage stability are outside the scope of this standard.

The opening and the associated closing appliances considered in this document are only those that are above the deepest waterline (dsw) and are critical for the ship integrity related to weathertightness and watertightness, i.e. those that can lead to ingress of water in the hull in case of rupture, dislocation or loss of the pane or its mounting. This document is related and limited to independent glazed openings in which the pane is supported solely by simple linear support at the edges. Glazing in which the rotation at the edges is constrained more than it would be by a single bond line is not covered by this document. This document, excluding annexes, is limited to glazing of any shape, which is simply supported along all edges. Horizontally positioned glazing is excluded.

NOTE This document is based on the experience of ship window and glass manufacturers, shipbuilders and authorities who apply to ships the regulations of SOLAS, as amended[7], and of the International Convention of Load Lines, as amended[6], noting the provisions by the SOLAS Protocol of 1988, Article 8, as agreed by the appropriate Marine Administration, and on the experience gained with application of the Large Commercial Yacht Code and the REG Yacht Code[16].

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 178, *Plastics — Determination of flexural properties*

ISO 1751, *Ships and marine technology — Ships' side scuttles*

ISO 3903, *Ships and marine technology — Ships' ordinary rectangular windows*

ISO 5797, *Ships and marine technology — Windows and side scuttles for fire-resistant constructions*

ISO 6345, *Shipbuilding and marine structures — Windows and side scuttles — Vocabulary*

ISO 12543-1, *Glass in building — Laminated glass and laminated safety glass — Part 1: Vocabulary and description of component parts*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 21005, *Ships and marine technology — Thermally toughened safety glass panes for windows and side scuttles*

ISO 6721-10, *Plastics — Determination of dynamic mechanical properties — Part 10: Complex shear viscosity using a parallel-plate oscillatory rheometer*

EN 1288-3, *Glass in building — Determination of the bending strength of glass — Part 3: Test with specimen supported at two points (four point bending)*

EN 1990:2008, *Eurocode — Basis of structural design*

EN 12150-1:2000, *Glass in building — Thermally toughened soda lime silicate safety glass — Part 1: Definition and description*

EN 12337-1, *Glass in building — Chemically toughened soda lime silicate safety glass — Part 1: Definition and description*

EN 13195-1, *Aluminium and aluminium alloys. Specifications for wrought and cast products for marine applications (shipbuilding, marine and offshore)*

EN 16612, *Glass in building. Determination of the lateral load resistance of glass panes by calculation*

ISO 29584, *Glass in building — Pendulum impact testing and classification of safety glass*

ISO 11336-2, *Large yachts — Strength, weathertightness and watertightness of glazed openings — Part 2: Glazed opening integrated into adjacent structure (elastically bonded to bulkhead or shell) design criteria, structural support, installation and testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6345 and the following 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
glazed opening
opening in the hull, *superstructure* (3.26) or deckhouse of a ship structure to be fitted with a transparent or translucent material

3.2
independent glazed opening
glazed opening (3.1) where the mechanical behaviour of the *pane* (3.5) can be considered independent from adjacent structure because the pane is mounted in such a way that it is isolated from deformations of the supporting structure, and the only loads on the pane are lateral pressure and effect of gravity and inertia

3.3
not independent glazed opening
glazed opening (3.1) where the mechanical behaviour of the *pane* (3.5) cannot be considered independent from adjacent structure, e.g. pane bonded directly into a seat in such a way that it is carrying in-plane loads or is subjected to out-of-plane deformations of the supporting structure