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Small craft — Hull construction and scantlings —

Part 9:
Sailing craft appendages

Petits navires — Construction de coques et échantillons —

Partie 9: Appendices des bateaux à voiles

FDIS stage

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Foreword

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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 188, *Small craft*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 464, *Small Craft*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12215-9:2012), which has been technically revised.

The main changes are as follows:

— ~~consideration~~considerations of canting keel actuator and keel support structure have been added to Table 3;

— Annex A is now required to be completed in all instances;

— a qualified backing plate diameter and thickness treatment in the case of reduced hull thickness has been added to Table D.2;

— a specific caution about bolt proximity to welds has been added in D.4.7;

— in Annex F, the operational life has been doubled to 16 million stress cycles and the associated MSF calculation revised.

A list of all parts in the ISO 12215 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.

Introduction

This document recognizes the importance of adequate scantlings, construction practice and condition assessment for sailing craft appendages, principally the ballast keel.

The loss of a ballast keel leading to craft capsize is one of the major casualty hazards on sailing craft and therefore the structural effectiveness of all elements of the keel and its connection to the craft is paramount.

This document specifies the design loads and their associated stress factors. The user (e.g. the designer or builder) then has a choice of one of the following two options to assess the structural arrangement:

a) Use of computational methods which allow the structure to be modelled three-dimensionally. Methods include finite element analysis, matrix displacement or framework methods, following which Annex A is completed for compliance. General guidance is provided on modelling assumptions in Clause 8.

b) Use of simplified two-dimensional stress formulae. These are presented in Annexes B to F and, if this option is chosen, use of all applicable annexes will be necessary to fulfil the requirements of this document, following which Annex A is completed for compliance.

This document has been developed in consideration of current practice and sound engineering principles. The design loads and criteria of this document may be used with the scantling determination formulae of this document or using equivalent engineering methods as indicated in a) above.

This document reflects current practice, provided the craft is correctly handled in accordance with good seamanship, is well designed and built, maintained, equipped and operated at a speed appropriate to the prevailing sea state. Inspection of all appendages after grounding is essential.

NOTE Compliance with this document will not ensure a satisfactory design in all cases nor absolve the user, such as the designer or builder, of their design responsibilities, with whom such responsibilities are entirely vested.

Racing craft are not the principal focus of the ISO 12215 series. In particular, users are strongly cautioned against attempting to design scantlings for racing craft such that scantlings only just comply.

Small craft — Hull construction and scantlings —

Part 9:
Sailing craft appendages

1 Scope

This document defines the loads and specifies the scantlings of sailing craft appendages on monohull sailing craft with a length of hull (L_H) measured in accordance with ISO 8666 or a load line length (see ISO 12215-5:2019, Clause 1, NOTE 1) of up to 24 m. It gives:

— design stresses;

— the structural components to be assessed;

— load cases and design loads for keel, centreboard and their attachments;

— computational methods and modelling guidance;

— the means for compliance with its provisions.

Table 4 lists where the structural components to be assessed are found in this document and describes ~~the~~step-by-step procedures to establish compliance~~, step by step~~.

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 3506-1, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes*~~

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

~~ISO 12217-2, *Small craft — Stability and buoyancy assessment and categorization — Part 2: Sailing boats of hull length greater than or equal to 6 m*~~

~~ISO 12215-3, *Small craft — Hull construction and scantlings — Part 3: Materials — Steel, aluminium alloys, wood, other materials*~~

ISO 3506-1, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes*

ISO 12215-5:2019, *Small craft — Hull construction and scantlings — Part 5: Design pressures for monohulls, design stresses, scantlings determination*

ISO ~~12215-6~~ 12217-1, *Small craft — ~~Hull construction~~Stability and ~~scantlings~~buoyancy assessment and categorization — Part 1: Non-sailing boats of hull length greater than or equal to 6 m*

ISO 12217-2, *Small craft — Stability and buoyancy assessment and categorization — Part 2: Sailing boats of hull length greater than or equal to 6~~: Structural arrangements and details~~ m*