SLOVENSKI STANDARD
SIST EN ISO 12215-9:2012

01-september-2012

Mala plovila - Konstrukcija trupa in dimenzioniranje - 9. del: Dodatni pribor jadrnic (ISO 12215-9:2012)

Small craft - Hull construction and scantlings - Part 9: Sailing craft appendages (ISO 12215-9:2012)

Kleine Wasserfahrzeuge - Rumpfbauweise und Dimensionierung - Teil 9: Segelboote - Anhänge und Takelagezubehör (ISO 12215-9:2012)

Petits navires - Construction de coques et échantillonnage - Partie 9: Appendices des bateaux à voiles (ISO 12215-9:2012)

Ta slovenski standard je istoveten z: **EN ISO 12215-9:2012**

ICS:

47.020.10	Ladijski trupi in njihovi konstrukcijski elementi	Hulls and their structure elements
47.080	Čolni	Small craft

SIST EN ISO 12215-9:2012 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 12215-9

June 2012

ICS 47.080

English Version

Small craft - Hull construction and scantlings - Part 9: Sailing craft appendages (ISO 12215-9:2012)

Petits navires - Construction de coques et échantillonnage - Partie 9: Appendices des bateaux à voiles (ISO 12215-9:2012)

Kleine Wasserfahrzeuge - Rumpfbauweise und Dimensionierung - Teil 9: Anhänge von Segelbooten (ISO 12215-9:2012)

This European Standard was approved by CEN on 9 April 2012.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 12215-9:2012: E

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Foreword

This document (EN ISO 12215-9:2012) has been prepared by Technical Committee ISO/TC 188 "Small craft".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 12215-9:2012 has been approved by CEN as a EN ISO 12215-9:2012 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 94/25/EC as amended by Directive 2003/44/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 94/25/EC as amended by 2003/44/EC on Recreational Craft.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1: Correspondence between this European Standard and Directive 94/25/EC as amended by Directive 2003/44/EC

Clauses/sub-clauses of this European Standard	Essential requirements (ERs) of EU Directive 94/25/EC as amended by Directive 2003/44/EC	Qualifying remarks/Notes
All clauses	Annex I, A, Clause 3.1	The standard provides requirements for strength of monohull sailing boat appendages with conventional keel configurations

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

INTERNATIONAL STANDARD

ISO 12215-9

First edition
2012-06-15

Small craft — Hull construction and scantlings —

Part 9: Sailing craft appendages

Petits navires — Construction de la coque et échantillonnage —

Partie 9: Appendices des bateaux à voiles

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12215-9 was prepared by Technical Committee ISO/TC 188, *Small craft*.

ISO 12215 consists of the following parts, under the general title *Small craft — Hull construction and scantlings*:

- *Part 1: Materials: Thermosetting resins, glass-fibre reinforcement, reference laminate*
- *Part 2: Materials: Core materials for sandwich construction, embedded materials*
- *Part 3: Materials: Steel, aluminium alloys, wood, other materials*
- *Part 4: Workshop and manufacturing*
- *Part 5: Design pressures for monohulls, design stresses, scantlings determination*
- *Part 6: Structural arrangements and details*
- *Part 7: Scantling determination of multihulls*
- *Part 8: Rudders*
- *Part 9: Sailing craft appendages*

Introduction

The reason underlying the preparation of this part of ISO 12215 is that standards and recommended practices for loads on the hull and the dimensioning of small craft differ considerably, thus limiting the general worldwide acceptability of craft.

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

This part of ISO 12215 specifies the design loads and their associated stress factors. The user then has a choice between one or the other of the following available options for assessing the structural arrangement.

a) Use of advanced engineering methods which allow the structure to be modelled as three-dimensional: suitable methods include finite element analysis and subsets thereof such as matrix displacement or framework methods. General guidance is provided on modelling assumptions within this part of ISO 12215.

b) Use of simplified, generally two-dimensional, “strength of materials”-based stress equations: These are presented in Annexes B to F and, if this option is chosen, use of the equations will be necessary to fulfil the requirements of this part of ISO 12215.

This part of ISO 12215 has been developed applying present practice and sound engineering principles. The design loads and criteria of this part of ISO 12215 may be used with the scantling determination equations of this part of ISO 12215 or using equivalent engineering methods as indicated in a), above.

The dimensioning according to this part of ISO 12215 is regarded as reflecting current practice, provided the craft is correctly handled in the sense of good seamanship and equipped and operated at a speed appropriate to the prevailing sea state.

During the latter stages of the development of the ISO 12215 series, and after publication of key parts, a number of authorities adopted this International Standard for the assessment of high-performance racing yachts. While, in theory, a category A blue-water cruising yacht could experience the same loads as a competitive racing yacht, the latter has not been the principal focus of ISO 12215. Consequently, designers are strongly cautioned against attempting to design high-performance racing craft such that nearly all structural components only just comply.

Small craft — Hull construction and scantlings —

Part 9:
Sailing craft appendages

1 Scope

This part of ISO 12215 defines the loads and specifies the scantlings of sailing craft appendages on monohull sailing craft with a length of hull, L_H, of up to 24 m, measured according to ISO 8666. 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, and

— the means for compliance with its provisions.

2 Normative references

The following referenced documents are indispensable for the application 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 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 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

ISO 8666, *Small craft — Principal data*

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

ISO 12215-5:2008, *Small craft — Hull construction and scantlings — Part 5: Design pressures for monohulls, design stress, scantlings determination*

ISO 12215-6:2008, *Small craft — Hull construction and scantlings — Part 6: Structural arrangements and details*

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*

3 Terms and definitions

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

3.1
design category
sea and wind conditions for which a craft is assessed to be suitable, provided the craft is correctly handled in the sense of good seamanship and operated at a speed appropriate to the prevailing sea state

3.1.1
design category A
"ocean category"
category of craft considered suitable to operate in seas with significant wave heights above 4 m and wind speeds in excess of Beaufort Force 8, but excluding abnormal conditions such as hurricanes

3.1.2
design category B
"offshore category"
category of craft considered suitable to operate in seas with significant wave heights up to 4 m and winds of Beaufort Force 8 or less

3.1.3
design category C
"inshore category"
category of craft considered suitable to operate in seas with significant wave heights up to 2 m and a typical steady wind force of Beaufort Force 6 or less

3.1.4
design category D
"sheltered waters category"
category of craft considered suitable to operate in waters with significant wave heights up to and including 0,3 m with occasional waves of 0,5 m height, for example from passing vessels, and a typical steady wind force of Beaufort 4 or less

3.2
loaded displacement mass
m_{LDC}
mass of the craft, including all appendages, when in the fully loaded ready-for-use condition as defined in ISO 8666

NOTE 1 The displacement includes all possible options (generator, air conditioning, etc.).

NOTE 2 The loaded displacement mass is expressed in kilograms.

3.3
sailing craft
craft for which the primary means of propulsion is wind power, having $A_S > 0{,}07(m_{LDC})^{2/3}$ where A_S is the total profile area of all sails that may be set at one time when sailing closed hauled, as defined in ISO 8666 and expressed in square metres

NOTE 1 For the headsails, A_S considers the area of the fore triangle.

NOTE 2 The area of the wing-mast(s) is included in A_S.

3.4
mass of keel
m_{KEEL}
mass of the ballast keel, i.e. keel fin plus bulb, where fitted, and, for twin or multiple keels, of a single keel

NOTE The mass of keel is expressed in kilograms.

4 Symbols

For the purposes of this document, unless specifically otherwise defined, the symbols given in Table 1 apply.

Table 1 — Symbols, coefficients, parameters in the main core of ISO 12215-9

Symbol	Unit	Designation/meaning of symbol	(Sub)clause/table concerned
A_{CB}	m²	Area of fully deployed centreboard	7.7.1
A_S	m²	Reference sail area (mainsail + fore triangle + wing mast) as per ISO 12217-2	7.7.1
a	m	Distance along keel centreline, from centre of gravity (CG) of keel to keel junction with hull or tuck	7
c	m	Distance along keel centreline from keel junction to floor mid-height	7
c_a	m	Average value of c for several floors	7.5
e	m	Proportion of the total side force taken by the centreboard	7.7.1
F_i	N	Design force with i according to load case	7
g	m/s²	Acceleration of gravity = 9,81 m/s²	7
h_{CE}	m	Height of centre of area of A_S	7.7.1
h_K	m	Height of keel between its bottom and hull connection	7.5.2
h_{F4}	m	Height of application of force F_4 (load case 4)	7.5.2
k_{DC}	1	Design category coefficient	5, Table 2
k_{LC}	1	Load case coefficient	5, Table 3
k_{LD}	1	Length displacement coefficient	7.7.1
k_{MAT}	1	Material coefficient	5, Table 2
L_{WL}	m	Length of waterline in m_{LDC} conditions	7.5.2, 7.7.1
m_{LDC}	kg	See definition 3.2	3.2, 7
m_{KEEL}	kg	See definition 3.4	3.4, 7.4
M_{IJ}	N·m	Design bending moment, with index I and J according to load case	7
st_i	N/mm²	Stress, which can be σ or τ, and where i can be LIM, d, u, y, yw or yu	5
α	deg.	Angle of attack of centreboard foil	7.7
ε_R	%	Elongation at break	Table 2
θ	deg.	Angle between keel axis and centreline for canting keels	7.3