

### SLOVENSKI STANDARD oSIST prEN ISO 12215-7:2018

01-februar-2018

# Mala plovila - Konstrukcija trupa in zahtevane lastnosti - 7. del: Ugotavljanje lastnosti večtrupnih plovil (ISO/DIS 12215-7:2017)

Small craft - Hull construction and scantlings - Part 7: Scantlings determination of multihulls (ISO/DIS 12215-7 :2017)

### iTeh Standards

Petits navires - Construction de coques et échantillonnage - Partie 7: Multicoques (ISO/DIS 12215-7:2017)

### Document Preview

Ta slovenski standard je istoveten z: prEN ISO 12215-7

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#### <u>ICS:</u>

47.020.10	Ladijski trupi in njihovi
	konstrukcijski elementi
47.080	Čolni

Hulls and their structure elements Small craft

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# Small craft — Hull construction and scantlings —

# Part 7: Scantlings determination of multihulls

Petits navires — Construction de coques et échantillonnage — Partie 7: Multicoques

ICS: 47.080

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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 <a href="https://www.iso.org/directives">www.iso.org/directives</a>).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 188, Small craft, together with CEN/BT/WG 69, Small craft.

A list of all parts in the ISO 12215 series can be found on the ISO website. <u>SISTEN ISO 12215-7:2021</u>

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#### ISO 12215-7:2017

#### 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 from one to another, thus limiting the general worldwide acceptability of boat scantlings. This part of ISO 12215 has been set towards the lower boundary of the range of current practice.

The objective of this part of ISO 12215 is to achieve an overall structural strength that ensures the watertight and weathertight integrity of the craft. It is intended to be a tool to assess the scantlings of a craft against lower bound practice and it is not intended to be a structural design procedure.

The assessment shall generally include all parts of the craft that are assumed watertight or weathertight when assessing stability, freeboard and buoyancy in accordance with ISO 12217 and are essential to the safety of the craft and of persons on board.

For the complete scantlings of the craft, this part of ISO 12215 shall be used in conjunction with Part 5 for final scantlings determination, Part 6, for details, Part 8 for rudders and Part 9 for appendages and Part 10 for rig loads and rig attachment.

The mechanical property data supplied as default values in Part 5 make no explicit allowance for deterioration in service nor provide any guarantee that these values can be obtained for any particular craft. The responsibility for the decision to use this part of ISO 12215 as part of the design procedure rests solely with the designer and/or manufacturer.

The design pressures given in this part of ISO 12215 shall only be used with the given methods, equations and safety factors.

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 operated at a speed appropriate to the prevailing sea state and operated in a safe and responsible manner, having due cognisance of the prevailing conditions. It may not be suitable for performance racing craft and excludes boats designed only for professional racing.

#### SIST EN ISO 12215-7:2021

This document is not a design standard and designers/builders are strongly cautioned from attempting 7-2021 to design craft such that nearly all structural components only just comply.

The scantling determination of windows, portlights, deadlights, hatches and doors shall be assessed using either ISO 12216 which is a simplified scantlings standard, or using the pressures determined in this part of ISO 12215, and/or ISO/DIS 12215-5, particularly for panels other that non stiffened plates, then using the equations, safety factors, mechanical properties and detailed requirements of ISO 12216.

#### Important notice:

- a) ISO/TC 188/WG 18 believes that this part of ISO 12215 is the best that can be achieved at the time of publication. It has therefore decided to publish this document as a DIS. It is anticipated that wider usage may reveal a number of issues that require modification.
- b) In addition, this part of ISO 12215 needs to be applied with a critical mind, and users are invited to report to WG 18, TC secretariat, or national standardization body, for any items that are considered to require correction, together with supporting evidence, be that theoretical or based on satisfactory, long-term service experience with actual boats operating in the appropriate design category sea states.

#### ISO 12215-7:2017

Like the other parts of this International standard, this document was developed to assess the structure of recreational craft up to 24 m  $L_{\rm H}$ , but it may also be used, where relevant, for non-recreational craft, workboats or yachts of greater length and  $L_{\rm H}$  up to 30/32 m or 24 m Load line length, with the necessary critical mind.

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### Small craft — Hull construction and scantlings — Part 7: Scantlings determination of multihulls

#### 1 Scope

This part of ISO 12215 applies to the determination of local design pressures, and to the determination of the global loads acting on connected structural members of multihull craft constructed from fibre-reinforced plastics, aluminium or steel alloys, glued wood or other suitable boat building material with a hull length  $L_{\rm H}$  up to and including 24m according to ISO 8666.

It only applies to craft in the intact condition and with a maximum speed  $\leq$  50 knots in m<sub>LDC</sub> conditions.

It is not applicable to Hydrofoils, Small Waterplane Area Twin-Hull Ships (SWATHS) or surface effect multihulls.

The assessment shall generally include all structural parts of the craft that are assumed watertight or weathertight when assessing stability, freeboard and buoyancy according to ISO 12217 and are essential to the safety of the craft and of persons on board.

For the complete scantlings of the craft, this part of ISO 12215 shall be used in conjunction with Part 5 for detail local scantlings; Part 6, for construction details, Part 8 for rudders and Part 9 for appendages, and Part 10 for rig loads and rig attachment, with eventual changes coming from this document.

The scantling determination of windows, portlights, deadlights, hatches and doors shall be assessed using either ISO 12216 which is a simplified scantlings standard, or using the pressures determined in this document and/or ISO/DIS 12215-5, particularly for panels other that non stiffened plates and their supporting structures, then using the equations, safety factors, mechanical properties and detailed requirements of ISO 12216.

The scope of ISO 12215 was initially developed for up to 24 m hull length  $L_{\rm H}$ , but it may be applied for craft up to 24 m load line length and beyond, (see Note) with the necessary critical mind.

Scantlings derived from this document are primarily intended to apply to recreational craft including recreational charter vessels. They are considered to correspond to the minimum strength requirements of motor and sailing craft which are operated in a safe and responsible manner, having due cognisance of the prevailing conditions. It primarily applies to boats designed to be available to open public, and used by non-professional crews, it is not suitable to racing craft that are only performance oriented and excludes boats designed only for professional racing. However Clause 14 considers the usage of a multihull as a workboats, with professional crew, provided Annex I of ISO/DIS 12215-5 is complied with.

Throughout this document, and unless otherwise specified, dimensions are in (m), Areas in  $(m^2)$ , masses in kg, forces in (N), moments in (Nm), Pressures in kN/m<sup>2</sup> (1kN/m<sup>2</sup>=1 kPa), stresses and elastic modulus in N/mm<sup>2</sup> (1N/mm<sup>2</sup>=1 Mpa).

NOTE The load line length is defined in the OMI "International Load Lines Convention 1966/2005", it may be larger than  $L_{\rm H}$  for craft with overhangs. This length also sets up, at 24 m, the lower limit of several IMO conventions.

#### 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 12215-7:2017

ISO 8666, Small craft — Principal data

ISO/DIS 12215-5, Small craf — Hull construction and scantlings Part 5: Design pressures for monohulls, design stress, scantlings determination

ISO 12215-6, Small craft — Hull construction and scantlings Part 6: Construction details

ISO 12215-8, Small craft — Hull construction and scantlings Part 8: Rudders

ISO 12215-9, Small craft — Hull construction and scantlings Part 9: Sailing craft- Appendages

ISO/DIS 12215-10, Small craft — Hull construction and scantlings Part 10: Rig loads and rig attachments

ISO 12217-1, Small craft — Stability and 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 m

#### 3 Terms and definitions

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

[Definition 3.3 to 3.7 SOURCE: ISO 8666: 2016]

#### 3.1 multihull

### iTeh Standards

craft with two or more hulls with a connecting wet deck/platform or beams above the loaded waterline, as opposed to a tunnel boat or scow

Note 1 to entry: Clause 6 and Figure 1 gives information on main dimensions of a multihull.

#### 3.2

#### IST EN ISO 12215-7:2021

design categories description of the sea and wind conditions for which a boat is assessed to be suitable

Note 1 to entry: the characteristics for the different design categories are in line with the European Recreational Craft Directive 2013/53/EU.

#### 3.3

#### loaded displacement mass

*m*<sub>LDC</sub>

mass of the craft, including all appendages, when in the fully loaded ready for use condition as defined in ISO 8666

Note 1 to entry: this displacement includes all possible options like generator, air conditioning, etc.

Note 2 to entry: it is important that this value is not surpassed, see 5.1.

#### 3.4

#### mass in Minimum operating conditions

moc

mass of the craft in minimum operating condition as defined in ISO 8666

#### 3.5

#### sailing craft

craft for which the primary means of propulsion is wind power, as defined in ISO 8666

Note 1 to entry: In ISO 12215, non-sailing craft are considered as motor craft.

#### 3.6

#### beam of hull

#### $B_{\rm H}$

beam across the outer hulls, as defined in ISO 8666

#### 3.7

#### beam waterline

 $B_{\rm WL}$ 

sum of the waterline beams of all hulls, boat upright and in loaded displacement condition, according to ISO 8666

#### 3.8

#### wet deck

underside area of the structure connecting hulls with an area greater than 5 %  $L_{\rm H}$   $B_{\rm H}$ 

Note 1 to entry: Some multihulls have no wet deck but just crossbeams.

#### 3.9

#### boat speed

for motor craft V, in knots, is, the maximum speed in calm water declared by the manufacturer, with the craft in  $m_{\rm LDC}$  conditions. For sailing craft, speed does not need to be declared

#### 3.10

#### non walking areas

— either the areas defined in the owner's manual as both outside of the working deck and where people are not liable to stand or walk in normal or emergency operation, or

 areas of the working deck of a multihull with an inclination of more than 25° against the horizontal in the longitudinal and transverse directions

All other areas of the deck and superstructures are deemed walking areas.

#### 3.11

#### displacement craft

powered craft whose maximum speed in flat water and  $m_{LDC}$  conditions, declared by its manufacturer, is

such that 
$$\frac{V}{\sqrt{L_{\rm WL}}} < 5$$

#### 3.12

#### displacement mode

mode of running of a craft in the sea such that its mass is mainly supported by buoyancy forces

Note 1 to entry: This is the case where actual the speed/length ratio in a seaway makes the craft behave as a displacement craft, in  $m_{\text{LDC}}$  conditions.

#### 3.13

#### planing craft

powered craft whose maximum speed in flat water and  $m_{LDC}$  conditions, declared by its manufacturer, is such that  $\frac{V}{\sqrt{L_{\text{WL}}}} \ge 5$ 

Note 1 to entry: This speed/length ratio limit has been arbitrarily set up for the purpose of this part of ISO 12215 and to ensure that the craft is well in planing but it in reality the planing mode speed may vary from one boat to another according to hull shape and other parameters.

#### 3.14

#### planing mode

mode of running of a craft in the sea such that a significantly part of its mass is supported by forces coming from dynamic lift due to speed in the water

#### 4 Symbols

Unless specifically otherwise defined, the symbols shown in Table 1 are used in this part of ISO 12215.

Symbol	Unit	Designation/Meaning of symbol	Reference/ Clause concerned	
General dimensions and data				
A <sub>S</sub>	m <sup>2</sup>	Total sail area as defined in 3.5	3.5	
B <sub>CB</sub>		Beam between centres of buoyancy	6.1 & Fig 1	
B <sub>CP</sub>	m	Beam between upper shrouds chainplates	Annex B	
B <sub>Hx</sub>	m	Beam at the <u>outside</u> of wet deck/beam connection with hulls at section x	6.1 & Fig 1	
B <sub>WL</sub>	m	Beam of waterline according to ISO 8666	6.1 & Fig 1	
B <sub>BWDx</sub>	m item ai/o	Beam at the <u>inside</u> of wet deck/beam connection with hulls at section <i>x</i>	6.1 & Fig 1	
B <sub>H</sub>	m	Beam of hull according to 3.7	6.1 & Fig 1	
B <sub>RO</sub>	m	Beam of hull at overhang root	Table 11, Fig7	
D <sub>RO</sub>	m	Depth of hull at overhang root	Table 11, Fig7	
L <sub>Ai</sub>	m	Length of crossbeam i	Table 11, Fig7	
L <sub>BB</sub>	m	Length between main beams centre of inertia	Annex B & C	
L <sub>H</sub>	m	Length of hull according to ISO 8666	1	
L <sub>OHi</sub>	m	Length of overhang (forward or aft) on float i	Table 11, Fig7	
L <sub>WL</sub>	m	Length of waterline according to ISO 8666	Fig 1	
L <sub>WD</sub>	m	Length of the wet deck measured parallel to $L_{WL}$	Fig 1	
m <sub>LDC</sub>	kg	Mass of displacement in fully loaded condition according to ISO 8666	3.3, 9	
m <sub>OC</sub>	kg	Mass in minimum operating condition according to ISO 8666	3.4, 11	
T <sub>C</sub>	m	Max canoe body depth (see Figure 1) <sub>i</sub>	Fig 1, 9.3	
V	Knots	Boat maximum speed in fully loaded condition ( <i>m</i> LDC)	Table 5.2,	
V <sub>AWK</sub>	Knots	Apparent wind speed in knots	Annex B & C	

Table 1	—Symbols.	dimensions.	coefficients.	parameters
Table 1	Symbols,	uninensions,	coefficients,	parameters