
**Small craft — Stability and buoyancy
assessment and categorization —**

**Part 1:
Non-sailing boats of hull length
greater than or equal to 6 m**

Petits navires — Évaluation et catégorisation de la stabilité et de la flottabilité —

Partie 1: Bateaux à propulsion non vélique d'une longueur de coque supérieure ou égale à 6 m





COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	v
Introduction	vii
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
3.1 Primary.....	2
3.2 Downflooding.....	4
3.3 Dimensions, areas and angles.....	5
3.4 Condition, mass and volume.....	7
3.5 Other terms and definitions.....	9
4 Symbols	12
5 Procedure	13
5.1 Maximum load.....	13
5.2 Sailing or non-sailing.....	13
5.3 Tests and calculations to be applied.....	14
5.4 Variation in input parameters.....	15
6 Tests, calculations and requirements	15
6.1 Downflooding.....	15
6.1.1 Downflooding openings.....	15
6.1.2 Downflooding height.....	17
6.1.3 Downflooding angle.....	20
6.2 Offset-load test.....	20
6.2.1 Objective.....	20
6.2.2 Test.....	21
6.2.3 Requirements.....	21
6.3 Resistance to waves and wind.....	21
6.3.1 General.....	21
6.3.2 Rolling in beam waves and wind.....	21
6.3.3 Resistance to waves.....	22
6.4 Heel due to wind action.....	23
6.4.1 General.....	23
6.4.2 Calculation.....	23
6.4.3 Requirement.....	24
6.5 Recess size.....	24
6.5.1 Application.....	24
6.5.2 Simplified methods.....	25
6.5.3 Direct calculation method.....	26
6.5.4 Design category C boats using option 6.....	27
6.6 Habitable multihull boats.....	27
6.7 Motor sailers.....	27
6.7.1 General.....	27
6.7.2 Requirement.....	28
6.8 Flotation requirements.....	28
6.9 Detection and removal of water.....	28
7 Application	29
7.1 Deciding the design category.....	29
7.2 Meaning of the design categories.....	29
Annex A (normative) Full method for required downflooding height	31
Annex B (normative) Method for offset-load test	33
Annex C (normative) Methods for calculating downflooding angle	41

Annex D (normative) Method for measuring freeboard margin	43
Annex E (normative) Determining the curve of righting moments	45
Annex F (normative) Method for level flotation test	48
Annex G (normative) Flotation material and elements	53
Annex H (normative) Information for owner's manual	55
Annex I (informative) Summary of requirements	57
Annex J (informative) Worksheets	58
Annex K (informative) Illustration of recess retention level	75
Bibliography	76

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 www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 188, *Small craft*.

This third edition cancels and replaces the second edition (ISO 12217-1:2013), of which it constitutes a minor revision. It incorporates the following modifications:

- Introduction: the reference to the European Directive has been updated (2013/53/EU);
- [Clause 1](#), [6.1.1.6](#) letter d) 3), [6.6](#) and Worksheet 9 of [Annex J](#): “vulnerable” has been replaced with “susceptible”;
- [Clause 2](#): ISO 6185-4:2011 has been added;
- [Clause 3](#): entries [3.1.1](#), [3.4.3](#), [3.4.5](#), [3.4.6](#) and [3.5.9](#) have been amended;
- [Subclause 6.1.2.2](#), letter c): option 6 has been included;
- [Subclauses 6.3.2](#) and [6.4.1](#): the formulae have been harmonised;
- [Subclauses 6.5.2.3](#) and [6.5.2.4](#): formulae coefficients have been corrected;
- [Subclause 7.2](#): the text and Table 6 have been amended;
- [Clause F.4](#): [Table F.5](#) has been amended, [subclause F.4.4](#) has been added;
- [Annex J](#): worksheets 1, 2, 3, 6, 7, 8, 9, 10 and 12 have been corrected to align with corrections listed above;
- [Annex K](#) has been added;
- Bibliography: reference to ISO 7010 has been added;
- Editorial and cross-referencing corrections have been made to [Table 2](#), [subclauses 6.5.1](#), [6.5.2.2](#) and [6.5.2.3](#), and worksheets 4 and 8 of [Annex J](#).

ISO 12217-1:2015(E)

ISO 12217 consists of the following parts, under the general title *Small craft — Stability and buoyancy assessment and categorization*:

- *Part 1: Non-sailing boats of hull length greater than or equal to 6 m*
- *Part 2: Sailing boats of hull length greater than or equal to 6 m*
- *Part 3: Boats of hull length less than 6 m*

Introduction

This part of ISO 12217 enables the determination of the limiting environmental conditions for which an individual boat has been designed.

It enables the boat to be assigned to a design category appropriate to its design and maximum load. The design categories used align with those in the Recreational Craft Directive of the European Union, EU Directive 2013/53/EU.

The design category given in respect of stability and buoyancy is that for which the boat satisfies all the requirements according to [5.3](#), as summarized in [Annex I](#).

Small craft — Stability and buoyancy assessment and categorization —

Part 1:

Non-sailing boats of hull length greater than or equal to 6 m

CAUTION — Compliance with this part of ISO 12217 does not guarantee total safety or total freedom of risk from capsize or sinking.

IMPORTANT — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

1 Scope

This part of ISO 12217 specifies methods for evaluating the stability and buoyancy of intact (i.e. undamaged) boats. The flotation characteristics of boats susceptible to swamping are also encompassed.

The evaluation of stability and buoyancy properties using this part of ISO 12217 will enable the boat to be assigned to a design category (A, B, C or D) appropriate to its design and maximum total load.

This part of ISO 12217 is principally applicable to boats propelled by human or mechanical power of 6 m up to 24 m hull length. However, it can also be applied to boats of under 6 m if they do not attain the desired design category specified in ISO 12217-3 and they are decked and have quick-draining recesses which comply with ISO 11812.

In relation to habitable multihulls, this part of ISO 12217 includes assessment of susceptibility to inversion, definition of viable means of escape and requirements for inverted flotation.

This part of ISO 12217 excludes:

- inflatable and rigid-inflatable boats covered by ISO 6185, except for references made in ISO 6185 to specific clauses of ISO 12217;
- personal watercraft covered by ISO 13590 and other similar powered craft;
- gondolas and pedalos;
- sailing surfboards;
- surfboards, including powered surfboards;
- hydrofoils and hovercraft when not operating in the displacement mode; and
- submersibles.

NOTE Displacement mode means that the boat is only supported by hydrostatic forces.

It does not include or evaluate the effects on stability of towing, fishing, dredging or lifting operations, which need to be separately considered if appropriate.