



DPC: 23/30472861 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 19 December 2023

Origin: International

Latest date for receipt of comments: 11 February 2024

Project No. 2023/00874

Responsible committee: SME/32 Ships and marine technology - Steering committee

Interested committees:

Title: Draft BS ISO 20650 Draft Inland navigation vessels. Small floating working machines. Requirements and test methods.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 11 February 2024

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

E-mail: admin.start@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

DRAFT INTERNATIONAL STANDARD

ISO/DIS 20650

ISO/TC 8/SC 7

Secretariat: DIN

Voting begins on:
2023-12-19

Voting terminates on:
2024-03-12

Inland navigation vessels — Small floating working machines — Requirements and test methods

ICS: 47.060

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.



Reference number
ISO/DIS 20650:2023(E)
Documents
Document Sharing Hub
© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 General Requirements	3
4.1 General Requirements.....	3
4.2 Strength.....	4
4.3 Stability.....	4
4.4 Residual safety clearance.....	4
4.5 Residual freeboard.....	4
4.6 Sinking resistance.....	4
4.7 Draught marks.....	4
4.8 Manoeuvring characteristics.....	4
4.9 Driving noise of the small floating working machine.....	4
4.10 Alarm signal.....	5
4.11 Stability and strength of working equipment.....	5
5 Steering system	5
5.1 General.....	5
5.2 Drive unit of the steering system.....	5
5.3 Indicators and monitoring devices.....	5
5.4 Penetrations for the rudder stocks.....	6
6 Helm station	6
6.1 General.....	6
6.2 Unobstructed view.....	6
6.3 Control, indicating and monitoring equipment.....	8
6.3.1 General requirements.....	8
6.3.2 Specific requirements concerning control and monitoring equipment of main engines.....	8
6.4 Elevating helm stations.....	8
7 Engine rooms	9
7.1 General.....	9
7.2 Fire protection.....	9
7.3 Heat detector.....	9
8 Requirements on engine design	9
8.1 General.....	9
8.2 Safety equipment.....	9
8.3 Propulsion systems.....	10
8.4 Engine exhaust systems of internal combustion engines.....	10
8.5 Fuel tanks, pipes and accessories for Liquid fuels or hydraulic oils.....	10
8.6 Tanks, pipes and accessories for LPG.....	11
8.6.1 General.....	11
8.6.2 Cylinders.....	11
8.6.3 Fuel system components.....	11
8.6.4 Installation.....	12
8.6.5 Installation of cylinders.....	12
8.6.6 Gas pipes and hoses.....	14
8.6.7 Electro installation.....	14
8.6.8 Gas detection.....	15
8.6.9 Forced ventilation.....	15
8.7 Bilge pumping and draining systems.....	15

8.8	Penetrations for the propeller shafts.....	16
9	Electrical equipment and installations.....	16
9.1	General.....	16
9.2	Protection against access to hazardous parts, against solid foreign objects, against ingress of water.....	16
9.3	Maximum permissible voltages.....	16
9.4	Generators, engines and transformers.....	17
9.5	Accumulators (batteries) and their charging devices.....	17
9.6	Switchgears.....	19
	9.6.1 Switchboards.....	19
	9.6.2 Switches, protective devices.....	19
	9.6.3 Placement of switchboards.....	19
9.7	Installation fittings.....	19
9.8	Cables, insulated cables and cable systems.....	19
9.9	Lighting installations.....	20
9.10	Navigation lights.....	20
9.11	Additional requirements for electronic Installations.....	20
10	Special provisions applicable to electric vessel propulsion motor.....	21
10.1	General.....	21
10.2	Generators, transformers and switchgear for electric vessel propulsion.....	21
10.3	Electric propulsion engines for electric propulsion.....	21
10.4	Power electronics for electric vessel propulsion.....	22
10.5	Monitoring equipment.....	22
10.6	Control, regulation and automatic power limitation.....	22
10.7	Protection of the electric vessel propulsion.....	22
11	Equipment.....	23
11.1	Lifebuoys and lifejackets.....	23
11.2	Anchor equipment.....	23
11.3	Portable fire extinguishers.....	23
11.4	Additional equipment.....	23
12	Safety at workstations.....	24
12.1	General.....	24
12.2	Protection against falling.....	24
12.3	Access to workstations.....	24
12.4	Exits and emergency exits.....	25
12.5	Ladders, steps and similar devices.....	25
12.6	Interior rooms.....	25
12.7	Protection against noise and vibration.....	25
13	Working gear.....	26
13.1	Accessory equipment.....	26
13.2	Mobile and temporary machinery/work equipment.....	26
13.3	Winches.....	26
13.4	Cranes.....	26
14	Fuel-fired heating equipment.....	27
15	Owner's manual.....	27
15.1	Basics.....	27
15.2	Range of use.....	27
15.3	References to tests to be carried out during operation.....	28
15.4	Cranes.....	28
	15.4.1 Cranes operating instructions.....	28
	15.4.2 Periodic inspection of cranes by an expert.....	28
	15.4.3 Regularly checks of cranes by a competent person.....	28
15.5	Electric propulsion.....	28
16	Marking of small floating working machines (Data plate).....	28

17	Testing	29
17.1	General	29
17.1.1	Range	29
17.1.2	Individual testing and type testing	29
17.1.3	Specimen selection for type testing	29
17.2	Basic tests	29
17.2.1	Visual inspection and measurement	29
17.2.2	Presentation of manufacturer's certificates	29
17.3	Strength	29
17.4	Stability	29
17.5	Safety against sinking	30
17.6	Manoeuvring characteristics	30
17.7	Noise limit values	30
17.8	Cranes	30
17.9	Electrical propulsion	31
17.10	Stairs	31
17.11	Climbing devices	31
Annex A	(normative) Proof of stability	32
Annex B	(normative) Manoeuvrability	35
Annex C	(normative) Safety requirements on stairs and ladders	36
Annex D	(normative) Safety requirements for winches	40
Bibliography		43

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 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 7, *Inland navigation vessels*.

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

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

ISO takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO. Information may be obtained from the patent database available at www.iso.org/patents.

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

Inland navigation vessels — Small floating working machines — Requirements and test methods

1 Scope

This document is applicable to small floating working machines used for work in, over or on inland waters. This document specifies safety-related requirements and test methods.

This document specifies minimum requirements for small floating working machines, with a length < 10 m and a product of $L \times W \times D < 30 \text{ m}^3$ with temporarily or permanently installed work equipment or machines used on inland waters.

With their help, work is carried out in, on or over bodies of water. These are, for example, extraction work, lifting work, sampling, mowing and clearing work or comparable work tasks.

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 630-2, *Structural steels — Part 2: Technical delivery conditions for structural steels for general purposes*

ISO 1035-1, *Hot-rolled steel bars — Part 1: Dimensions of round bars*

ISO 1035-2, *Hot-rolled steel bars — Part 2: Dimensions of square bars*

ISO 1035-3, *Hot-rolled steel bars — Part 3: Dimensions of flat bars*

ISO 2922, *Acoustics — Measurement of airborne sound emitted by vessels on inland waterways and harbours*

ISO 2923, *Acoustics — Measurement of noise on board vessels*

ISO 4254-1, *Agricultural machinery — Safety — Part 1: General requirements*

ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 7165, *Fire fighting — Portable fire extinguishers — Performance and construction*

ISO 9519, *Shipbuilding and marine structures — Rungs for dog-step ladders*

ISO 10240, *Small craft — Owner's manual*

ISO 11102-1, *Reciprocating internal combustion engines — Handle starting equipment — Part 1: Safety requirements and tests*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 12402-2, *Personal flotation devices — Part 2: Lifejackets, performance level 275 — Safety requirements*

ISO 12402-3, *Personal flotation devices — Part 3: Lifejackets, performance level 150 — Safety requirements*

ISO 13297, *Small craft — Electrical systems — Alternating and direct current installations*

ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14895, *Small craft — Liquid-fuelled galley stoves and heating appliances*

ISO 16180, *Small craft — Navigation lights — Installation, placement and visibility*

ISO 17631, *Ships and marine technology — Shipboard plans for fire control, damage control, life-saving appliances and means of escape*

ISO 18422, *Ships and marine technology — Inland navigation vessels — Plate with instructions for rescue, resuscitation and first aid for drowning persons*

IEC 60092-504, *Electrical installations in ships — Part 504: Automation, control and Instrumentation (IEC 60092-504:2016, modified)*

IEC 60364-5-54, *Low-voltage electrical installations — Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

IEC 62619, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for secondary lithium cells and batteries, for use in industrial applications*

IEC 62620, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Secondary lithium cells and batteries for use in industrial applications*

3 Terms and definitions

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

Small floating working machine

watercraft used on inland waters with a hull whose length is less than 10 m and whose product of $L \times W \times D < 30 \text{ m}^3$ with temporarily or permanently installed working equipment or machinery

EXAMPLE Mowing boats, watercraft for sampling, extraction work, keeping waters clean, lifting work.

3.2

residual safety clearance

shortest vertical distance between surface of the water and the lowest part of the small floating working machine beyond which it is no longer watertight taking into account trim and heel resulting from the moments

3.3**residual freeboard**

smallest vertical distance between the surface of the water and the upper surface of the deck at its edge taking into account trim and heel

3.4**working area**

area of inland water, where the work is carried out

3.5**operating range**

driving range from the berth to the working area and the working area itself

3.6**propulsion system**

system consisting of internal combustion engine and/or electric drive engine with power source including power electronics, gearbox, shaft, propeller, etc., used to move the craft in the water

3.7**propulsion**

diesel, LPG, electric or diesel or gas-electric propulsion system of a small floating working machine containing at least one propulsion engine

3.8**main propulsion**

propulsion used to achieve the manoeuvring characteristics

3.9**propulsion engine**

engine for driving the propeller shaft or the shaft of comparable drive systems such as water jet drives

3.10**expert**

a person recognised by the competent authority or by an authorised institution, having specialist knowledge in the relevant area on the basis of his or her professional training and experience, fully conversant with the relevant rules and regulations and the generally accepted technical rules (e.g. ISO Standards, relevant regulations, technical rules), and able to examine and give an expert assessment of the relevant systems and equipment

3.11**competent person**

a person who has acquired sufficient knowledge in the relevant area on the basis of his or her professional training and experience and is sufficiently conversant with the relevant rules and regulations and the generally accepted technical rules (such as ISO Standards, relevant regulations, technical rules) to be able to assess the operational safety of the relevant systems and equipment

4 General Requirements**4.1 General Requirements**

Small floating working machines shall be built in accordance with good shipbuilding practices.

At least one watertight collision bulkhead and one machinery space bulkhead shall be fitted up to the deck or to the upper edge of the ship's side. The collision bulkhead shall be installed at an appropriate distance from the bow so that when the watertight compartment forward of the collision bulkhead is flooded, the buoyancy of the fully loaded vessel is maintained and a residual safety clearance of not less than 300 mm is maintained.

4.2 Strength

The strength of small floating machines shall be sufficient to withstand the stresses to which it is exposed under the conditions of use specified by the manufacturer.

When using steel S 235 B according to ISO 630-2, this requirement is fulfilled if the thickness of the bottom and side plates is at least 3 mm. If other materials or lower material thicknesses are used, a mathematical verification is required.

4.3 Stability

The stability of small floating machines shall withstand the stresses to which it is exposed under the conditions of use specified by the manufacturer.

The stability of small floating machinery shall be sufficient for the loads to which it is subjected under the conditions of use specified by the manufacturer. It shall be demonstrated mathematically by the test conditions given in [Annex A](#).

In the case of small floating working machines for which no change in heel or trim can be caused by their working equipment and for which a shift in the centre of gravity can be ruled out as far as possible, a mathematical verification may be dispensed with.

4.4 Residual safety clearance

The residual safety clearance shall be at least 300 mm.

4.5 Residual freeboard

The residual freeboard shall be at least 300 mm.

4.6 Sinking resistance

Small floating working machines shall be safe against sinking in the event of flooding of one watertight compartment.

The residual buoyancy force at the end of flooding of any compartment of the small floating working machine shall be at least 100 N for each designated crew member.

4.7 Draught marks

The plane of maximum draught shall be marked on each side at each end of the small floating working machine by indelible draught marks in a contrasting colour. These shall consist of a rectangle measuring 150 mm x 30 mm (L x H) with the base line horizontal and coinciding with the plane of the maximum allowed draught.

4.8 Manoeuvring characteristics

Small floating working machines shall

- have adequate driving and manoeuvring characteristics in accordance with [Annex B](#);
- be able to reach a minimum speed of 4 km/h in relation to the water in the travel range.

4.9 Driving noise of the small floating working machine

The noise emitted by a small floating working machine under way at a lateral distance of 25 m from the craft's side shall not exceed 75 dB(A) measured according to ISO 2922.

4.10 Alarm signal

There shall be an alarm signal with which all persons on board can be warned.

The alarm signal shall be clearly distinguishable from other signals. It shall produce a sound pressure level at all workstations that is at least 5 dB(A) higher than the maximum local sound pressure level.

4.11 Stability and strength of working equipment

The stability and strength of working equipment and, where appropriate, its attachments, shall be sufficient to withstand the forces resulting from the expected heel, trim and movement of the floating equipment.

5 Steering system

5.1 General

Small floating working machines shall be fitted with a reliable steering system which provides at least the manoeuvrability required by [Annex B](#).

The steering systems shall be designed in such a way that the rudder cannot change position unintentionally.

The steering system as a whole shall be designed for permanent lists of up to 15° and ambient temperatures from 20 °C to +50 °C.

The components of the steering system shall be robust enough to always be able to withstand the stresses to which they may be subjected during normal operation.

5.2 Drive unit of the steering system

The steering system shall incorporate a manual drive or a powered drive unit if so required by the forces needed to actuate the rudder.

Regardless of rudder position, a kick-back of the steering wheel shall be prevented when the manual drive is engaged.

A steering apparatus with a powered drive unit shall be protected against overloads by means of a system that restricts the torque applied by the drive unit.

Hydraulic steering apparatus drive units shall have:

- an emergency mode such as manual operation; and
- a level alarm for the hydraulic tank;
- the pipework designed, dimensioned and arranged in such a manner to exclude as far as possible mechanical damage or damage resulting from fire.

5.3 Indicators and monitoring devices

The rudder position shall be clearly displayed at the steering position. If the rudder-position indicator is electric it shall have its own power supply.

An optical and acoustic alarm shall be present at the steering position to signal the following:

- the oil level of the hydraulic tanks falling under the lowest content level;
- failure of the electrical supply for the steering control.

5.4 Penetrations for the rudder stocks

The penetrations for the rudder stocks shall be so designed as to prevent the spread of water polluting lubricants.

6 Helm station

6.1 General

Helm stations shall be arranged in such a way that the helmsman (oarsman, operator) may at all times perform his task while the vessel is under way.

In driving mode, sound pressure generated by the vessel and measured at the level of the helmsman's head at the steering position shall not exceed 70 dB(A).

The operator's workstation shall be equipped with technical protection against UV radiation and precipitation which is sufficient for the expected demand.

6.2 Unobstructed view

There shall be an adequately unobstructed view in all directions from the helm position for safe operation.

The equipment shall be under visual control in all positions from the helm position to the water surface.

The upper edge of the forward-facing windows of the helm station shall be high enough to allow a person at the helm station (eye level: seated person 1 324 mm and/or standing person 1 800 mm each above the floor) a clear forward view (to the horizon and an angle of 10° upwards) of at least 120° within the forward semicircle. At the rear, a field of vision of at least 30° shall be possible.

For an example of the design of the unobstructed view, see [Figure 1](#).

Clear vision through these windows shall be ensured by suitable means in all weather conditions.

Windowpanes used in the helm station shall have a minimum light transmission of 75 %. If they are made of glass, safety glass shall be used. To avoid reflections, the helm station front windows shall be glare-free or fitted so as to exclude reflections effectively.