



BSI Standards Publication

Small craft — Electrically operated bilge pumps

National foreword

This British Standard is the UK implementation of EN ISO 8849:2021. It is identical to ISO 8849:2020. It supersedes BS EN ISO 8849:2018, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GME/33, Small craft.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication has been prepared under a mandate given to the European Standards Organizations by the European Commission and the European Free Trade Association and is intended to support essential requirements of the EU legislation detailed in the European foreword. Annex ZA/ZZ describes how the publication relates to the legislation.

For the Great Britain market (England, Scotland and Wales), if the UK Government has designated this publication for conformity with UKCA marking legislation and has not amended the essential requirements of that legislation, Annex ZA/ZZ and any references to EU law in the publication should be read in accordance with the designation as applying to UK legislation in the same way as to EU law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

For the Northern Ireland market, UK law will continue to implement relevant EU law subject to periodic confirmation. References to EU legislation are therefore still valid.

More information on legislation can be found at www.gov.uk.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2021
Published by BSI Standards Limited 2021

ISBN 978 0 539 00450 2

ICS 47.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2021.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

English Version

**Small craft - Electrically operated bilge pumps
(ISO 8849:2020)**

Petits navires - Pompes de cale à moteur
électrique (ISO 8849:2020)

Kleine Wasserfahrzeuge - Elektrisch
angetriebene Bilgepumpen (ISO 8849:2020)

This European Standard was approved by CEN on 16 May 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 8849:2021) has been prepared by Technical Committee ISO/TC 188 "Small craft" in collaboration with CCMC.

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 November 2021, and conflicting national standards shall be withdrawn at the latest by May 2022.

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

This document supersedes EN ISO 8849:2018.

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(s).

For the relationship with EU Directive(s) 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 8849:2020 has been approved by CEN as EN ISO 8849:2021 without any modification.

Annex ZA (informative)

Relationship between this European Standard and the essential requirements of Directive 2013/53/EU aimed to be covered

This European standard has been prepared under a Commission's standardization request M/542 C(2015) 8736 final to provide one voluntary means of conforming to essential requirements of Directive 2013/53/EU.

Once this standard is cited in the Official Journal of the European Union under that Directive, 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 corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — - Correspondence between this European Standard and Directive 2013/53/EU

Essential Requirements of Directive 2013/53/EU	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex I, Part A, 2.5 – Owner's manual	4.10, 7	
Annex I, Part A, 3.5 – Flooding, (c) removal of water by pumps or other means.	4, 5, 6	In respect of electrically operated bilge pumps intended for the removing bilge water only. This International Standard does not cover pumps intended for damage control.
Annex I, Part A, 5.3 - Electrical system	4.3, 4.8, 5	In respect of the electrical requirements to ensure the proper operation of electrically operated bilge pumps only. This International Standard does not deal with the following elements of this essential requirement; <ul style="list-style-type: none"> • Electric shock; • Interaction with electric propulsion circuits; • Battery ventilation
Annex I, Part A, 5.6.1 – Fire protection, General	4.2, 4.9, 4.10, 5.3	In respect of preventing a fire hazard
Annex II, Components (1) Ignition protected equipment for inboard and stern drive engines and petrol tank spaces	4, 5.1 to 5.4 inclusive, 6	This standard is relevant in respect of the requirements for ignition protected electrically operated bilge pumps that are suitable for watercraft with inboard or stern drive engines and petrol tank spaces and which are supplied as components.

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

Contents		Page
Foreword		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	General requirements	2
5	Electrical requirements	3
6	Marking	4
7	Owner’s manual	4
Bibliography		5

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 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 third edition cancels and replaces the second edition ([ISO 8849:2003](http://www.iso.org/iso/8849:2003)), which has been technically revised.

The main changes compared to the previous edition are as follows:

- clarified scope and applicable voltages;
- added Clause 7, Owner's manual.

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.

Small craft — Electrically operated bilge pumps

1 Scope

This document specifies requirements for electrically operated bilge pumps intended for use in removing bilge water. It applies to:

- direct current (DC) bilge pumps which operate at a nominal voltage not exceeding 50 V; and
- single phase alternating current (AC) bilge pumps which operate at a nominal voltage not exceeding 250 V.

It does not cover pumps intended for damage control.

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 8846:1990](#), *Small craft — Electrical devices — Protection against ignition of surrounding flammable gases*

ISO 13297:2020, *Small craft — Electrical systems — Alternating and direct current installations*

IEC 60529:2013, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

automatic pump

pump equipped with a sensing means that activates and deactivates the pump's operation at predetermined liquid levels

3.2

nominal voltage

voltage commonly used on *small craft* ([3.5](#)) with direct current (DC), such as 6 V, 12 V or 24 V, and alternating current (AC) such as 110/120 V or 230/240 V

3.3

submersible pump

pump designed to be operated completely immersed in water

3.4

design voltage

113 % of *nominal voltage* ([3.2](#))

3.5
craft
small craft

recreational boat, and other watercraft using similar equipment, of up to 24 m length of hull (L_H)

Note 1 to entry: The measurement methodology for the length of hull (L_H) is defined in [ISO 8666](#).

[SOURCE: ISO 8666:2020, 3.15, modified – Note 1 to entry has been added.]

3.6
critical bilge-water level

level at which bilge water contacts metallic fuel tanks, couplings, engine pans, non-submersible machinery, or non-watertight electrical circuits and connections, with the craft in the static floating position or in normal operation

4 General requirements

4.1 Bilge pumps shall be designed to operate for a continuous 24-hour period at 87,5 % of nominal voltage, up to their design voltage at the point within the range of performance recommended for the pump that results in the highest power consumption.

4.2 Bilge pumps and devices used to convert bilge pumps to automatic operation (automatic pumps) installed in compartments where explosive vapour and gasses may accumulate shall meet the ignition protection requirements specified in [ISO 8846:1990](#).

4.3 Bilge pumps and devices used to convert bilge pumps to automatic operation (automatic pumps) shall meet the electrical requirements of ISO 13297:2020.

4.4 Bilge pumps shall be rated in litres of water flow per minute or per hour at nominal voltage, at static pressures of 0 kPa, 10 kPa and 20 kPa, i.e. heads of 0 m, 1 m and 2 m, discharging through a smooth-bore hose fixed to the pump-outlet of an inside diameter equal to the pump outlet outside diameter and of a length equal to 1,5 times the lift.

The pump rating and capacities shall be stated in the installation and operating instructions provided with the pump.

The pump rating shall include the maximum output pressure and lift at which the pump ceases operation, i.e. the discharge of water.

4.5 Bilge pumps shall be provided with means of securely fastening them to the craft.

4.6 Materials used in the construction of bilge pumps, which can be expected to come in contact with sea water, shall be

- selected or coated to be resistant to corrosion;
- galvanically compatible; and
- resistant to deterioration by bilge-cleaning agents and intermittent exposure to petrol (gasoline), oil and diesel fuel.

4.7 Submersible pumps shall be provided with a strainer or other means of preventing debris from entering the pump inlet. Inlet strainers and screens shall be designed such that they can be cleaned.

4.8 Installation and operating instructions shall be available for each bilge pump. An electrical diagram shall be provided. It shall identify each conductor and shall include the proper location of the control

switch(es) in the circuit and the bonding connection, if applicable. The recommended overcurrent protection for non-integrally protected bilge pumps shall be stated.

4.9 Centrifugal and axial flow pumps shall be capable of operating dry at their design voltage for at least 7 h without creating a fire hazard. Alternatively, a means integral with the pumps shall be provided to shut the pump off automatically to prevent a fire hazard.

4.10 Positive or semi-positive displacement pumps, i.e. those in which the impeller can be in continuous contact with the housing when operating dry, shall be capable of operating dry at their design voltage for at least 5 min without damage to the impeller or housing and for at least 1 h without creating a fire hazard. Alternatively, a means integral with the pumps shall be provided to shut the pump off automatically to prevent a fire hazard. Information shall be provided in the owner's manual cautioning against operating the pump dry for more than 1 min.

5 Electrical requirements

5.1 Submersible pumps shall have watertight electrical connections, IP 67, in accordance with IEC 60529:2013.

The use of a length of watertight electrical cable sealed at the pump connection is recommended, so that connections to the power supply can be made above the critical bilge-water level.

5.2 Metallic parts of a DC pump housing that can be exposed to contact with bilge water and can become a source of stray current leakage shall have provisions for equipotential bonding conductor connections.

Pumps designed with a double-insulated electrical system, requiring a break in two distinct insulation systems before electrical leakage can reach exposed metallic parts, do not require a bonding connection.

5.3 Bilge pumps shall be protected against continuously locked rotor conditions by

- integral overcurrent protection, or
- overcurrent protection in the circuit of a size to protect the bilge-pump motor,
- being capable of sustaining operation with a locked rotor for 7 h without generating surface temperatures in excess of 150 °C, at an ambient temperature of 60 °C, and without evidence of charring, burning or melting,
- temperatures not exceeding 150 °C when the pump operates at 120 % of nominal voltage in an ambient temperature of 60 °C for 7 h.

5.4 DC bilge pumps shall be capable of withstanding a DC voltage of 500 V for 1 min without leakage in excess of 1 mA. The test voltage shall be applied between the current-carrying parts and the non-current-carrying metal parts. If the pump is internally earthed, the earth connection shall be broken in order to carry out this test.

AC bilge pumps shall be fitted with or supplied by a circuit protected by a residual current device (RCD).

5.5 Bilge pumps designed for automatic operation (automatic pumps) shall be provided with an override switch to permit manual operation if the automatic operation fails.

6 Marking

Each bilge pump shall be marked as follows, by a name-plate or other equally permanent means, with at least the following information:

- manufacturer's name or identification;
- model and/or serial number;
- electrical rating in volts and amperes;
- a reference to this document, i.e. "ISO 8849";
- output rating at 10 kPa (1 m lift) (see [4.4](#));
- the reference "[ISO 8846](#) MARINE" (if applicable).

7 Owner's manual

The following information shall be included in the owner's manual.

- The pump rating and capacities shall be stated in the installation and operating instructions provided with the pump.
- Installation and operating instructions shall be available for each bilge pump. An electrical diagram shall be provided. It shall identify each conductor and shall include the proper location of the control switch(es) in the circuit and the bonding connection, if applicable. The recommended overcurrent protection for non-integrally protected bilge pumps shall be stated.
- Information about the risk of operating a positive or semi-positive displacement pump in a dry condition.

Bibliography

- [1] ISO 8666:2020, *Small craft — Principal data*

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- user for personal or internal company use only.
- The standard may be stored on more than one device provided that it is accessible by the sole named user only and that only one copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than one copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright and Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email cservices@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services

Tel: +44 345 086 9001

Email: cservices@bsigroup.com

Subscriptions

Tel: +44 345 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK