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Small craft — Waste systems —

Part 2: Sewage treatment systems

Petits navires — Circuits d'eaux usées —

Partie 2: Traitement des eaux usées

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Foreword

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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).

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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.

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Small craft — Waste systems —

Part 2: Sewage treatment systems

1 Scope

This document specifies requirements for the design, construction and installation of sewage treatment systems on small craft.

It does not address waste retention systems, nor accidental discharge prevention of pollutants (e.g. oil, fuel) overboard.

It does not address the technical discharge limits of a sewage treatment unit, subject to certain international as well as national regulations.

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.

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ISO 8099-1:2018, *Small craft — Waste systems — Part 1: Waste water retention*

ISO 9093:2020, *Small craft — Seacocks and through-hull fittings*

ISO 8099-2:2020
https://standards.iteh.ai/catalog/standards/sist/1f0125e0-5f41-44a8-a75f-391f5130d071/iso-8099-2-2020

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

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
sewage
black water
human body wastes and the wastes, including flushing water, from toilets and other receptacles intended to receive or retain these wastes

Note 1 to entry: This includes any water that comes into direct contact with sewage.

[SOURCE: ISO 8099-1:2018, 3.2, modified - Note 1 to entry has been added.]

3.2
sewage treatment system
interconnected sanitation equipment, including the *sewage treatment unit* (3.3), hoses, pipes, tanks and fittings, designed for use on board *small craft* (3.7) to treat and dispose of treated sewage

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3.3
sewage treatment unit
unit which processes *sewage* (3.1) to reduce contaminants (e.g. nitrogen, phosphorous, coliforms and suspended solids) to acceptable levels before discharge

Note 1 to entry: Acceptable levels can be subject to certain regulations, see Annex A.

3.4
accessible
capable of being reached for inspection, removal or maintenance without removal of the permanent craft structure

3.5
readily accessible
capable of being reached for operation, inspection or maintenance without removal of any parts of the craft structure or use of any tools

3.6
sewage holding tank
tank intended to receive and hold *sewage* (3.1) or treated sewage

3.7
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.]

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4 General requirements

ISO 8099-2:2020
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4.1 Toilets shall be connected solely to a sewage holding tank system in accordance with ISO 8099-1:2018, or to a waste treatment system.

4.2 The sewage treatment system shall be installed to prevent the emission of vapor and liquids within the craft.

4.3 The sewage treatment system shall be capable of operation throughout an ambient temperature range of +1 °C to +50 °C.

For storage, the system shall withstand an ambient temperature of −40 °C to +60 °C.

4.4 The system shall be capable of operation, i.e. discharge of sewage from the toilet to the treatment system, when the boat is heeled at angles up to 20° for monohull sailing craft and 7° for other craft.

4.5 Back siphoning shall be prevented up to a heel angle to either side of at least 30° for monohull sailing craft and 20° for other craft, as well as up to a trimmed condition at the bow or stern of at least 10°:

— from raw water intakes and discharge outlets;

— from the contents and escape of gas from the treatment system back through the toilet fixture;

— from the escape of sewage from the treatment system to the exterior of the craft.

4.6 Electrical components shall meet the requirements of ISO 13297:2020.

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4.7 The sewage treatment system, including all tanks, connecting piping, hoses and fittings, shall be tested to withstand a pressure of 20 kPa for a period of 5 min without leaking.

In addition, a sewage treatment system that can be exposed to negative pressure for direct pump out by its function shall be tested to a negative pressure of 20 kPa for a period of 5 min without permanent deformation.

4.8 The sewage treatment unit shall include a visible or audible alarm.

The alarm shall be visible or audible from within the habitable space to notify of a sewage treatment unit malfunction.

4.9 The sewage treatment system shall be provided with a readily accessible means to disable discharge which shall be capable of being secured in the closed position to avoid accidental discharge.

4.10 Each part of the sewage treatment unit that is required by the manufacturer's instructions to be serviced routinely shall be accessible in the as installed position of the unit.

4.11 The sewage treatment unit shall be tested by a recognised laboratory, against the discharge limits as stated by the manufacturer.

NOTE A recognised laboratory is, for example, one that either meets the requirements of ISO/IEC 17025 or a nationally recognised testing and calibration laboratory.

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5 Materials

The materials used in the sewage treatment unit intended to receive sewage shall meet the following requirements.

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5.1 Be resistant to the effects of the following substances when partially submerged in each for 100 h at an ambient air temperature of 22 °C:

— sewage;

— any disinfectant that is required in the operation of the sewage treatment unit;

— any chemical compound in solid, liquid or gaseous form, used, emitted or produced in the operation of the device;

— fresh or salt (3,5 % sodium chloride) flush water;

— bleach;

— engine oil (SAE/30);

— ethylene glycol;

— detergents (household and bilge cleaning type).

5.2 Be resistant to being soaked 20 times, with a 1 h drying period between dousings, in each of the following substances:

— petrol;

— diesel fuel;

— bio-fuel;

— mineral spirits;

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— turpentine;

— methyl alcohol.

At the end of the tests, the materials shall retain their original properties and characteristics.

6 Plumbing system

6.1 Hoses and piping

Hoses and piping shall be suitable for use in sewage treatment systems, and shall be securely fastened in position and restrained to minimize deterioration resulting from contact with other elements of the system (e.g. hot surfaces, sharp edges) and vibration.

All hoses, pipes and fittings shall be safely accessible for visual inspection.

Piping or hose between the toilet and sewage treatment unit shall be as short as practicable and its inner surface shall:

— be smooth and without convolutions to permit free flow of sewage;

— have an inside diameter in conformity with the toilet manufacturer's recommendations; or have a minimum inside diameter of 38 mm, if no recommendations are provided.

6.2 Seacocks

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Any seacock used for overboard discharge shall be in accordance with ISO 9093:2020.

7 Vent system

ISO 8099-2:2020
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The vent system shall:

— be equipped with a means to minimise odour;

— be self-draining;

— terminate on the exterior of the craft and outside of weather enclosures;

— be installed as per the sewage treatment unit manufacturer's requirements;

— prevent water ingress.

8 Sewage holding tanks

If sewage holding tanks are separately installed or are an integral part of the sewage treatment system, they shall meet the requirements specified in ISO 8099-1:2018.

9 Pump-out fitting

If installed, pump out fittings shall meet the requirements specified in ISO 8099-1:2018.

10 Labelling

Sewage treatment units that conform to this document shall be legibly marked with the following information where applicable:

— name or trademark of the manufacturer;

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— name, model and serial number of the system;

— marking 'ISO 8099-2';

— date of manufacture;

— power supply, characteristics (e.g. V/Hertz);

— system treatment capacity, expressed in litres;

— system flow rate, expressed in litres per minute;

— the maximum negative and positive allowable unit pressure;

— the maximum allowable head of water;

— the maximum accumulated biological charge in 24 h;

— the maximum accumulated hydraulic charge in 24 h.

The marking shall be affixed in such a way that it is clearly visible after the sewage treatment system has been fitted with all the auxiliary equipment necessary for its operation. A supplementary label may be used for this purpose.

11 Installation, operation and maintenance manual

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The sewage treatment unit manufacturer shall supply the installation, operation and maintenance manual which shall include the following:

— how to install the device in a manner that will permit access to all parts of the device requiring routine service;

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— recommended methods of making required plumbing and electrical connections, including supply circuit overcurrent protection:

  — commissioning, operation, stand-by, maintenance, servicing and winterization procedures;

  — troubleshooting;

  — the cleaning procedure, including the removal of by-products;

  — a complete parts list;

  — a schematic diagram showing the relative location of each part;

  — a wiring diagram;

  — a description of the service that can be performed by the user without coming into contact with sewage or chemicals;

  — the average and peak capacity of the device for the flow rate, volume, or number of persons that the device is capable of serving and the period of time the device is rated to operate at peak capacity;

  — the power requirements, including voltage and current;

  — the maximum angles of pitch and roll at which the sewage treatment unit operates;

  — whether the device is designed to operate in salt, fresh, or brackish water;

  — the maximum hydrostatic pressure at which a pressurized sewage retention tank meets the requirements;

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