
International Standard



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Small craft — Toilet retention and recirculating systems for the treatment of toilet waste

Navires de plaisance — Systèmes de rétention et de traitement des déchets des installations sanitaires (toilettes)

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8099 was prepared by Technical Committee ISO/TC 188, *Small craft*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Small craft — Toilet retention and recirculating systems for the treatment of toilet waste

1 Scope and field of application

This International Standard specifies requirements for the design, construction and installation of sanitation systems on boats designed to hold or treat human waste for temporary disposal.

It applies to retention and recirculating systems on board small craft. Such systems are used solely for the storage and/or treatment of sewage and flush-water. The holding tanks are designed to work at ambient air pressure and temperature, or at an overpressure.

2 Reference

ISO 4567, *Shipbuilding — Yachts — Waste water fittings*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 retention system : System comprising a holding tank with all necessary fittings, to provide for the reception, venting and pumping out of sewage.

3.2 recirculating system : System comprising a holding tank with all necessary fittings, to provide for the recirculation of flushing liquid and for the reception, venting and pumping out of sewage.

3.3 system : A sanitation system comprising equipment designed for installation on board a vessel, to receive, retain, treat or discharge sewage, and equipment using any process to treat such sewage.

3.4 sewage : Human body wastes and the wastes from toilets intended to receive or treat human body wastes.

3.5 deodorant : Substance which masks or destroys offensive odours.

3.6 manufacturer : Company which assembles the various parts of the system (except where specified otherwise).

4 General requirements

4.1 Manufacturers shall provide a guarantee for their system.

4.2 If deodorants and/or chemical products are used, the manufacturer of these shall state the trade name of the product, the principle ingredients and the required concentration. This information shall be prominently displayed in a permanent form, specifying any precautions necessary for the safe storage, handling, and usage of the deodorant or chemical product.

5 Materials

5.1 Materials shall be capable of withstanding the corrosive effects of

- sewage and sewage-deodorant;
- disinfectants;
- cleaning agents;
- fresh or salt flush-water;
- a marine environment;
- any chemical compounds in solid, liquid or gaseous form, used, emitted or produced in the operation of the system;
- detergents.

5.2 Materials shall be chemically and galvanically compatible, and shall be capable of withstanding an ambient temperature range of $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.

6 Deodorant

The deodorant recommended by the manufacturer of the retention system shall comply with the following requirements :

- a) It shall be readily obtainable.
- b) It shall constitute a minimum hazard when handled, stored and used according to the manufacturers' recommendations and shall form no dangerous concentration of gases, nor react dangerously with other chemicals used for the same purpose.

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7 Design and construction

The system shall:

- a) be capable of operation when heeled 15° to either side (30° for a sailing vessel) and trimmed 10° by bow or stern, and be capable of safely withstanding $\pm 15^\circ$ pitching and $\pm 45^\circ$ rolling;
- b) be of sufficient strength for safe operation;
- c) provide for the venting of dangerous gases to the atmosphere exterior to the vessel. The vent pipe shall be of such size as to prevent an accumulation of gases and shall be designed and constructed to minimize clogging by either the contents of the tank or as a result of climatic conditions (for example snow and ice) and shall be capable of resisting the full vacuum pressure of the pump-out system;
- d) preclude the possibility of back-syphoning;
- e) prevent escape of liquids and/or sewage to the interior of the vessel;
- f) be free of design defects such as rough or sharp edges that may cause bodily injuries, and be free of design defects that would permit explosive, toxic or offensively smelling substances to escape to the interior of the vessel;
- g) be of such design and construction that the shifting contents will not endanger either the system or the vessel;
- h) provide for the permanent mounting of the device, independent of any connecting piping (mounting provisions shall not require the dismantling of any major components);
- i) be such that each part of the device required by the manufacturer's instructions to receive routine servicing is readily accessible in the installed position of the system as recommended by the manufacturer;
- j) include provisions for ease of cleaning, maintenance, and replenishment of the specified deodorant or disinfectant;
- k) be equipped with a means of indicating when the holding tank is more than 3/4 full by volume.

8 Requirements for disposal equipment

- 8.1 The system shall be designed for efficient removal of nearly all of the liquid and solids in the holding tank.
- 8.2 Baffles in holding tanks, if any, shall have openings to allow liquid and vapour to flow freely across the top and bottom of the tank.
- 8.3 The system shall be equipped with a sewage removal fitting in accordance with ISO 4567.
- 8.4 Fittings shall be designed, constructed and/or equipped to ensure an airtight closure during normal operation of the

vessel, except in cases where the deck fitting has integral venting. They shall afford minimum obstruction to the flow of sewage, be cleanable, and designed to prevent the discharge of static electricity. They shall be clearly marked with such a word or sign as will readily identify their intended use.

9 Installation, operation and maintenance

9.1 The interior of the piping or hose connecting the toilet to the holding tank shall be as smooth as is practicable to permit the free flow of sewage, and shall have an internal diameter of not less than 38 mm. The hose or piping should be as short and direct as is possible.

9.2 Where a Y-valve is fitted in the discharge from the toilet to the holding tank, to enable the sewage to bypass the tank and be discharged overboard, a positive arrangement shall be provided to prevent the accidental or unauthorized operation of the discharge valve.

NOTE — The use of a padlock, heavy tape, non-releasable wire-tie, or the removal of a handle are considered as adequate methods for securing the valve.

9.3 A shut-off valve or cock which is intended to control the discharge from the holding tank or overboard shall be so designed as to be capable of being effectively sealed in a manner which will comply with national regulations when such forbid the use of a discharge valve cited in 9.2.

9.4 The holding tank shall be placed as low as is practicable.

10 Instructions for installation

The manufacturer of a recirculating or pressurized system shall provide detailed instructions with each system, and shall include directions for the following:

- a) installation of the system in such a manner as will permit ready access to all parts requiring routine servicing;
- b) the installation of a vent pipe;
- c) recommended methods of making necessary plumbing.

The manufacturer shall also include, if appropriate:

- d) the electric power requirements, including voltage and current;
- e) a wiring diagram;
- f) recommended methods for electrical connections, including supply circuit overcurrent protection;
- g) the maximum hydrostatic pressure at which a pressurized retention tank meets the requirements of the following type tests:

1) Pressure test : Any holding tank that is designed to operate under pressure shall be pressurized hydrostatically at a pressure head of 20 kPa or to 150 % of the maximum pressure specified by the manufacturer for the operation of the tank, whichever is the greater. The tank shall hold the water at this pressure for 1 h with no evidence of leaking.

2) Pressure and vacuum pulse test : Liquid retention components of the system with the tank manufacturer's specified venting installed shall be subjected to 50 fillings of water at a pressure head of 2,14 m or the maximum pressure specified by the tank manufacturer for the operation of the system, whichever is the greater, and then emptied with a 170 l/min, or larger, positive displacement pump that remains in operation 30 s after emptying the tank at the end of each cycle.

h) the maximum operating level of liquid retention components;

i) whether the system is designed to operate in association with salt, fresh or brackish water.

11 Information leaflet

The manufacturer shall provide an information leaflet giving the following information with each system :

- a) the name of the manufacturer of the recirculating or pressurized system;
- b) the name and model number of the system;
- c) the serial number of the system;
- d) the month and year of completion of manufacture;
- e) the average and peak capacity of the system for the flow rate and volume, and the period of time for which the device is rated to operate at peak capacity;
- f) whether the system is designed to operate in association with salt, fresh or brackish water;
- g) the types and quantities of chemical products that are required to operate the system, including instructions on the proper handling, storage and use of the chemical products;

h) a description of the service which may be performed by the user without coming into contact with sewage or chemical products;

i) cleaning, winter lay/up and sludge removal;

j) operating instructions.

12 Operating instructions and safety precautions

Each system shall be supplied with a placard, permanently attached in the inlet compartment, bearing the operating instructions, safety precautions, and warnings pertinent to the system. The lettering of the placard shall not be less than 3 mm high.

The placard shall be capable of withstanding, without loss of legibility, the combined effects of normal wear and tear and the environmental conditions in a boat.

13 Identification

13.1 Each system shall be legibly marked with the information given in 13.3. The information shall appear on a nameplate attached to the system, or in lettering on the system, which shall be designed to resist efforts to remove it.

13.2 The nameplate or lettering shall be capable of withstanding, without loss of legibility, the combined effects of normal wear and tear and the environmental conditions in a boat.

13.3 The nameplate or lettering shall indicate :

- a) the name of the manufacturer of the recirculating or pressurized system;
- b) the name and model number of the system;
- c) the serial number of the device;
- d) the month and year of completion of manufacture.

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