INTERNATIONAL STANDARD

ISO 8099

Second edition
2000-12-15

Small craft — Toilet waste retention systems

Petits navires — Systèmes de rétention des déchets des installations sanitaires (toilettes)

Reference number
ISO 8099:2000(E)

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Printed in Switzerland

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

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

This second edition cancels and replaces the first edition (ISO 8099:1985), of which it constitutes a technical revision.

Annex A forms a normative part of this International Standard. Annex B is for information only.

Small craft — Toilet waste retention systems

1 Scope

This International Standard specifies requirements for the design, construction, and installation of systems for temporary retention of sewage for subsequent disposal. It applies to small craft of hull length up to 24 m.

2 Normative reference

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 228-1:1994, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*.

ISO 9093-1:1994[1)], *Small craft — Seacocks and through-hull fittings — Part 1: Metallic*.

ISO 10133:2000, *Small craft — Electrical systems — Extra-low-voltage d.c. installations*.

ISO 13297:2000, *Small craft — Electrical systems — Alternating current installations*.

3 Terms and definitions

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

3.1
retention system
interconnected sanitation equipment including hoses, pipes, holding tank and fittings designed for use on board small craft to receive, retain, vent and dispose of sewage

3.2
sewage
human body wastes and the wastes, including flushing water, from toilets and other receptacles intended to receive or retain these wastes

3.3
accessible
capable of being reached for inspection, removal or maintenance without removal of the permanent craft structure

1) EN ISO 9093-1 published in 1997.

3.4
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

3.5
portable holding tank
tank designed and intended to be removed for the disposal of its contents

3.6
holding tank
tank intended to receive and hold sewage from toilets and other receptacles for disposal at another time

4 General requirements

4.1 The system shall be capable of operation throughout an ambient temperature range of + 1 °C to + 60 °C and shall withstand, when empty, an ambient temperature range of – 40 °C to + 60 °C.

4.2 The system shall be installed to prevent the emission of noxious gases within the craft.

5 Materials

Materials shall be resistant to the effects of the following:

a) sewage;

b) fresh, salt or brackish water with

- impurities,
- waste water from toilet systems,
- oily bilge water;

c) disinfectants, deodorants and antifreeze solutions recommended by the system manufacturer;

d) household cleaning agents recommended by the system manufacturer;

e) chemical compounds, in solid, liquid or gaseous form, likely to be generated by the operation of the system.

6 Design and installation

6.1 Characteristics

6.1.1 Introduction

The toilet retention system, as installed in the craft, shall have the characteristics specified in 6.1.2 to 6.1.11.

6.1.2 Operation

The system shall be capable of operation, i.e. discharge of waste from the toilet or retention system, when the boat is heeled at least 20° to either side and trimmed at least 10° by bow or stern.

6.1.3 Back siphoning

Back siphoning of the contents and escape of gas from the holding tank back through the toilet fixture shall be prevented up to a heel angle to either side of at least 30° for monohull sailing craft, 20° for other craft and a trimmed condition at the bow or stern of at least 10°.

6.1.4 Escape of sewage

Escape of sewage from the holding tank to the exterior of the craft shall be prevented when the boat is heeled to either side at least 30° for monohull sailing craft, 20° for other craft, at 90 % of tank capacity and to the interior of the craft under maximum anticipated conditions of heel or trim, i.e. 45° for monohull sailing craft, 30° for engine-driven craft and multihull sailing craft.

6.1.5 Fastening

The holding tank shall be securely fastened and located independently of any connecting piping.

6.1.6 Location and accessibility

Pump-out deck fittings shall be readily accessible, with access, for pump-out connections, and located in relation to fittings for potable water and fuel filling to reduce the possibility of accidental contamination.

6.1.7 Indication of contents

The level of holding-tank contents shall be observable when the holding tank is 3/4 full by volume, when the tank is viewed directly while installed in a readily accessible location, or by another means.

6.1.8 Access opening

Holding tanks of capacity greater than 40 litres shall have an accessible sealable, (i.e. vapour and liquid tight) minimum opening of 75 mm diameter or smallest dimension to the holding tank interior for flushing, cleaning and maintenance.

6.1.9 Tank walls

Holding tanks shall not have common walls, tops or bottoms with fuel and potable-water tanks.

6.1.10 Hoses and piping

Connecting hoses and piping shall be securely fastened in position to prevent damage by abrasion or vibration.

6.1.11 Accessibility of fittings and connections

Holding-tank fittings and connections shall be accessible for inspection and maintenance.

6.2 System venting for fixed holding tanks

6.2.1 Venting of gases

The system shall provide for venting of gases within the system to the exterior of the craft at heel angles up to 20° at 90 % of tank capacity.

6.2.2 Rigid tanks

6.2.2.1 Capacity of less than 400 litres

The minimum inside diameter of the vent pipe shall be 19 mm, or a vent pipe of inside diameter not less than 16 mm may be used if the tank is fitted with an automatic (vacuum operated) or manual relief valve with a minimum combined area of 1 100 mm^2.

6.2.2.2 Capacity of 400 litres and greater

The minimum inside diameter of the vent pipe shall be 38 mm, or, if multiple vent pipes are used, their inside diameter shall be at least 19 mm and the combined cross-sectional flow area shall be at least equivalent to that of a single vent pipe with an area of 1 100 mm^2. As an alternative, a vent pipe of inside diameter not less than 16 mm may be used if the tank is fitted with an automatic (vacuum operated) or manual relief valve with a minimum combined area of at least 1 100 mm^2.

If a manual relief valve is fitted, a sign shall be installed, in symbols or language acceptable in the country of use, located in the vicinity of the pump-out deck fitting, indicating that the relief valve must be opened prior to pump out.

6.2.3 Flexible tanks

Flexible (collapsible) tanks shall have at least one vent of inside diameter minimum 16 mm.

6.2.4 Inside diameter of fittings

The inside diameter of fittings to which vent piping is connected shall not be less than 75 % of the inside diameter of the piping with a length of less than six times the inside diameter of the fitting.

6.2.5 Prevention of clogging — Pressure resistance

The design and construction of the vent system shall minimize clogging by either the contents of the tank or as a result of climatic conditions such as snow and ice. The vent shall be capable of resisting, without damage, a negative pressure of 50 kPa.

6.2.6 Flow area

The minimum flow area through vent screens and equivalent flow resistance of any filters installed in the vent system shall be not less than the smallest flow area in either the vent pipe or its fittings.

6.3 Electrical systems

Electrical systems shall meet the electrical requirements of ISO 13297 and ISO 10133.

6.4 Piping/hose

Piping or hose between the toilet and holding tank, and between the tank and the pump-out deck fitting, 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.

See 6.5 and clause 11.

6.5 Seacock fitting

Retention systems with the possibility of direct overboard discharge of sewage to the sea shall be fitted with a seacock at the through-hull fitting. Any seacock used for direct overboard discharge shall be in accordance with ISO 9093-1 and shall be capable of being sealed in the closed position.

6.6 Pump-out deck fitting

Fixed systems shall be equipped with a pump-out deck fitting in accordance with clause 11.

NOTE Illustrations of typical installations for toilet retention systems are shown in Figures B.1 and B.2 in annex B.

7 Requirements for fixed holding tanks

7.1 The tank, as designed, shall provide removal of at least 90 % of the contents of the holding tank through the pump-out deck fitting.

7.2 Baffles, if any, in holding tanks shall have openings to allow sewage and vapour to flow freely across the top and bottom.

7.3 Fittings, including the covers of clean-out openings, shall be designed and constructed to ensure a gastight and watertight closure.

8 Requirements for portable holding tanks

8.1 Portable holding tanks shall be of capacity less than 20 litres and shall not be connected to any pump-out fitting or outlet.

8.2 The internal diameter of the vent line for portable holding tanks, if used, shall not be less than 16 mm and shall have a quick disconnect at the tank-vent opening, with a cap or closing device permanently attached to the tank, which ensures a watertight seal during transport of the tank.

8.3 All other holding-tank openings shall be sealed with watertight and gastight closing devices.

8.4 Handles or recesses for carrying the tank shall be provided on the tank in a location that will allow safe transport and emptying of the tank.

8.5 A label that shows how to disconnect, transport and empty the tank shall be visibly displayed on the tank.

9 Test for fixed holding tanks

The tank and the system connecting piping or tubing including all fittings, as installed, shall be tested to withstand a pressure of 20 kPa for a period of 5 min without leaking. The tank shall withstand a negative pressure of 20 kPa without permanent deformation.

10 Identification

Prefabricated holding tanks delivered for resale shall be legibly marked on the holding tank with the following information:

— name or trademark of the manufacturer;

— name and/or model number of the system;

— “ISO 8099”;

— the symbol for “Toilet waste tank” as indicated in Figure A.2, or in language acceptable in the country of use;

— tank capacity, expressed in litres.

11 Pump-out deck fitting

11.1 The dimensions of the pump-out deck fitting shall be as shown in Figure A.1.

NOTE Figure A.1 does not determine the overall design.

11.2 Threads shall be in accordance with ISO 228-1.

11.3 The pump-out deck fitting shall be identified by marking, on the fitting or in its vicinity, with at least the symbol in accordance with Figure A.2.

12 Information for owner's manual

Literature on the system operation and maintenance shall be furnished with the system or incorporated into the owner's manual for the craft and shall include at least the following information:

a) operation and maintenance;

b) Y valve use:

   — sealing,

   — avoidance of inadvertent discharge;

c) capacity of the holding tank, expressed in litres;

d) chemicals acceptable for use:

   — cleaning materials,

   — deodorants,

   — anti-freeze solutions;

e) pump-out procedure including use of the manual relief valve, if applicable;

f) instruction that the system shall be empty during storage at freezing temperatures.

Annex A
(normative)

Nominal design of pump-out fitting

A.1 Characteristics

The main dimensions shall be as shown in Figure A.1. In particular, the thread shall be in accordance with ISO 228-1.

The fitting shall have a sealing cap, the design of which is left to the discretion of the manufacturer.

NOTE Figure A.1 does not determine the overall design.

Dimensions in millimetres

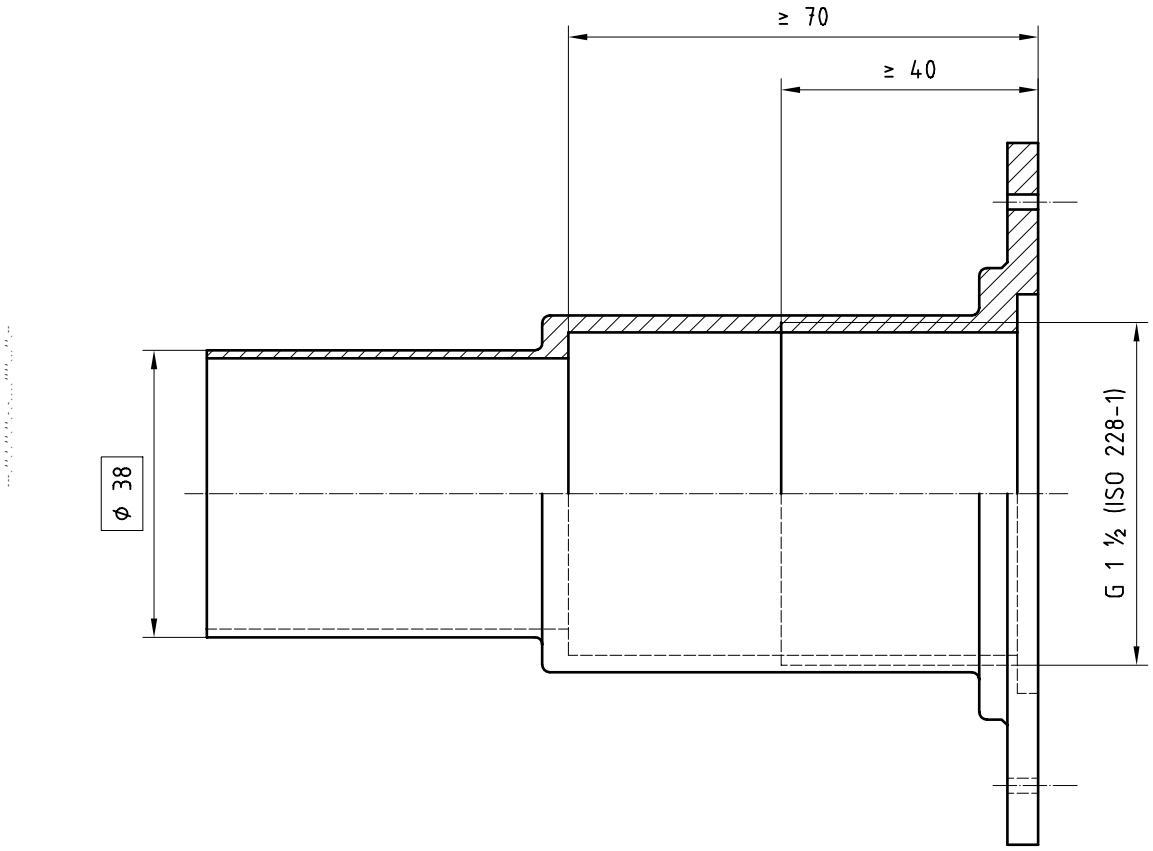


Figure A.1 — Dimensions of pump-out deck fitting

A.2 Marking

The pump-out deck fittings complying with this International Standard shall be marked by at least the symbol shown in Figure A.2.

The symbol shall be placed visibly on, or in the vicinity of, the fitting.

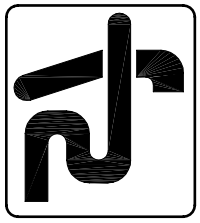
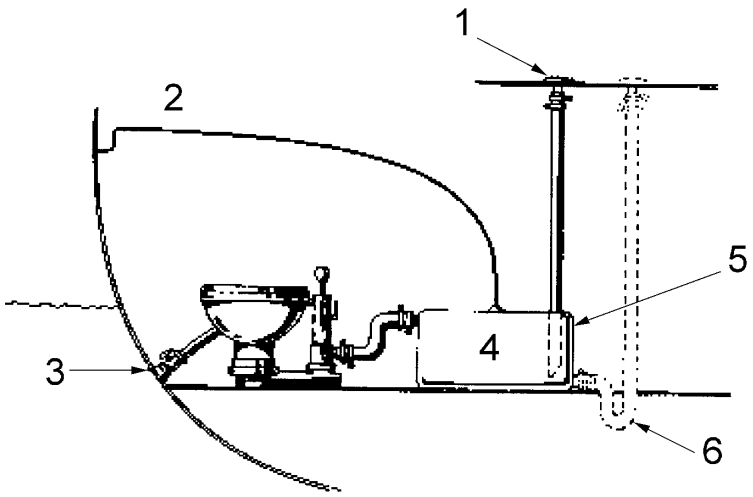


Figure A.2 — Pump-out deck fitting symbol

Annex B
(informative)

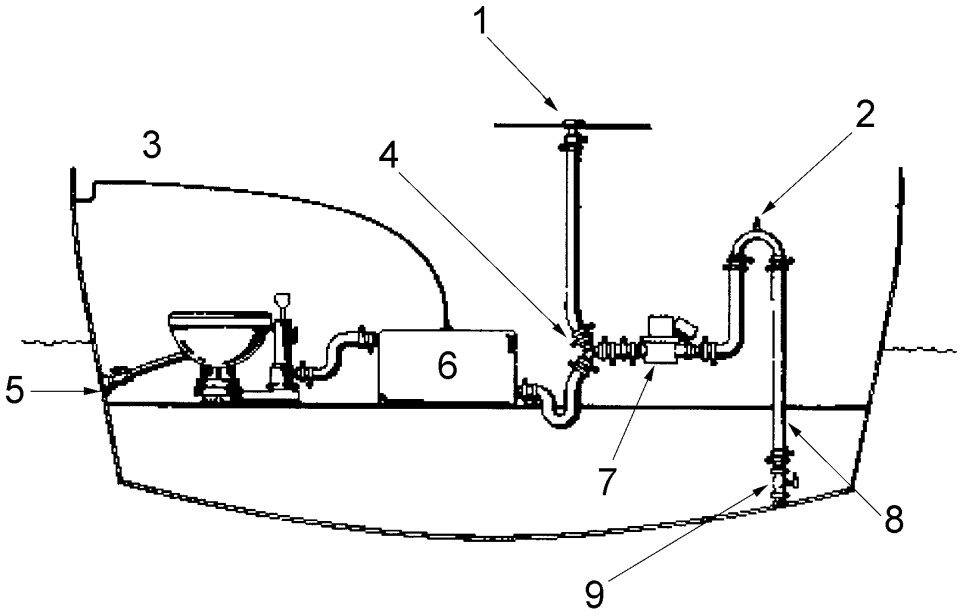
Typical installations for toilet retention systems



Key

1 Pump-out deck fitting
2 Vent
3 Intake through hull
4 Holding tank
5 Dip tube
6 P-trap

Figure B.1 — Toilet retention system with deck pump-out only



Key

1 Pump-out deck fitting
2 Siphon break may be necessary if system is below waterline
3 Vent
4 Y-valve
5 Intake through hull
6 Holding tank
7 Macerator pump
8 Overboard discharge
9 Seacock

Figure B.2 — Toilet retention system with deck pump-out and overboard discharge capability

ICS 47.080

Price based on 10 pages