INTERNATIONAL STANDARD

ISO 15748-1

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Ships and marine technology — Potable water supply on ships and marine structures —

Part 1: Planning and design

Navires et technologie maritime — Approvisionnement en eau potable sur navires et structures maritimes —

Partie 1: Planification et conception

Reference number
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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.

The main task of technical committees is to prepare International Standards. 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 part of ISO 15748 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15748-1 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

ISO 15748 consists of the following parts, under the general title *Ships and marine technology — Potable water supply on ships and marine structures*:

— *Part 1: Planning and design*

— *Part 2: Method of calculation*

Annexes A, B and C of this part of ISO 15748 are for information only.

Ships and marine technology — Potable water supply on ships and marine structures —

Part 1: Planning and design

1 Scope

This part of ISO 15748 applies to the planning, design and configuration of potable water supply systems on ships, stationary or floating marine structures and inland navigation vessels.

This part of ISO 15748 specifies the minimum requirements for potable water supply systems to be met in order to protect the potable water and to maintain its quality.

It also provides hints on components to be used and on laying of the pipelines.

NOTE The transfer of potable water and the regulations to be observed are not covered by this part of ISO 15748. The transfer of potable water is subject to special regulations.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15748. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15748 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 ISO and IEC maintain registers of currently valid International Standards.

ISO 7-1, *Pipe threads where pressure-tight joints are made on the thread — Part 1: Dimensions, tolerances and designation*

ISO 65, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

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

ISO 274, *Copper tubes of circular section — Dimensions*

ISO 426-2, *Wrought copper-zinc alloys — Chemical composition and forms of wrought products — Part 2: Leaded copper-zinc alloys*

ISO 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*

ISO 1635, *Wrought copper and copper alloys — Round tubes for general purposes — Mechanical properties*

ISO 4200, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ISO 5620-1, *Shipbuilding and marine structures — Filling connection for drinking water tanks — Part 1: General requirements*

ISO 14726-1, *Ships and marine technology — Identification colours for the contents of piping systems — Part 1: Main colours and media*

ISO 14726-2[1)], *Ships and marine technology — Identification colours for the contents of piping systems — Part 2: Additional colours for different media and/or functions*

ISO 15748-2, *Ships and marine technology — Potable water supply on ships and marine structures — Part 2: Method of calculation*

SOLAS 1974, *International Convention for the Safety of Life at Sea, 1974*

3 Terms and definitions

For the purposes of this part of ISO 15748, the following terms and definitions apply.

3.1
potable water supply system
system for the generation, treatment, transfer, conveyance, storage, transport and distribution of potable water

3.2
water treatment plant
equipment for treating potable water whilst maintaining potable water properties, e.g. using filters, dosage plants, ion exchangers, disinfecting plants

3.3
potable water heaters
appliances used to heat potable water without affecting its properties for consumption apart from a change in temperature, e.g. continuous-flow water heaters, storage heaters

3.4
apparatus
collective term for technical installations making use of and/or transforming potable water

EXAMPLE

— distillation and sterilization apparatus;

— large-scale cooking equipment, dosage plant;

— pressurized water reservoirs, water heaters;

— dishwashers, coffee machines, as well as devices of all kinds forming part of the potable water system or connected temporarily or permanently to it, except for supply and circulating pumps.

3.5
water
collective term for all types of water used for water supply

1) To be published

3.6
raw water
untreated water

NOTE Raw water and sea water are considered equivalent.

3.7
freshwater
water originally intended for human consumption and use on board as potable water but also used for certain technical purposes and for sanitary-hygienic needs

3.8
potable water
water suitable for human consumption and use in compliance with the quality requirements laid down in the applicable statutory provisions, defined in this part of ISO 15748 as:

a) water from a central public potable water supply;

b) water converted from sea water by evaporation at temperatures exceeding 80 °C;

c) water converted from sea water by evaporation at temperatures below 80 °C, and which has additionally been sterilized;

d) water generated by reverse osmosis;

e) hot potable water heated in suitable water heaters.

3.9
cold water
cold potable water at temperatures between 5 °C and 25 °C

NOTE The upper temperature limit may be higher e.g. in the tropics.

3.10
hot water
hot potable water at temperatures between 50 °C and 90 °C, usually up to 60 °C

3.11
mixed water
hot and cold potable water mixed by means of a mixer tap

3.12
potable water line
pipeline exclusively carrying potable water

3.13
supply line
entire potable water pipeline system downstream of the discharge (supply) pump

3.14
water main
section of piping between the discharge pump and the point where the cold water line branches off from the line leading to the central water heater

3.15
distribution line
section of the supply line downstream of the watermain

3.16
ring line
distribution line providing bidirectional water supply by way of loop-type installation

3.17
hot-water ring line
distribution line for unidirectional supply only with water circulation by means of a circulating pump to feed back unused hot water to the water heater

3.18
circulating line
section of the cold/hot-water ring line without dispensing point, via which unused cold water is fed back to the suction side of the supply pump or unused hot water is fed back to the water heater

3.19
trunk line
riser
vertical section of the supply line branching off from a distribution line

NOTE Deck lines and dispensing lines branch off from trunk lines.

3.20
deck line
section of the supply line branching off from the trunk line within one deck

3.21
service line
single feed line
section of the supply line leading from the deck line to the consumer

3.22
pump discharge line
discharge line downstream of the discharge outlet of a pump

3.23
pump return line
line through which water is fed to the pump

3.24
service fitting/outlet fitting
fitting for shutting off, releasing and controlling the volume flow at the end of a supply line, the outlet side thereof being in accordance with the service function, e.g. equipment valve, outlet valve, flush valve, mixer tap

3.25
safety fitting
fitting to protect system parts against inadmissible pressure and temperature transgressions, e.g. safety valves

3.26
protective fitting
fitting to protect the water characteristics in the piping system, e.g. vacuum breakers in connection with non-return valves, pipe disconnectors

3.27
filter
device for extraction of solid matter from potable water

3.28
calculation flow
assumed flow at the service fitting taken as calculation basis:

$$\dot{V}_R = \left(\dot{V}_{min} + \dot{V}_0\right)/2$$

where

$\dot{V}_R$ is the calculation flow, expressed in litres per second;

$\dot{V}_{min}$ is the minimum flow, expressed in litres per second;

$\dot{V}_0$ is the peak flow, expressed in litres per second.

3.29
sum flow
sum of the calculation flows for all water-consuming units served via one cross-section

3.30
peak flow
flow decisive for hydraulic calculation, taking into consideration probable simultaneous water withdrawals during operation

3.31
closed continuous flow heater
water heater resistant to pressure wherein the water is heated whilst passing the heater, with or without storage

3.32
open storage heater
pressureless water heater, heating and storing water in a container which is part of the storage heater

4 Capacity requirements

On ships, marine structures and inland waterway craft, pure potable water shall always be available in sufficient quantity. The potable water supply system shall be sized and designed accordingly.

Depending on needs, sufficiently sized potable water storage tanks and/or plants for the conversion of sea water to potable water shall be provided.

Any accommodation areas on ships and marine structures that are not provided with a dispensing facility from a central potable water supply shall be equipped with a sufficiently sized potable water container.

5 Sanitary requirements

5.1 Potable water

The quality of the potable water shall be such that its consumption and use will not affect human health, particularly as far as pathogenic microorganisms are concerned; i.e. potable water

— shall be free of pathogenic microorganisms;

— shall be as sterile as possible;

— should be palatable (it shall be colourless, clear, cool, odourless and acceptable with respect to taste);

— may only contain traces of dissolved minerals.

As far as health considerations are concerned, the potable water characteristics shall comply with the potable water regulations stated by the authorized national governmental bodies.

5.2 Protection of the potable water, maintenance of the potable water quality

5.2.1 Potable water supply systems shall be fitted with a means of sterilizing water transferred from land-based facilities or water stored on board for a prolonged period of time.

5.2.2 It is not permissible to connect potable water lines to lines or facilities carrying water which is not potable (e.g. cooling freshwater lines); there shall be a hygienically reliable separation between these lines, which may be achieved, e.g.

— by means of a free air line;

— by means of an indirect connection via the storage units (water supply via a free air line);

— by means of a pipe disconnector;

— by means of a back flow preventer.

5.2.3 Potable water dispensing points where a backflow of water is possible shall be secured by means of protective fittings in accordance with 3.26.

5.2.4 Any material, auxiliary material or protective coating used shall be safe from a hygienic and physiological point of view, and shall be sufficiently resistant to any physical, chemical or corrosive stress to be anticipated. It shall not release any substances which may influence the digestibility, taste, smell or colour of the potable water. If applicable, the coating shall comply with the requirements of national authorities.

Pressurized components shall not be negatively influenced by water temperatures of up to 90 °C. For service fittings the maximum temperature is 70 °C.

5.2.5 Internal corrosion shall be prevented as far as possible by selecting and using materials that are suitable for potable water (cold or hot) and that are compatible with each other.

5.2.6 Compressed-air cushions directly contacting the water surface inside the pressurized reservoir shall not impair the quality of the potable water.

5.2.7 Plastics and other non-metallic materials shall conform to the requirements and recommendations concerning the suitability of these materials to potable water, stated by the authorized national bodies.

6 Potable water supply systems

A potable water supply system includes all facilities, piping and apparatus serving to transfer, store, treat, transport or dispense potable water. Also included in this definition are facilities serving to produce potable water, e.g. distillation from sea water.

If the potable water is conveyed through apparatus and facilities that will impair its alimentary quality as defined by the regulations, the potable water system terminates at the assigned safety fitting. The following components may be included in potable water supply systems:

— potable water tanks;

— transfer, operating and service lines;

— pumps;

— pressurized water reservoirs;

— potable water heaters;

— potable water treatment plants;

— potable water distillation plants;

— fittings (shut-off, safety, protection and supply or outlet fittings);

— measuring and control devices. Figure 1 shows an example of realization of a potable water supply system.

7 Technical requirements

7.1 Associated regulations

In planning the installation of potable water supply systems, the following regulations and directives shall be observed:

— rules for classification and construction of seagoing ships stated by the relevant classification society;

— technical rules given by a marine employer's liability insurance (if applicable);

— nationally-stated requirements concerning potable water systems.

7.2 Identification marking

Fittings and appliances shall be marked legibly and permanently with the manufacturer's designation or name in order to readily provide identification of the product at any time. The marking shall comply with the applicable regulations.

7.3 Pressure and temperature

7.3.1 For safety reasons all components shall be designed to sustain the same working pressures; this pressure shall comply with the highest set pressure of a safety valve within the system.

7.3.2 Pressure surges and drops occurring during operation shall not exceed the applicable limits (see ISO 15748-2). This, and the admissible flow rates, shall be taken into consideration when selecting the fittings.

7.3.3 Temperature increases in cold water pipes shall be prevented by suitable means; see explanations in annex A.

7.3.4 The water temperature in hot water pipes shall be at least 50 °C; see explanations in annex A.

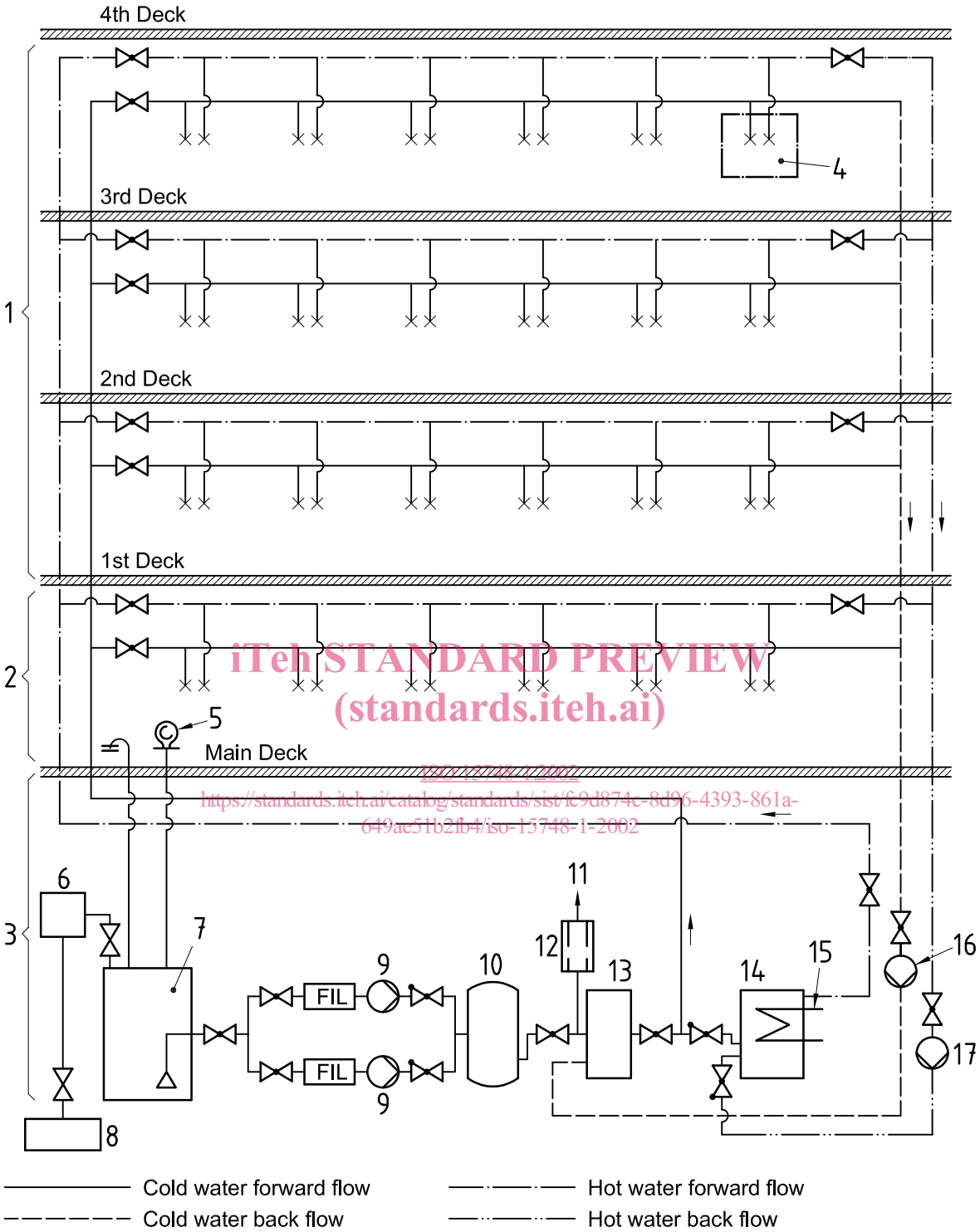
8 Pipelines

8.1 Air pipes, filling pipes and overflow pipes

For air pipes, filling pipes and overflow pipes see the requirements of the relevant classification society. The filling connection for drinking water tanks shall be in accordance with ISO 5620-1.

8.2 Sounding pipes

For sanitary reasons, sounding pipes for operational gauging in potable water tanks are not permitted. To check the level, fluid level gauges or devices for measuring tank contents shall be installed.



Key

1 Accommodation area with showers/W.C.
2 Commissary area
3 Engine room
4 Shower/W.C.
5 Filling connection for potable water tanks (see ISO 5620-1)
6 Potable water generator
7 Drinking water tank
8 Sea chest
9 Potable water supply pump
10 Pressure tank
11 Technical load
12 Pipe disconnector
13 Sterilization
14 Water heater
15 Heating medium
16 Cold water circulating pump
17 Hot water circulating pump

Figure 1 — Example of a potable water supply system on a ship with four superstructure decks