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Ships and marine technology — Drainage systems on ships and marine structures —

Part 5: Drainage of decks, cargo spaces and swimming pools

Navires et technologie maritime — Installations de drainage sur navires et structures maritimes —

Partie 5: Drainage des ponts, des cales et des piscines

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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15749-5 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

ISO 15749 consists of the following parts, under the general title *Ships and marine technology — Drainage systems on ships and marine structures*:

— *Part 1: Sanitary drainage-system design*

— *Part 2: Sanitary drainage, drain piping for gravity systems*

— *Part 3: Sanitary drainage, drain piping for vacuum systems*

— *Part 4: Sanitary drainage, sewage disposal pipes*

— *Part 5: Drainage of decks, cargo spaces and swimming pools*

Ships and marine technology — Drainage systems on ships and marine structures —

Part 5: Drainage of decks, cargo spaces and swimming pools

1 Scope

This part of ISO 15749 applies to the planning and design of drain lines for gravity-operated conveyance of grey water from

— weather decks and non-weathertight spaces on ships and marine structures,

— ro-ro spaces,

— cargo spaces, and

— swimming pools.

NOTE Wastewater from spaces in which live animals are accommodated is classified as sewage water and shall be discharged in accordance with MARPOL regulations. For drainage of sewage, see ISO 15749-2 and ISO 15749-3.

For planning and basic requirements, see ISO 15749-1.

2 Normative references

The following referenced documents are indispensable for the application 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 65, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

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

ISO 9329-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Unalloyed steels with specified room temperature properties*

ISO 9330-1, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Unalloyed steel tubes with specified room temperature properties*

ISO 15749-1, *Ships and marine technology — Drainage systems on ships and marine structures — Part 1: Sanitary drainage-system design*

ISO 15749-4, *Ships and marine technology — Drainage systems on ships and marine structures — Part 4: Sanitary drainage, sewage disposal pipes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15749-1 and the following definition apply.

3.1
drain line
pipeline which serves to carry wastewater from drains directly overboard or into the bilge using the gravity principle without a collector tank or sewage treatment plant being connected in between

4 Drainage of exposed decks and non-weathertight spaces

4.1 Basic considerations

4.1.1 Wastewater from exposed decks and superstructure or deckhouses, without weathertight doors, shall be discharged overboard.

4.1.2 Open superstructure decks may be drained directly overboard or via pipes leading from one deck to the next lower deck.

4.1.3 The weather deck shall be drained overboard mainly via openings in the bulwark. Residual wastewater that cannot be drained via these openings has to be discharged overboard via drain lines.

4.1.4 The drain line from the funnel or stack top should not terminate on an exposed deck owing to the soot that may be contained in the wastewater.

This line may, taking the quantity of wastewater occurring into consideration, be connected to other lines draining exposed decks and leading directly overboard.

4.2 Drains

Drains shall be fitted with water discharges without odour seals.

4.3 Piping

4.3.1 Types of pipes

For deck drainage, the following pipes may be used:

— steel pipes in accordance with 9.1;

— spigot and socket steel pipes, but only in the exposed superstructure deck area.

Plastic pipes may be used only with the approval of the classification society.

4.3.2 Nominal bore

The nominal bores of the above-mentioned pipes usually range from NB 40 to NB 150.

Table 1 gives information about the possible amount of drainage, depending on the nominal bore and assuming gravity delivery lines.

Table 1 — Amount of drainage

Nominal bore, NB	40	50	65/70	80	100	125	150
Amount of drainage, l/s	0,4	0,7	1,8	2,6	4,7	8,5	13,8

The amount of drainage can be calculated using the diagram in Annex A.

5 Drainage of cargo holds on bulkhead decks of passenger ships and on freeboard decks, respectively, and on vehicle decks of cargo ships

Cargo spaces on the bulkhead deck of passenger ships or on the freeboard deck of cargo ships, respectively, shall be discharged directly overboard in case of 5° list. Drain lines to overboard shall have a non-return fitting in accordance with ISO 15749-4.

Wastewater from refrigerated cargo spaces is generally drained into the bilge via separate drain lines.

If the deck edge is immersed with the ship listing less than 5°, the wastewater shall be drained into sufficiently dimensioned collector tanks.

These collector tanks shall be equipped with level alarms and shall be capable of being drained overboard via appropriate equipment.

Additionally, it shall be guaranteed that

— scuppers are dimensioned and arranged in sufficient numbers such that accumulation of free water will be prevented,

— dimensioning of the gravity delivery line shall take into account the volume of water from the deluge system and that from the required fire-hose nozzles,

— water polluted with fuel and/or dangerous products cannot be drained into engine rooms or other spaces with ignition sources, and

— the scupper in holds protected by a CO_2-plant shall have installations which prevent the leakage of fire-extinguishing gas.

6 Drainage of swimming pools

6.1 Swimming pools on exposed decks

The discharge lines of drains and swimming pool overflows on exposed decks shall be routed directly over the side in the same way as the drain lines for deck drainage.

If the stability calculations for a ship do not include a swimming pool on the exposed deck, the relevant classification society shall be consulted as to whether and how emergency drainage has to be provided.

6.2 Indoor swimming pools

6.2.1 Swimming pools above the freeboard deck

See 6.1 and Clause 8.

6.2.2 Swimming pools on and below the freeboard deck

Swimming pools located in this area may be drained directly overboard via suitable closing devices in accordance with ISO 15749-4.

6.3 Piping

Steel pipes in accordance with 9.1 or 9.2 shall be used.

7 Wastewater discharges

Drain line outlets in the shell coming from exposed decks, vehicle decks, and swimming pools shall not be located in the vicinity of gangways and in areas where lifeboats are launched.

8 Shut-off fittings (closing devices)

See ISO 15749-4.

9 Piping

9.1 General

Piping shall comply with the requirements of the relevant classification society.

Taking into consideration the stipulations laid down in Clauses 4 to 6, the following pipes shall be used as drain pipes:

— steel pipes in accordance with 9.2;

— steel pipes with spigot and socket joints in accordance with 9.3.

Nominal bores shall be selected in accordance with Table 3 and Table 4, respectively.

9.2 Steel pipes

9.2.1 Types of pipes

The following types of pipes or equivalent pipes are applicable:

— seamless steel pipes in accordance with ISO 4200 and ISO 9329-1, of S 235 JR;

— welded steel pipes in accordance with ISO 4200 and ISO 9330-1, of S 235 JR;

— threaded pipes in accordance with ISO 65, of S 185.

9.2.2 Dimensions

The wall thickness of drain lines shall be selected from types A, B and N in accordance with Table 2 and Table 3, depending on the place of installation.

Table 2 — Wall thickness types for steel pipes depending on place of installation

Place of installation		Wall thickness type
Tank with same medium		A
Tank with different medium [a]		B
Below freeboard or bulkhead deck [b]	without shutoff valve at the shell (for wastewater from exposed deck)	B
	with shutoff valve at the shell	A
Above freeboard deck [c]		N
Cargo hold		B
Pipes terminating in the bilge		A

[a] See ISO 15749-1.
[b] See ISO 15749-4.
[c] Permitted only in exceptional cases after consultation with the classification society.

Table 3 — Dimensions for steel pipes

Nominal bore, NB	**Outside pipe diameter**, d	**Wall thickness**, s_{min}, with wall thickness type			
		mm			
		A	B	N	
	mm			a	b
40	48,3	4,5	6,3	2,3	2,6
50	60,3	4,5	7,1	2,3	2,9
65	76,1	4,5	7,1	2,6	2,9
80	89,9	4,5	8	2,9	3,2
100	114,3	4,5	8	3,2	3,6
125	139,7	4,5	8,8	3,6	4
150	168,3	5	10	4	4,5

[a] For pipes in accordance with ISO 4200, thickness range D.
[b] For pipes in accordance with ISO 4200, thickness range E.

9.3 Spigot and socket steel pipes

For the employment of spigot and socket steel pipes, including their processing and laying, see the manufacturer's instructions.

Pipes with socket joints and cylindrical guidance (A) made of steel or of stainless steel shall be used.