

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Order on the construction and equipment of small commercial vessels and cargo vessels, etc.

Pursuant to Section 1(2), Section 3(1), Section 4(2), and Section 32(9), of the Maritime Safety Act, cf. Order No. 1629 of 17 December 2018, and Section 1(2), Section 3(1), Section 4(2), and Section 32(2) of the Order on the entry into force for Greenland of the Maritime Safety Act, cf. Order No. 1674 of 16 December 2015, shall be determined after authorisation in accordance with Section 1(1)(No. 3), in Order No. 261 of 23 March 2020 on the transfer of certain powers to the Danish Maritime Authority and on the right of appeal, etc., and Section 1(1)(No. 2), in Order No. 279 of 23 March 2020 for Greenland on the transfer of certain powers to the Danish Maritime Authority and on the right of appeal, etc.:

Section 1. The Order and its Annexes shall apply to:

- 1) New commercial vessels with a length L of less than 15 m and with a scantling number between 20 and 100, subject to Subsection 2. Vessels regularly used for navigation with up to 12 passengers must also comply with the current rule on small vessels carrying up to 12 passengers.
- 2) New cargo vessels of length L of 15 to 24 m, and of a scantling number of 100 or above, subject to Subsections 2 and 5.

Subsection 2. The Order and its Annexes shall apply to existing commercial vessels and existing cargo vessels to the following extent:

- 1) Existing commercial vessels with a length L of less than 15 m, and with a scantling number between 20 and 100, and existing cargo vessels with a length L of 15 to 24 m, and with a scantling number of 100 or more shall comply with Sections 5-8, Section 10 and Section 11, rule 7(1. 7.6.1), Subsection 7.7, and Rule 14(14.3), second indent, in Annex 3, Rule 12(2) in Annex 4 and Annexes 5 to 9.
- (2) Existing fishing vessels as defined in Subsection 3(No. 7) shall, in addition to the provisions of Subsection 1, comply with Rule 7(7.10) of Annex 3.
- (3) Existing mussel fishing vessels as defined in Section 3(No. 9) shall, in addition to the provisions of No. 1, comply with Annex 2 with the exception of Rule 4(4).

Subsection 3. The Order shall also apply to natural or legal persons in Denmark who carry out conversions on covered small commercial vessels and cargo vessels.

Subsection 4. This Order shall not apply to:

- 1) Passenger vessels,
- 2) Warships and troop carriers,
- 3) Recreational craft,
- 4) Wooden vessels of primitive construction (Viking ships), and
- 5) Vessels not propelled by mechanical means.

Subsection 5. Cargo vessels with a length of 15 to 24 metres and a scantling number of 100 or above shall comply exclusively with the Order on the construction and equipment of ships, etc,

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implementation of the International Convention for the Safety of Life at Sea (SOLAS) 1974, when operating more than 100 nautical miles from the nearest coast.

Section 2. Small commercial vessels and cargo vessels must comply with Annexes 1-10 to the Order, while cargo vessels must also comply with the additional rules in Annex 11 to the Order.

Subsection 2. The Order shall contain provisions in the Annexes on:

- 1) Structure, watertight integrity and equipment, cf. Annex 1.
- 2) Stability and seaworthiness, cf. Annex 2.
- 3) Machinery and electrical installations, cf. Annex 3.
- 4) Fire protection, fire detection and fire extinguishing, cf. Annex 4.
- 5) Protection of crew, working environment and safety, etc., cf. Annex 5.
- 6) Rescue equipment and arrangements, cf. Annex 6.
- 7) Emergency procedures, musters, and drills, cf. Annex 7.
- 8) Radio communications, cf. Annex 8.
- 9) Safety of navigation, cf. Annex 9.
- 10) Special provisions for Greenland, cf. Annex 10.
- 11) Additional rules for cargo vessels of 15 to 24 metres, cf. Annex 11.

Section 3. For the purposes of this Order:

- 1) Vessel: any object covered by Section 1(1), including a ship, cutter, boat, dinghy or similar, used as a means of transport on water.
- 2) Decked vessel: vessel which is fully decked or covered. This means that it is fitted with a continuous watertight deck above the waterline at the deepest operating waterline, with adequate weathertight means of closure for all openings.
- 3) Open vessel: vessel that is not a decked vessel. An open vessel may be partially covered over.
- 4) New vessel: a vessel for which
 - (a) The contract for new construction or major renovation is entered into on or after 1 July 2021,
 - (b) The contract for new construction or major renovation was entered into before 1 July 2021 and is delivered after 1 July 2021, or
 - (c) There is no building contract but the vessel undergoes its first survey on or after 1 July 2021.
- 5) Existing vessel: vessel which is not a new vessel.
- 6) Date of construction of the vessel: time for which
 - (a) The contract for the construction or major conversion of the vessel was entered into before, on or after the date indicated,
 - (b) The keel has been laid or construction identifiable with a particular vessel has commenced without a construction contract, or
 - (c) Assembly of the vessel has commenced, comprising at least 1% of the total weight.
- 7) Fishing vessel: vessel used for the commercial catching of fish, whales, seals, walrus, shellfish or other living resources from the sea, including vessels fitted out as fishing vessels and able to process their own catch or whose nationality certificate bears a port identification number.

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- (8) Beam trawler: fishing vessel designed for fishing by a type of bottom trawl where the trawl is tied to a fixed steel frame and where two beams are normally used, which are swung over the side so that two trawls are towed.
- 9) Mussel fishing vessel: special vessel used for catching mussels, oysters, cockles and similar in Danish waters and for which the Danish Fisheries Agency has issued a licence.
- 10) Passenger vessel: vessel carrying more than 12 passengers.
- 11) Cargo vessel: vessel other than a passenger vessel or a fishing vessel.
- 12) Tank ship: cargo vessel built or adapted for the carriage in bulk of liquid cargo of a flammable nature.
- 13) Recreational craft: craft used for sport or leisure purposes, irrespective of the means of propulsion, and not used for commercial purposes, as defined in the Order on safety at sea in recreational craft and safety requirements for recreational craft over 24 metres in length. In case of doubt, the Danish Maritime Authority will decide whether a vessel can be considered a recreational craft. Hire without a driver or professional training for pleasure boating is not considered commercial.
- 14) Tug: vessel designed to tow or to be towed by other vessels and fitted with hooks, winches, bollards or other similar arrangements.
- 15) Length (L): calculated as 96% of the total length of a waterline at 85% of the minimum depth (moulded) measured from the keel line, or as the length from the bow to the axis of the stem of the rudder calculated on the said waterline, if this length is the greater. In vessels with steering speed, the waterline on which the length is measured shall be parallel to the drawn waterline.
- 16) Length overall (Loa): the distance in a straight line between the foremost point of the bow and the rearmost point of the stern. For the purposes of this regulation, this length shall be applied to fishing vessels as indicated in the tonnage certificate of the vessel, in accordance with the rule in force defining the characteristics of fishing vessels.
- 17) Length L1: is the length measured from the forward edge of the intersection of the plating with the upper surface of the deck at the bow to the aft edge of the intersection of the plating with the deck at the stern. On open vessels, the length shall be measured at the top of the gunwale. For the purpose of this rule, this length shall be used for small commercial vessels other than fishing vessels, as indicated in the tonnage certificate of the vessel, in accordance with the rule in force defining the characteristics of fishing vessels.
- 18) Length: unless otherwise specified, for the purposes of this rule, "length overall" for fishing vessels and "length L1" for other small commercial vessels, as indicated in the vessel's tonnage certificate, in accordance with the regulation in force defining the characteristics of fishing vessels.
- 19) Beam B: the maximum beam of the vessel as stated in the vessel's tonnage certificate, as defined in No. 15, and the Order on Safety at sea in recreational craft and safety requirements for recreational craft over 24 metres in length.
- 20) Scantling number: for fishing vessels, the Loa of the vessel multiplied by the beam of the vessel (Loa x B). For other small commercial vessels it is the length L1 multiplied by the beam (L1 x B).
- 21) Moulded depth: the vertical distance measured amidships from the keel line to the top of the working deck beam at the side. In vessels where the connection between the ship's side and the deck is rounded, the moulded depth shall be measured to the intersection of the extension

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of the deck and the extension of the plating, the lines being extended as if the deck and plating were made in straight lines. Where the working deck is stepped and the raised part of the deck extends beyond the point at which the moulded depth is to be determined, the moulding depth shall be measured to a line extending from the lowest part of the deck parallel to the raised part.

22) Deepest operating waterline: the waterline corresponding to the maximum permissible draught during use. The draught at the deepest operating waterline shall not be greater than the structural draught used for the hull design. For fishing vessels, the structure draught shall in general be set equal to the "moulded depth", as no minimum freeboard is required for these vessels.

23) Light waterline: the waterline where the vessel is without cargo, persons, ice and fishing gear, but with stores and 10% bunkers.

24) Midships: the midpoint of the length L_{oa} for fishing vessels and L_1 for other small commercial vessels.

25) Midship section: that section of the hull which passes through amidships, defined by the intersection of the moulded surface of the hull and a vertical plane perpendicular to the waterline and centreline planes.

26) Keel line: the line parallel to the slope of the keel, passing through the centre of the hull

(a) The upper edge of the keel or the line of intersection between the shell plating and the keel, if a bar keel projects above this line in a vessel with metal shell plating,

(b) The outer edge of the rabbet of the keel of a vessel with a wooden or composite shell plating, or

(c) The intersection between a smooth continuation of the outer surface of the shell plating at the bottom and the centreline in a vessel with shell plating of a material other than wood and metal.

27) Baseline: horizontal line intersecting the keel line.

28) Freeboard: the vertical distance measured amidships on the plating from the deepest operating waterline to the upper edge of the working deck at the side.

29) Working deck: deck from which fishing, towing and similar operations are carried out, normally the lowest complete deck above the deepest operating waterline. In vessels with two or more full decks, the Danish Maritime Authority may approve a lower deck as a working deck, provided that the deck is located above the deepest operating waterline.

30) Weather deck: deck exposed to weather and sea from above and from at least 1 side.

31) Superstructure: the covered structure of the working deck extending from side to side of the vessel or the sides of which are not more than $0.04 \times B$ inside the shell plating.

32) Closed superstructure¹⁾: Superstructure with

(a) Closing containment bulkheads of sound construction,

(b) Any ingress openings in such bulkheads are fitted with permanently fixed weathertight doors of a strength equivalent to that of the non-penetrating part of the structure and which can be operated from both sides, and

(c) Other openings in the sides or ends of the superstructure, fitted with effective weathertight closing devices.

33) Superstructure deck: the complete or partial deck forming the upper part of a superstructure, deckhouse or other superstructure, placed at a height of at least 1.8 metres

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*Order no. 2447 of 13 of December 2021
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above the working deck. If this height is less than 1.8 metres, the upper part of such deckhouses or other superstructures shall be regarded as a working deck.

34) Height of a superstructure or other superstructure: the minimum vertical distance, measured at the side, from the top edge of the deck beams of a superstructure or other superstructure to the top of the working deck beams.

35) Structural rules: rules on the structure, construction and maintenance of hulls, anchor and mooring equipment, towing hawsers, machinery, boiler plant, all other technical installations and electrical installations, including rules on strength and material dimensions.

36) Engine room: room forming part of the structure of the vessel in which internal combustion engines for propulsion and/or central heating oil boilers, other than small oil boilers of the pot-boiler type and similar, are installed, or a room in which internal combustion engines are installed for purposes other than propulsion, having a total power output of not less than 375 kW.

37) Weathertight: water shall not be able to enter the vessel under any sea and weather conditions.

38) Watertight: capable of preventing the penetration of water through the structure in any direction under a water pressure equal to that for which the surrounding structure is designed.

39) Stowage: Compartment or container for storing a catch or gear. The stowage may consist of permanent or movable supports and movable boards or side plates.

40) Bin: compartment or container in which the catch is placed when taken on board. A bin can be a permanently built-in compartment in the hull or be arranged as stowage.

41) Approved: Approved by the Danish Maritime Authority or approved in accordance with the Order on marine equipment. Equipment which has been conformity assessed and bears a certification mark (the 'wheel mark') in accordance with that Regulation is approved. The detailed rules for obtaining type-approval, including technical requirements and requirements concerning marking, test procedures, etc., shall be determined for each type of equipment.

42) Crew: the master and all persons employed or engaged on board a vessel in connection with the operation of the vessel.

43) Passenger: Any person on board older than one year, excluding the master and other crew.

44) GRP: Glassfibre Reinforced Polyester, and is the commonly used abbreviation in English for glass fibre vessels.

45) Recognised organisation: an organisation recognised in accordance with the Order on the recognition and authorisation of organisations performing ship inspection and survey and regulation (EC) No 391/2009 of the European Parliament and of the Council of 23 April 2009 on common rules and standards for ship inspection and survey organisations.

46) Recognised standard: requirements adopted by the International Maritime Organization (IMO), as well as standards developed by the International Organization for Standardization (ISO), the European Committee for Standardization (CEN), the Danish Standards (DS), the recognised organizations and the Nordic Boat Standard.

Section 4. The trading area is the area of the sea which the vessel is built, fitted and equipped to navigate and is determined as follows:

1) Trading area F1 means trade within 2 nautical miles of the nearest coastline within the Skagen-Vinga lines and west of 16° East longitude in the Baltic Sea and along the west coast of Jutland.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2) Trading area F2 means trade within 10 nautical miles of the nearest coastline within the Skagen-Vinga lines and west of 16° East longitude in the Baltic Sea and along the west coast of Jutland.

1) Trading area F1 means trade within 30 nautical miles of the nearest coastline within the Skagen-Vinga lines and west of 16° East longitude in the Baltic Sea and along the west coast of Jutland.

4) Trading area F4 means trade within the lines east of 6° east longitude in the North Sea and south of 56° north latitude in the Baltic Sea.

5) Trade area F5 means trade in the North Sea east of 4° west longitude, south of 62° north latitude and south of 56° north latitude in the Baltic Sea.

6) Trade area F6 means trade within trade area F5 and on all seas within 100 nautical miles of the nearest coast.

Subsection 2. Each vessel's trade area - designated F1 - F6 - is allocated individually by the Danish Maritime Authority according to the following principles. The specific Greenlandic trade areas are listed in Annex 10, Rule 1, Subsection 2.

1) Open vessels may be assigned a trade area within F1 and F2.

2) Decked vessels may be assigned a trade area that is safe taking into account the size, structure and use of the vessel.

3) Decked vessels up to 12 m in length can normally be assigned to a trade area within F3.

4) Decked vessels up to 15 m in length can normally be assigned to a trade area within F4.

5) Decked vessels with a length²⁾ of 15 m or above and with a scantling number less than 100 can normally be assigned to a trade area within F5.

6) Decked vessels with a length³⁾ L of 15 to 24 m, and with a scantling number of 100 or above, may normally be assigned to a trade area within F6.

Section 5. The Danish Maritime Authority may exempt a vessel wholly or partly from the provisions of these rules if the Authority considers that the application of the regulations would be unreasonable and impractical, taking into account the distance between the ship's working area and its base port, the type of ship, the weather conditions and the navigational risks, and provided that the ship meets health, safety and working environment requirements which, in the opinion of the Danish Maritime Authority, are adequate for the service for which the ship is intended and which will ensure the general safety of the ship.

Subsection 2. Decisions of the Danish Maritime Authority may not be appealed against to a higher administrative authority. However, the Danish Shipping Appeals Board is the appeal body when a ship has been detained.

Section 6. The Danish Maritime Authority may allow the use of other equipment, material, equipment, apparatus, etc., on board, or that another measure be taken in the vessel, or the vessel is built or constructed in another way, including according to recognised standards, if the Danish Maritime Authority otherwise finds it demonstrated that such measures are at least as effective and represent an equivalent level of protection to that required by this Order;.

Subsection 2. The Danish Maritime Authority shall accept tests carried out by recognised testing institutes in EFTA States which are contracting parties to the EEA Agreement and in Turkey which provide appropriate and satisfactory guarantees of the technical, professional and independent nature of the tests.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Section 7. A vessel that is repaired or altered shall continue to meet at least the requirements that were previously applicable to the vessel. This applies, for example, to repairs, replacements and minor improvements made solely because of wear, corrosion, rot, damage and ordinary maintenance which does not alter the structure or arrangement. The same applies to conversions whose sole purpose is to improve the survivability of a ship, e.g., by improving stability, structural fire protection, visibility or similar.

Subsection 2. Repairs and alterations of major importance and equipment related thereto shall comply with the requirements for new vessels to the extent deemed appropriate and practical by the Danish Maritime Authority. However, this fully applies to life-saving devices and other equipment. Major repairs, alterations and modifications and related equipment include

- 1) Any substantial alteration to the main dimensions of a ship, for example, by lengthening, a new deck or a new fore or aft end,
- 2) Changes which substantially alter the capacity of a vessel, for example, in terms of fishing capacity, or carrying capacity,
- 3) Alterations which substantially increase the life of a ship, such as a complete refurbishment of an entire engine room, passenger compartment on an entire deck, or the entire interior fittings of a cargo or fishing vessel; and
- 4) A series of minor alterations and conversions which, together, substantially alter the characteristics or capacity of a vessel.

Subsection 3. Any change in the use (type) of a vessel, such as the conversion of a cargo vessel into a fishing vessel or a passenger vessel, shall require the whole vessel to comply with the provisions for a new vessel of the type into which it is converted.

Subsection 4. Any change of a vessel's trade area from protected to less protected waters shall require the entire vessel to comply with the provisions for a new vessel in the new trade area. However, changes to a previously approved less protected trade area will mean that only the equipment requirements for new vessels will need to be met.

Subsection 5. Natural or legal persons, including shipowners or shipyards, in Denmark who carry out conversions of small commercial vessels and cargo vessels in accordance with Subsection 2 shall notify the Danish Maritime Authority before the conversion is commenced.

Section 8. For the purpose of enforcing the provisions of this Order, the survey and inspection of vessels shall be carried out by the Danish Maritime Authority. However, the Danish Maritime Authority may entrust certain surveys and inspections to authorised natural or legal persons or to recognised organisations.

Subsection 2. It is the responsibility of the owner, possibly through the shipyard or consultant, to register the vessel for a survey and to have the measurement carried out by an authorised measurer.

Subsection 3. A nominated surveyor or recognised organisation which finds that a vessel or its equipment is in such a condition that it is not fit to proceed to sea without danger to the vessel or persons on board shall immediately arrange for the conditions to be rectified and shall immediately notify the Danish Maritime Authority. If no action is taken to rectify the situation, the trading permit of the vessel concerned shall be withdrawn and the Danish Maritime Authority shall be immediately informed. If the vessel is in a foreign port, the competent authorities of that port shall also be informed immediately.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Subsection 4. Before the construction of the vessel is commenced, drawings and calculations or other design data shall be submitted to the Danish Maritime Authority.

Subsection 5. The submitted drawings, calculations and other structural data shall adequately demonstrate the vessel's structure, material dimensions, arrangement, cargo, freeboard, stability, propulsion machinery and the number of persons on board for which the vessel is intended and shall demonstrate that the vessel complies with the provisions of these rules.

Subsection 6. Every vessel shall be subject to a survey as specified below:

- 1) A first survey before the vessel is put into service, either as newly built or as purchased from abroad. This first survey shall be carried out before the trading permit in Section 10(1) is issued for the first time.
- 2) A renewal survey at intervals of no more than:
 - (a) 48 months from the last survey for vessels used for special purposes or authorised to operate in trade area F5.
 - (b) 60 months from the last survey for cargo vessels of length L of 15 to 24 m and of a scantling number 100 or above, and for Danish-registered fishing vessels.
- 3) For cargo vessels with a length L of 15 to 24 m, and with a scantling number of 100 or above, there should also be:
 - (a) A minimum of two surveys of the external bottom of the vessel in any 5-year period, in that the interval between two such surveys should not exceed 36 months in any case. Survey of the external bottom shall be endorsed on the vessel's national safety certificate.
 - b) An annual survey of the vessel's radio equipment and AIS, including those used in life-saving devices. The survey is endorsed on the national safety certificate. Vessels operating exclusively on domestic voyages are exempted from this survey.
- 4) Additional surveys as assessed by the Danish Maritime Authority.
- 5) For laid-up vessels, the Danish Maritime Authority may allow prescribed periodic surveys to be omitted in whole or in part for as long as the vessel remains laid-up.

Subsection 7. The surveys referred to in Subsection 6 shall be carried out in the following manner:

- 1) The first survey shall include a complete examination of the vessel's structure, stability, machinery, arrangements and materials, including the outside of the hull and the inside and outside of boilers and equipment, to the extent that the vessel is covered by this rule. The survey is carried out in such a way that it ensures that the structure, material and material dimensions of hulls, boilers and other pressure vessels with accessories, main and auxiliary machinery, electrical systems, radio systems including those used in the rescue equipment, fire protection, fire detection and extinguishing systems, rescue equipment and arrangements, the vessel's navigation equipment, including AIS, nautical publications and other equipment, fully comply with the requirements of this rule. The survey shall also ensure that the workmanship of all parts of the vessel and its equipment is satisfactory in all respects and that the vessel is fitted with the navigational lights, the means of sounding signals and the distress signals required by these regulations and the International Maritime rules in force.
- (2) The renewal survey shall include a survey of the structure, stability, machinery and equipment as specified in No. 1 to ensure that they meet the requirements of this Order, are in satisfactory condition and fit for the service for which the vessel is intended.
- 3) An additional survey, either in whole or in part, must be carried out after major repairs, renewals and alterations as described in Section 7.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4) A renewal survey at intervals not exceeding 48 months from the last survey for vessels used for special purposes or authorised to operate in trade area F5.

(5) For all vessels used for purposes other than fishing, the surveys referred to in Subsection (6)(2) and (3) and Subsection (7)(1) to (4), or surveys in accordance with specific provisions in force, shall also include a survey of provisions relating to seafarers' working and living conditions. The survey shall at least cover those areas which, in the judgement of the Danish Maritime Authority, are considered relevant and practicable on the ship. The assessment shall include provisions concerning seafarers' working and living conditions, including minimum age, medical certificates, seafarers' qualifications, employment agreements, the use of licensed or certified or regulated chartering and brokering services, hours of rest, manning of the ship, working and living quarters, on-board recreational facilities, food and catering, health and safety protection and accident prevention, on-board medical treatment, on-board complaint procedures and payment of wages.

6) The Danish Maritime Authority's assessment according to No. 5 shall, in addition, for Danish-registered vessels used for purposes other than fishing, include provisions concerning financial security for repatriation, as well as financial security for liability in connection with occupational injuries and occupational diseases.

Subsection 8. Prescribed renewal surveys must be carried out within a period of three months before the prescribed survey date.

Subsection 9. An annual self-inspection must be carried out on new and existing fishing vessels in accordance with the checklist published on the Danish Maritime Authority's website.

Subsection 10. To ensure that the vessel will remain fit in all respects to proceed to sea without danger to the vessel or persons on board, the vessel and its equipment shall be maintained at all times so as to comply with the provisions of these rules.

Subsection 11. After completion of a survey under these regulations, no alteration shall be made in the design, machinery, equipment or other matters covered by the survey without the permission of the Danish Maritime Authority or the recognised organisation. However, approved equipment and devices may be replaced by equivalent approved equipment and devices.

Section 9. Where the Danish Maritime Authority has not laid down design rules in the Annexes, new vessels shall be designed, built and maintained in accordance with recognised standards.

Subsection 2. For vessels which are not constructed wholly or in part to recognised standards, the owner shall arrange for an appropriate risk assessment to be carried out, for example, in accordance with IMO Circ. 1455 Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments. Based on this assessment, the Danish Maritime Authority will carry out further approval work.

Section 10. After an initial survey or after each renewal survey, a trading permit shall be issued stating the duration of the trading permit, the vessel's trade area and the maximum number of persons on board. Cargo vessels covered by Annex 11 shall also be issued with a national safety certificate. The trading permit and any national safety certificate shall be produced on request together with the tonnage certificate of the vessel. A trading permit is valid as long as the conditions of use of the vessel and the survey deadlines are respected.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Subsection 2. Vessels covered by these provisions shall be fitted with signs, notices and markings to an extent appropriate to the size and the trade area of each vessel, after specific assessment.

Section 11. Such precautions shall be taken to guard against accidents in the normal operation of the ship as will, so far as possible, prevent accidental injury to persons while working or residing on board or while moving to and from the ship.

Section 12. Equipment for small commercial vessels and cargo vessels specified in the Annexes may be replaced by equipment which is conformity marked in accordance with the Order on marine equipment.

Section 13. Violation of this Order is punishable by a fine or imprisonment for up to 1 year.

Subsection 2. The penalty may increase to imprisonment for up to 2 years if

- 1) The infringement has caused damage to life or health or has created a danger thereof,
- (2) A prohibition or an order has previously been issued in respect of the same or a similar matter; or
- 3) The infringement has resulted in or is intended to result in a financial benefit for the person concerned or for others.

Subsection 3. It shall be regarded as a particularly aggravating circumstance that, in the case of a young person under 18 years of age, harm to life or health has occurred or danger thereof has been caused, as referred to in Subsection 2(1).

Subsection 4. Where no confiscation of the proceeds of the offence is ordered, the amount of any financial advantage obtained or intended shall be taken into account, in particular in the assessment of any fine, including any additional fine.

Subsection 5. Criminal liability may be imposed on companies or other legal persons in accordance with the rules laid down in Chapter 5 of the Criminal Code.

Section 14. If the matter is covered by the Order on the entry into force for Greenland of the Act on Safety at Sea, measures may be taken in accordance with the Criminal Code for Greenland.

Subsection 2. The circumstances referred to in Section 13(2) and (3) shall be regarded as aggravating circumstances.

Subsection 3. If no confiscation of proceeds is made, cf. Section 120 of the Criminal Code for Greenland, the amount of any financial benefit obtained or intended shall be taken into account in particular when imposing a fine, including an additional fine.

Subsection 4. Where an infringement is committed by companies or other legal persons, the legal person as such may be held liable to pay a fine. If the infringement is committed by the State, the Government of Greenland, a municipality, or a settlement board, the public authority as such may be held liable to pay a fine.

Subsection 5. If the person concerned is not resident in Greenland, or their connection with Greenlandic society is of such a loose nature that the conditions for the application of measures are not met, the case may be brought or referred for prosecution in Denmark, cf. Section 7 of the Criminal Code for Greenland.

Section 15. The Order shall enter into force on 1 January 2022.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Subsection 2. Order No. 1008 of 18 September 2014 on Notices from the Danish Maritime Authority F, construction and equipment of small commercial vessels, etc., is repealed, cf. Subsection 3.

Subsection 3. Chapter 12 of Order No. 1008 of 18 September 2014 on Notices from the Danish Maritime Authority F, the construction and equipment of small commercial vessels, etc., shall continue to apply to small commercial vessels with a length L of less than 15 m and with a scantling number between 20 and 100.

Subsection 4. The design requirements of the previous regulations existing at the time of construction of the vessel shall continue to apply to existing small commercial vessels and cargo vessels unless otherwise stated in this Order. Deviations from this may, however, be specified in later rules.

The Danish Maritime Authority, 13 December 2021

Martin Hvid John

/ Malene Loftager Mundt

Annex 1

Structure, watertight integrity and equipment

- Rule 1 Structure, general**
- Rule 2 Bulkheads and watertight compartments**
- Rule 3 Ice-strengthening**
- Rule 4 Special provisions for open vessels**
- Rule 5 Special provisions for decked fishing vessels**
- Rule 6 Hull weathertightness in general**
- Rule 7 Weathertight doors**
- Rule 8 Weathertight hatches on decked vessels**

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

- Rule 9 Engine room openings**
- Rule 10 Other deck openings and ice covers**
- Rule 11 Fans**
- Rule 12 Air and sounding pipes**
- Rule 13 Portholes, windows and doors**
- Rule 14 Ingress and egress openings (hull penetrations)**
- Rule 15 Freeing ports in decked vessels**
- Rule 16 Anchor and mooring equipment**
- Rule 17 Working deck under an enclosed superstructure on fishing vessels**
- Rule 18 Draught mark**
- Rule 19 Rudder**
- Rule 20 Simplified strength requirements for GRP vessels**
- Rule 21 Construction of GRP vessels**
- Rule 22 Simplified strength requirements for steel vessels**
- Rule 23 Construction of steel vessels**
- Rule 24 Simplified strength requirements for aluminium vessels**
- Rule 25 Construction of aluminium vessels**

Rule 1 Structure, general

1 Application

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.1 All new vessels being built or converted shall comply with the structure, watertight integrity and equipment requirements described in this Annex or equivalent requirements accepted by one of the recognised organisations in the same field.

1.2 A vessel which is converted to another type (application), e.g., conversion of a cargo vessel to a fishing vessel or passenger vessel, irrespective of when it was built, shall be treated as a vessel of that type built on the date on which such conversion commences.

2 Structure and building

2.1 The strength and structure of the hull, superstructures, deckhouses, engine-room casings, companionways, all other superstructures and ship's equipment shall be sufficient to withstand all foreseeable conditions during the intended use of the vessel.

2.2 Foreign-built vessels may be approved provided they carry a certificate showing that they have been approved and inspected by a recognised organisation, either in accordance with these rules or in accordance with equivalent requirements accepted by a recognised organisation.

2.3 The hull of wooden vessels built in Denmark shall be built in accordance with recognised standards. However, propeller arrangement and rudder dimensions shall be determined in accordance with Rule 19 of this Annex and Annex 3, Rule 3. Other provisions of this rule shall apply mutatis mutandis to these vessels.

2.4 For small wooden vessels which are not covered by a recognised standard, the traditional design and dimensioning of Danish-built fishing boats will be applied to the individual vessel.

2.5 The draught for dimensioning the hull strength, etc., is equal to the "Moulded depth", as defined in Section 3, No. 21, or the depth to the gunwale for open vessels.

2.6 Tanks, watertight bulkheads, watertight and weathertight hatches and doors, as well as profile grates and screw nozzles, etc., shall be pressure or leak tested according to the applicable standards and practices by a recognised organisation.

2.7 Corrections and strengthening for fishing vessels.

2.7.1 Dimensioning corrections.

All formulas for thickness and momentum of resistance given in Rule 20 shall be multiplied by an application coefficient according to the table below:

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

| Application coefficient for: | Coefficients: |
|-----------------------------------------------|---------------|
| Bottom and bilge | 1.05 |
| Sides and stern | 1.05 |
| Deck and rear deck | 1.15 |
| Superstructure | 1.10 |
| Shear strength of the core in sandwich panels | 1.05 |

Rule 2 Bulkheads and watertight compartments

1 In decked vessels, the engine room, cargo space and living quarters shall be separated by watertight bulkheads from bottom to deck. Steering machinery, tank arrangements and the like located in cargo or store compartments shall also be shielded by suitable bulkheads. Wooden vessels must have the same bulkheads built in. These bulkheads shall be watertight if practicable.

2 Open vessels shall have watertight bulkheads or an engine casing around engine installations up to 300 mm above the deepest operating waterline but not higher than the top of the gunwale. The same applies to air intake openings for the engine.

3 It may be accepted in open vessels that bulkheads or engine casings and, where appropriate, the floor above the gear are made wholly or partly demountable in order to permit maintenance and servicing of the engine installation. Joints and seals at demountable bulkheads or engine casings and floors shall be of the same strength and tightness as the other bulkheads or engine casings.

4 Where a propeller shaft, pipe, electrical cable or starting handle is passed through a watertight bulkhead, the penetration shall be such as to maintain the watertight integrity of the bulkhead.

Rule 3 Ice-strengthening

1 General

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1 Vessels with a trading permit in areas where ice is frequently encountered shall be ice-strengthened. All new vessels built for or operating in Greenland must be ice-strengthened. Wooden vessels must also be ice-skinned.

2 Semi- or fully planing vessels and/or vessels fitted with a so-called "inboard-outboard drive" instead of the traditional propeller and propeller arrangement, as well as vessels with an underslung rudder or semi-underslung rudder, will only be able to obtain a trading permit for navigation in normally ice-free areas.

3 It is assumed that the speed of the vessel is reduced appropriately when approaching ice-covered waters. The extent and severity of ice-strengthening on vessels intended to operate in ice conditions at speeds exceeding 15 knots shall be specially considered and the Danish Maritime Authority may impose increased requirements on the vessel, its equipment, operational conditions, areas of operation, etc.

4 The formulae and values given in this Annex may be replaced by more accurate methods if these are approved by the Danish Maritime Authority or a recognised organisation.

5 Ice-strengthened vessels are expected to be able to develop sufficient propulsive thrust for continuous navigation through the ice of a thickness to be expected under normal circumstances in the area where it is applicable.

6 The propulsion machinery, including the engine and cooling machinery and steering gear, shall be designed to operate without damage in the forward motion specified in Subsection 5 and in the reverse motion in equivalent ice below half speed, where appropriate.

7 Propeller driven vessels shall have sufficient draught to allow the propeller to be sufficiently submerged without trimming the vessel in such a way that the current waterline at the bow is below the light ice waterline

2 Requirements for ice-strengthening

1 The vertical extent of the ice area includes the shell plating from 500 mm above the deepest load waterline to 500 mm below the lightest operating waterline for navigation in ice (ballast waterline). The main ice area shall extend horizontally from the bow to 5% of the length anywhere astern of the point where the deepest operating waterline reaches its maximum width. The ice area also includes the bottom at a distance of 30% of Loa measured from the intersection of the bow with the light ice waterline.

2 A flat stern (transom stern) shall not normally extend below the deepest operating waterline.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 On vessels with two or more propellers, shafts and stern tube shall in general be enclosed in plate boxes. If separate support struts are required, their design strength and attachment must be specially considered.

4 The propeller shaft shall be strengthened so that its diameter is increased by at least 15% compared with the requirements of Annex 3.

The diameter of the rudder stock shall be increased, the formulae in Rule 19 assuming at least a 25% increase in rudder power over that otherwise specified. Bolts in rudder couplings, plates in rudders, etc., are also strengthened accordingly.

The thickness of the rudder plate and inner plate stiffeners is increased by 15% on steel and aluminium vessels and by 50% on GRP vessels.

5 Ice-strengthening of the plating includes the following common minimum requirements, which are applied where more extensive requirements are not specified under the individual hull materials.

5.1 The thickness of the shell plating in the ice area must be increased to at least:

$$t_{is} = 1.3 \times t + 1.5 \text{ mm}$$

where t is the laminate or plate thickness according to the design rules given in Rules 20, 22 or 24.

5.2 The keel shall be strengthened so that its strength (momentum of resistance) is doubled compared to the otherwise specified dimensional requirements.

6 The frames shall be strengthened in the ice area so that their bending momentum of resistance is increased by 50% compared to the otherwise specified design requirements.

The frame distance shall not exceed 300 mm. If this is the case, ice frames are placed inside the ice belt between the regular frames. The ice frames can be stopped by an ice stringer, deck, tank top or similar longship bracing, but do not need to be welded to it (can be cut off at an angle).

7 Built-in fuel tanks shall not be placed at the side in the ice area where they are particularly vulnerable to damage when navigating in ice.

3 Steel and aluminium vessels

1 The thickness of the plating in the ice area shall be either at least

$$t_k = 6 + (0.15 \times L_{vl})$$

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

or as specified in Subsection 5.1, whichever is greater.

2 From 25% of the length of the loaded waterline aft of the bow to the stern, the thickness of the ice belt shall not be less than 6 mm.

3 The bow shall be constructed around a solid profile starting at least 1 m before the end of the keel and extending to at least 1 m above the deepest operating waterline. The cross section area of the bow section (flat steel or round steel) shall be at least $1.3 \times L_{oa}$ (cm²).

4 The thickness of the plates shall be at least 1.25 x the required thickness of the plate after ice-strengthening. The stern structure shall be supported by knees and/or collars spaced not more than 300 mm apart and having a minimum thickness of 8 mm.

5 Where the ice stringers in the foreship terminate towards the bow, a bow strap is placed. In addition, bow straps or knees shall be placed between other decks and stringers at a distance from each other as specified in Subsection 4.

6 The distance between the main frames in the ice area shall not exceed 500 mm, the distance between the ice frames and the main frames shall not exceed 300 mm, and the momentum of resistance of the transverse frames shall not be less than 15 cm³. The momentum of resistance of longship frames shall not be less than 19 cm³.

7 Flat steel should not be used for main and ice frames in the ice belt without special precautions against capsizing, but, e.g., bulb, angle or other profile type.

8 If the distance between the main frames is more than 300 mm, ice frames must be placed between the main frames in the ice area. The supported plate area in the ice area shall not exceed 0.3 m² (l x w of the area).

9 In the area from the bow to 25% of the length of the loaded waterline astern of the bow, ice frames shall be brought to or in the immediate vicinity of the keel.

10 In the area aft of the stern, if the distance between the main frames is more than 300 mm, ice frames shall be placed in the ice area as specified in Subsection 8, but not more than to the deck at the top and to the lowest bend or marked bilge radius on the bilge plate at the bottom.

11 In the case of vessels locally strengthened in the stern for trawling with welded half-round bars or equivalent, this may replace the required ice-frames.

12 Ice-frames must have a minimum momentum of resistance of 75% of that required for the main frame.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

13 The ice frames shall go forward, from the bow to 25% of the length from the bow, and terminate (welded) at either the deck or a stringer. Other ice frames may be terminated (snipped/cut off) at the top and bottom by a collar or stringer of the same depth as the main frame.

14 Ice stringers shall be placed at the loaded waterline from bow to stern. The stringer shall have a minimum depth of 120 mm and a body thickness corresponding to the current plate thickness. The stringer must be fitted with a flange if no bulb or angle profile is used. The stringer can be performed as an insert.

The ice-stringer shall be connected to any plate frames, bulkheads, aft and stern and fitted with knee connections where possible.

Where the main deck does not extend continuously from stern to stern, a continuous stringer as specified above shall be placed in line with the extension of the deck if the vertical distance to the overlying deck (e.g. stern or poop) from the original deck line exceeds 0.8 m.

15 An external keel profile shall be placed which has sufficient strength to support the vessel when docking and banking on uneven ground. Any necessary fixed ballast weight should be integrated into the keel construction, e.g. by increasing the material thickness of the keel profile and keel plates.

16 Aluminium vessels shall, where particularly heavy wear is foreseeable, e.g., on the keel, bottom, bow area and at knee lines in the hull, have additional wear strips welded on in the form of half-round or flat aluminium. Alternatively, wear strengthening should be built into the hull itself at the exposed locations.

17 Welded joints of profiles and stiffeners for plating and bracing in the ice area shall be made as double continuous welds.

4 Wooden vessels

1 The full width of the bow shall be fitted with a steel stem rail with an external cross section area measured in cm^2 of $0.8 \times L_{\text{oa}}$ in m. The stem rail shall extend from the foremost point of the stem to one metre aft of the intersection of the stem and the keel. The stem rail is attached to the stem with stowage bolts or ship nails. The stem is reinforced with a steel stem shoe by bolting on side plates, which are also welded to the stem rail. The dimensioning of the stem shoes and side plates depends on the size of the vessel and its use, etc. To protect the caulking in the rabbet groove, half-round iron rails are applied or the ice skin is passed over the rabbet of the keel.

2 In addition to the vessel's ordinary keel, a keel strake shall be fitted to the vessel to protect against abrasion by ice or grounding. The wear keel must have the same width as the actual keel, but at least 80 mm. It may alternatively be made of steel of appropriate thickness

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 Ice skins shall be fitted throughout the ice area and in a wedge from the aft edge of the stem shoe at the keel to the ice skin belt at maximum width. The ice skin shall be of black or galvanised iron, aluminium or copper plate. Black or galvanised sheet plate and aluminium plate shall be securely fastened to the shell plating with galvanised ship nails approximately $\frac{3}{4}$ of the plating thickness. A skin of copper plate is fastened with copper nails. Aluminium or copper ice skins must not touch steel or other metal.

4 Vessels with a trade area where there is a risk of particularly severe ice conditions shall have their plating further protected by flat iron or plates. This protection shall be secured by means of countersunk ship's nails and shall be placed as nearly perpendicular as possible to the bow and interconnected by tack welding in the area above and below the loaded waterline.

5 GRP vessels

1 Where sandwich structures, other than for decks and superstructures, are used for the hulls of vessels intended to operate in ice, the GRP of the shell plating shall have sufficient local strength equivalent to the minimum required for the outer laminate of a single skin structure.

2 On the bow and keel, from 750 mm above the deepest operating waterline and continuing along the keel to the heel below the propeller, an additional GRP wear layer and strengthening of approximately 10 mm in thickness and at least 100 mm to each side of the hull shall be applied. This replaces the previously required steel stem and wear keel.

3 Changes in laminate thickness shall be gradual and in no case shall the reduction in thickness be over a length less than 20 times the thickness difference.

4 If the weather deck of any part of the vessel is located below the upper limit of the ice belt, the bulwark shall be strengthened to match the ice belt.

5 There should be no kinks, protrusions or other irregularities from the smooth hull side below the waterline. If any kinks or protrusions occur with a radius of curvature smaller than 200 mm, these must be reinforced with additional laminates on the outside. The thickness of these additional laminates shall be 50% of the current plating thickness. There should be a colour change between the extra laminates and the original laminates to mark the wear of the extra laminates.

6 When using refrigeration, the outboard pipes must be protected. The protection can consist of glued blocks or by placing the pipes in a recess, positioned in such a way that the pipes are protected against the impacts caused by grounding or ice blocks.

7 The echo sounder should be positioned so that it is smooth with the bottom. The sounder well shall be located inboard of the hull. The casting must have the same strength as the hull laminate. If the sounder well is made of steel, it must be primed with epoxy primer or equivalent primer

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

before over-lamination. A watertight connection (possibly a pipe) must be fitted around the wire connection to the echo sounder. The connection must be brought up to deck level.

The echo sounder placed on the outside of the hull shall be embedded on the sides and on the fore and aft edges with reinforced polyester and the moulding shall be shaped so as to best repel ice.

8 The rudder shall be made of steel with a steel quality at least equivalent to shipbuilding steel grade A.

Rule 4 Special provisions for open vessels

1 In vessels with a live tank, the live tank funnel, decks and bulkheads shall have the same strength as the hull, and the upper edge of the live tank funnel shall have a height at least equal to the height of the gunwale.

2 Doorstep and frame heights

2.1 The doorstep height to the wheelhouse or similar shall be 380 mm above the floor or deck. Doors to these compartments must open outwards.

2.2 Hatches to engine rooms and hatches and doors to superstructure living quarters shall be designed so that they can be closed tightly.

2.3 In vessels of less than 12 m in length, a doorstep height of 200 mm may be permitted in openings to compartments from which water cannot fill compartments under the deck, and the door may be constructed as a sliding door.

2.4 For openings to compartments below deck, or which form part of the buoyancy volume of the vessel for stability, Rule 7(1) shall also apply.

3 Air pipes shall be externally fitted to the plating as high as possible and protected against mechanical damage.

4 Drainage of floors on open vessels.

The floor shall not be placed so high as to adversely affect the stability of the vessel. If the floor is located above the waterline of the light boat, and furthermore is so close that water can accumulate on the floor, the following must be met to ensure the stability of the vessel:

4.1 On both sides of the floor, there shall be drainage openings for draining water to the bottom of the vessel (see Fig. 1).

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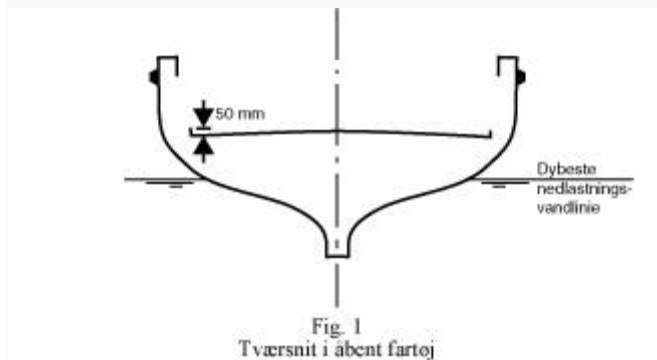
*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4.2 The drainage area shall be at least 75% of the freeing port requirement for a deck directly overboard.

4.3 Open vessels shall not be fitted with freeing ports.

4.4 To avoid rainwater running down to the bottom of the vessel through the drains, these can be placed a maximum of 50 mm above the floor, as shown in the figure below.

4.5 There must be good access to the bilge pump intake.



Rule 5 Special provisions for decked fishing vessels

1 In vessels with a live tank, the live tank funnel, deck and bulkheads shall be of the same strength as the hull and the live tank funnel shall have a watertight connection to the deck.

2 Stowage arrangements shall be capable of being locked or held in position when in use and shall not obstruct the discharge of intake water. There shall be sufficient distance between the stowage bulkhead and the farthest to the side of the long-ship spar to ensure a free and unobstructed flow of water to the freeing ports.

Rule 6 Hull weathertightness in general

It shall be possible to close external openings in such a way as to prevent water from entering the vessel. Deck openings which may be open during fishing operations shall normally be located close to the centreline of the vessel. The Danish Maritime Authority may approve other arrangements after a specific assessment if it considers that the safety of the vessel is not thereby impaired.

Rule 7 Weathertight doors

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issued by the Danish Maritime Authority*

1 Openings in superstructures, deckhouses, companionways or the like, from weather decks to spaces below decks or to spaces forming part of the buoyancy volume of the vessel for stability purposes, shall be provided with weathertight doors opening outwards.

2 For a door to be considered weathertight, the following is required:

2.1 The door must have the same strength as the bulkhead in which it is fitted.

2.2 The door must be fitted with gaskets that cannot be pressed out.

2.3 The door shall be hinged and capable of being secured in the open position.

2.4 In addition to the hinges, the door shall be fitted with at least 2 latches which shall be capable of being opened and closed from both sides of the bulkhead.

3 The doorstep height above the deck for weathertight doors with direct access to the working deck shall be at least 380 mm on the working deck and 300 mm on the superstructure deck.

Rule 8 Weathertight hatches on decked vessels

1 Frames for hatch openings on working decks shall have a minimum height above deck of 380 mm. For hatches on the first deck above the working deck, the frame height must be at least 300 mm.

2 Hatches which are opened at sea shall be hinged or fastened and capable of being secured in the open position.

3 The height of frames for small hatches (emergency hatches, etc.), which are not normally opened when the vessel is at sea, may be a minimum of 230 mm on working decks and 100 mm on superstructure decks above weather/working decks. Where, in the opinion of the Danish Maritime Authority, there is no immediate danger of water ingress, approved flush patent hatches without frames may be accepted. The hatches shall be clearly marked on both sides:
EMERGENCY EXIT, KEEP CLOSED AT SEA.

4 The hatch frame height requirement may be reduced or waived for:

4.1 Engine room hatches used only for maintenance and repair of machinery and other hatches not similarly required for the normal operation of the vessel.

4.2 Small hatches with an area not exceeding 0.1 m².

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*Order no. 2447 of 13 of December 2021
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It is assumed that the hatches have gaskets and clamps with a short distance between them, that they cannot be opened easily and that the weather tightness is additionally ensured.

2 For a hatch to be considered weathertight, the following is required:

2.2 The hatch must be fitted with gaskets that cannot be pressed out.

5.2 Scale brackets shall be spaced not more than 600 mm apart and 300 mm from corners of hatches.

5.3 The hatch shall be fitted with at least two hinges or similar.

6 Strength calculations shall assume that hatch covers are subjected to the weight of the load intended to be carried on them, but not less than 10.0 kN per square metre. For covers made of mild steel, the maximum load as specified above multiplied by 4.25 shall not exceed the minimum breaking strength of the material. At this load, the deflection shall not be more than 0.0028 times the span.

7 Covers made of materials other than mild steel shall have at least an equivalent strength to that of covers made of mild steel and shall be of a construction sufficiently rigid to ensure weathertightness under the loads specified above.

8 All covers shall be capable of being held in the open position and shall be protected against accidental closure by a self-locking device.

Rule 9 Engine room openings

Engine room openings shall be enclosed and closed by casings of the same strength as the surrounding superstructure. External egress openings shall have doors complying with the requirements of Rule 7. Other openings shall have covers of a strength equivalent to the unpenetrated house or superstructure. The covers shall be permanently fitted and capable of being closed in a weathertight manner.

Rule 10 Other deck openings and ice covers

1 Where it is essential for the use of the vessel, hatches and ice covers may be fitted, smooth with the deck, of the screw, bayonet or similar type, and manholes, provided they can be closed weathertight and are permanently fixed in position. Taking into account the size and distribution of the openings and the nature of the closures, metal to metal closures may be used, as determined by the Danish Maritime Authority, when the openings can be closed in a reasonably weathertight manner and the closures are secured by chain or similar means so that they can be quickly repositioned when removed.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 Where the working and/or superstructure deck is penetrated by a fish lift and/or ice lift, such lifts shall be led up through a deck penetration to a height of at least 900 mm above the working and/or superstructure deck and shall be terminated by a satisfactory seal around the lift. The penetration must be braced and dimensioned as a hatch frame. Lifts shall have a reasonably tight hinged flap fitted at the top, the lower edge of which shall be at least 1200 mm above the deck.

Rule 11 Fans

1 On decked vessels, ventilation openings shall have a height of at least 450 mm above the deck. They shall be so designed and arranged that water washing over the deck cannot penetrate into the vessel.

2 The height above deck of engine room ventilator frames shall be as great as is reasonably practicable, but not less than 760 mm on weather/working decks and 450 mm on superstructure decks. With regard to the mechanical requirements for ventilation of engine rooms, see Annex 3, Rule 2(2.9).

3 Ventilation openings shall be designed and located to prevent the ingress of water. They shall be capable of being closed in a weathertight manner by fixed closing devices. The closing devices shall be operable from the open deck. The closing devices must be capable of being held in both the open and closed positions.

4 Ventilation openings shall be so designed and positioned that they are not submerged until heeling of more than 30° on open vessels and more than 40° on decked vessels.

5 Fan frames shall be of a strength equivalent to the adjacent structure.

Rule 12 Air and sounding pipes

1 Air ducts shall have a height equal to the upper edge of the bulwark, but not less than 450 mm above the deck. Air pipes must be positioned so that they are protected from damage when working on deck.

2 Air pipes shall be fitted with non-return valves, goosenecks or similar permanent means of closure to prevent water washing over the deck and entering tanks, battery compartments and the like.

3 Air pipes shall be of a strength equivalent to the adjacent structure and have adequate protection.

4 Vessels of 12 metres in length and over shall be fitted with sounding devices complying with the requirements of the Authority for:

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4.1 Bilge wells/gutters in compartments not readily accessible at all times during navigation; and

4.2 For all tanks and cofferdams.

5 Openings for fuel oil tank sounding pipes shall not be located in the crew accommodation and shall not be capable of causing oil spillage in the event of a tank overflowing. The openings of the pipes shall have permanently attached closures.

Rule 13 Portholes, windows and doors

1 Windows, portholes and light openings and the glazing therein in hulls, superstructures and housings on weather decks/working decks shall be of suitable material of sound and suitable construction for the purpose. The dimensioning shall be according to the following table, which applies to toughened, carbonated, acrylic and laminated glass windows. Those at risk of being damaged by fishing gear or similar shall be adequately protected.

Glass thickness in mm with height (h) and width (w) in cm

| h cm ⇒ | 20 | 30 | 40 | 50 | 60 | 70 |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Kolonne ⇒ | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| b cm ↓ | | | | | | |
| 20 | 5 5 4 | 5 5 4 | 5 5 4 | 5 5 4 | 5 5 4 | 6 5 4 |
| 30 | 5 5 4 | 5 5 4 | 6 5 4 | 6 5 4 | 6 5 4 | 6 6 4 |
| 40 | 5 5 4 | 6 5 4 | 6 5 4 | 6 6 4 | 8 6 4 | 8 6 5 |
| 50 | 5 5 4 | 6 5 4 | 6 6 4 | 8 6 4 | 10 6 5 | 10 8 5 |
| 60 | 5 5 4 | 6 5 4 | 8 6 4 | 10 6 5 | 10 8 5 | 10 8 5 |
| 70 | 6 5 4 | 8 6 4 | 8 6 5 | 10 8 5 | 10 8 5 | 10 8 5 |
| 80 | - 5 4 | - 6 4 | - 6 5 | - 8 5 | - 8 5 | - 10 6 |
| 90 | - 5 4 | - 6 5 | - 8 5 | - 8 5 | - 10 6 | - 10 6 |
| 100 | - 5 4 | - 6 5 | - 8 5 | - 8 5 | - 10 6 | - 10 6 |
| 110 | - 5 4 | - 6 5 | - 8 5 | - 10 6 | - 10 6 | - 12 6 |
| 120 | - 5 4 | - 6 5 | - 8 5 | - 10 6 | - 10 6 | - 12 6 |
| 130 | - 5 4 | - 6 5 | - 8 6 | - 10 6 | - 12 6 | - 12 6 |
| 140 | - 5 4 | - 6 5 | - 8 6 | - 10 6 | - 12 6 | - 12 6 |

The use of columns 1, 2 and 3 depends on the window location and whether it is a decked or open vessel according to the following guidelines:

Column 1

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

(a) Windows in hulls from 0.5 m to the following height in m, measured to the lower edge of the window above the deepest operating waterline:

$$\frac{3,2 \times \Delta}{1000 \times L \times B}$$

where:

Δ : fully loaded displacement in kg

L: length in m as defined in Section 3.

B: maximum hull width in m, measured on the outside of the hull, but excluding fenders, etc.

Portholes, windows or light valves with this location must be fitted with a deadlight.

b) Horizontal hatches or windows which may be subjected to point loads in the deck or superstructure roof of decked vessels and which are located higher than

$$\frac{3,2 \times \Delta}{1000 \times L \times B}$$

metres above the deepest operating waterline.

Similar hatches or windows with a lower location will be assessed specifically by the Danish Maritime Authority.

Column 2

Windows in the superstructure, wheelhouse, etc., of decked vessels where the window location is higher than

$$\frac{3,2 \times \Delta}{1000 \times L \times B}$$

metres above the deepest operating waterline.

Column 3

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*Order no. 2447 of 13 of December 2021
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a) Windows in superstructures of open vessels, or partially superstructured vessels where the window location above the deepest operating waterline is higher than the freeboard amidships for such vessels.

(b) Windows at the 2nd superstructure level on decked vessels, except at the front of the wheelhouse where column 2 shall apply.

2 Toughened safety glass or equivalent shall be used for wheelhouse windows.

3 No windows or portholes in the hull side shall be fitted so that their lower edge is less than 500 mm above the deepest operating waterline. Portholes in the hull side must be fitted with a hinged deadlight. Furthermore, for front windows on the other floors of the structure, there shall be at least two shutters of sufficient strength, but not less than 5.0 mm steel sheet or 7 mm aluminium sheet, per window type, but not more than one per window. The shutters must be easily and safely positioned in front of damaged windows. All portholes or windows placed less than 1.0 m above the deepest operating waterline shall be of a type which cannot be opened.

4 Windows or portholes in the hull side below the working deck, or weather deck on vessels other than fishing vessels, shall be located at least 10 mm inside the hull side and shall not be capable of being opened. Frames on the outside of the hull shall not be more than 5 mm outside the hull side.

5 Tinted glass or panes of easily scratched material shall not be used in front of or to the side of the wheelhouse or at the steering position.

6 Glass in portholes and windows and light openings located in the freeboard, on exposed decks and in hatches that are level with the deck shall be mechanically retained between 2 frames or between a rebate and a frame. The frame can be made as a whole or as a split frame. Where there is a risk of the glass being pushed out of the frame, for example, because of large windows, the bending properties of the glass or the position of the window, special precautions must be taken against indentation. Such precautions may include increasing the installation area between the glass and the frame or protection with grilles or gratings.

7 Windows for compartments included in buoyancy for stability shall always be fixed in a fixed frame as specified in Subsection 6.

8 Rubber profiles for fitting glass can only be approved after specific assessment by the Danish Maritime Authority and only for secondary compartments where there is no possibility of water ingress to compartments below the working deck. Where rubber profiles are used, the glass shall be fitted in a crush-proof manner and the thickness of the glass in columns 1 and 2 shall be increased by 20%. If other than toughened glass is used, the thickness must be adapted to the stiffness and strength of the material.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

9 If windows with a greater length or width than indicated in the table are used, an equivalent strength and stiffness must be documented.

10 Freeboard doors on open vessels shall be designed to be watertight. Doors and frames must have at least the same strength as the rest of the hull. Side, bow and stern ports on decked vessels are not permitted below working decks.

11 The lower edge of the door openings of open vessels shall not be less than 200 mm above the deepest operating waterline.

12 For doors with the bottom edge of the opening lower than 500 mm above the deepest operating waterline, solid gaskets and scale brackets not more than 300 mm apart are required. Through doors located higher than 500 mm above the deepest operating waterline, larger volumes of water shall not be able to penetrate. Such doors shall have satisfactory closing and scaling devices.

13 Retractable doors shall be fitted with stop devices at the bottom bearing.

Rule 14 Ingress and egress openings (hull penetrations)

1 Ingress and egress openings through the shell plating, either from spaces below the working deck or from enclosed superstructures or deckhouses on the working deck with doors complying with the provisions of Rule 7, shall be fitted with accessible devices to prevent the ingress of water into the vessel. Normally, each opening shall have an automatically operating check valve fitted with a safe closing mechanism that can be operated from an accessible position. However, such valves are not required if the Danish Maritime Authority considers that the ingress of water through the opening is unlikely to lead to dangerous filling and that the thickness of the piping system is sufficient. The valve control shall be fitted with an indicator showing whether the valve is open or closed.

2 Hull penetrations with an opening less than 100 mm above the deepest operating waterline or below the floor on open vessels shall be fitted with a means of closure (see Figure 2).

3.1 Valves on hull penetrations shall be suitable for use on vessels. They shall be made of steel, bronze or other approved tough material and shall be so fitted as to be readily accessible in all circumstances: also see Annex 3, Rule 11.

3.2 Valves located in the cargo compartment or below the floor shall have the manoeuvring device extended above the floor or deck.

3.3 Valves with threads in the cover or upper section shall be secured against loosening of the cover or upper section when the valve is opened or closed. The valve control shall be fitted with an indicator showing whether the valve is open or closed.

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4 Egress openings in the hull above the light waterline and less than 350 mm above the deepest operating waterline, as well as systems with open inboard outlets, shall be fitted with a non-return valve to prevent water ingress if the pipe is at any point below 350 mm above the deepest operating waterline (see Figs. 2 and 3).

5 Piping systems connected to penetrations in the shell plating shall be so installed that water does not enter the vessel even if the valves are open.

6 Pipe systems with hose connections shall be fitted with double corrosion-resistant hose clamps at both ends. Hose connections to penetrations are not permitted to be located lower than 350 mm above the deepest operating waterline, and the hoses shall be armoured hoses.

7 Penetrations must not be placed in sandwich laminate without this being made solid around the penetration.

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Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority

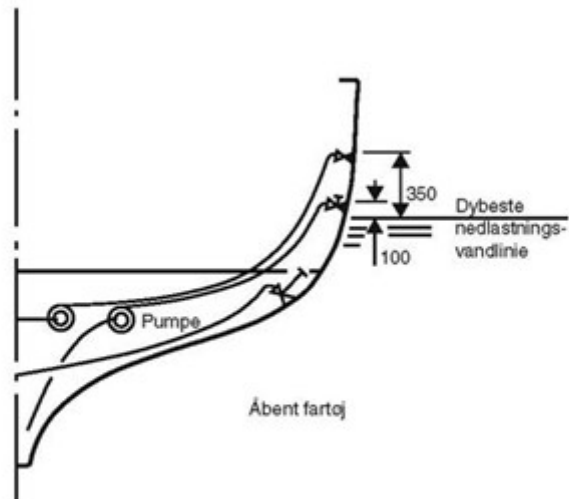


Fig. 2

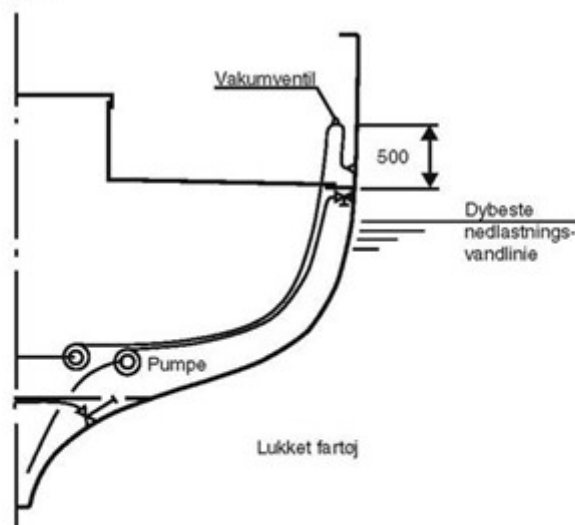


Fig. 3

Tværsnit med udmunding af rørledninger

Rule 15 Freeing ports in decked vessels

1 On open decks with a fixed bulwark, a sufficient number of freeing ports shall be fitted on each side.

2 Freeing ports shall be distributed along the deck so that the location is most concentrated in the areas where water accumulation on the deck will be greatest due to leaks, likely trim, etc. Freeing ports shall be located along the bulwark in such a way as to ensure that the deck is drained as

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

quickly and efficiently as possible. The lowest edges of the freeing ports shall be as close to the deck as practicable.

3 The minimum area (A) calculated in square metres on each side of the vessel for each well on the working deck shall be determined in proportion to the length (l) and height of the bulwark in the well, as follows:

$$3.1 A = Kx l$$

where: K = 0.07 for vessels of 15 m in length

K = 0.05 for vessels of 12 m in length and less

For intermediate values of K these are found by interpolation.

(l need not be taken as greater than 70% of the length of the vessel)

3.2 If the bulwark is more than 1200 mm in average height, the required area shall be increased by 0.004 m^m per metre length of the well for each 100 mm difference in height.

3.3 Where the bulwark is less than 900 mm in average height, the area required may be reduced by 0.004 m² per metre of length of well for each 100 mm difference in height.

4 Unless approved by the Danish Maritime Authority, the minimum freeing port area for each well on the superstructure deck shall not be less than one half of the area (A) specified in Subsection 3.

5 The freeing port area calculated in accordance with Subsection 3 shall be increased when the Danish Maritime Authority considers, after a specific assessment, that the vessel's sheer is not sufficient to ensure that the deck is drained quickly and efficiently.

6 In vessels fitted with a live tank with adequate drainage to it, the requirement for freeing port area may be reduced, but not by more than 10% of the required freeing port area.

7 The freeing ports must not be able to be battened down, but can be fitted with external top-hinged hatches and internal bars. However, these arrangements shall not result in a significant reduction in the effective freeing port area. Any hatches or exterior rubber flaps in recessed doors must be secured with hinges at the top edge. The hatches must have enough clearance so that they do not get stuck. The hinges must be made of materials that are not attacked by corrosion. It must not be possible to lock the freeing port hatches.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

8 Larger freeing port openings shall be fitted with ribs spaced not more than 380 mm apart, but not more than 230 mm below the lowest rib.

9 The positioning of stowage boxes and gear stowage devices shall be such that the effectiveness of the freeing ports is not reduced.

10 In vessels with a trading permit in areas at risk of ice accumulation, as listed in Annex 3, Rule 6, hatches and other protection for freeing ports shall be readily removable to reduce icing.

Rule 16 Anchors and mooring equipment

1.1 Every vessel shall be equipped with anchor gear, bollards or securing brackets so that the vessel can be quickly and safely anchored, moored, or towed in a safe manner.

1.2 The requirements for anchors, chains and moorings are given in the following table.

1.3 The anchor equipment specified in the table is based on bottom conditions with normal holding force.

2 Mooring fittings, bollards and cleats.

The anchor rope or chain shall be capable of being securely fastened to the forward end of the vessel. Where necessary, dunnage, rollers, deflector plates or the like shall be placed where moorings, anchor ropes or chain intersect the clearance, deck or hawser.

3 All vessels shall have at least one bollard, bracket or cleat forward and two aft. Where two bollards or brackets are fitted, these should be positioned as far to the side as possible.

4 One bollard or bracket at the bow and one at the stern shall be positioned to permit towing. If a bow-mounted towing bracket is easily accessible, this may also be approved as a mooring bracket on open vessels without a foredeck.

5 Mooring brackets and their fixings shall be of sound construction and installation and shall be designed for a direct horizontal tensile load (breaking strength) "P" in the longitudinal direction equal to the following:

$$P = \frac{50 \times \Delta}{L}$$

where:

P: Tensile load (N)

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Δ : weight displacement at full operation (kg)

L: length in m as defined in Section 3.

6 The area where bollards, bracket clamps or cleats are attached shall be provided with adequate reinforcements. Bolts, nuts and other mounting parts shall be of materials resistant to corrosion and shall be secured against loosening.

7 The anchor weight may be divided into 2 anchors, the largest of which (main anchor) shall have a weight of at least 2/3 of that specified.

8 The anchor weights given in the table are based on traditional anchor types. If the anchor is of a special type with high holding power, the anchor weight can be reduced by up to 25%.

9 Vessels with a particularly large superstructure or rigging shall be fitted with heavier anchor gear. The anchor weight and the length and breaking strength of the anchor rope or chain are increased by up to 20% compared to the table.

10 In vessels with a trading permit in trade areas F4 or F5, the anchor weight and the length and breaking strength of the anchor rope or chain and chain leader shall be increased by 20% in relation to the following table.

11 In vessels with a trading permit in Greenland, the anchor weight and the length and breaking strength of the anchor rope or chain shall be increased by 30%. If anchor ropes are used, the length of the chain leader must also be increased by 100% in relation to that indicated in the following table.

12 Anchor ropes and moorings

The vessel shall be equipped with at least one anchor rope or anchor chain and three mooring lines of the length and breaking strength specified in the table.

13 Chain leader

If an anchor rope is used, a chain leader of the length and dimension indicated in the table shall be inserted between the anchor and the anchor rope.

14 Trawl wire or fibre rope

Trawl wire or fibre rope may be used as anchor wire, provided that this wire has at least an equivalent breaking strength to that specified in the table for anchor wire. It is acceptable for the trawl wire or fibre rope to pass through the hanger block. Between the anchor and the wire or rope

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

there shall be a chain leader of the diameter shown in the table and of a length of not less than 12.5 m.

15 Anchor chain

The chain dimensions given in the curve sheet apply to short link chain. The chain must be made according to a recognised standard.

| Skroglængde Mindre end (m) ⇒ | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------------------------------|-----|----|----|----|----|----|----|----|----|------|------|------|----|----|
| Samlet anker- vægt (kg) | 5 | 6 | 9 | 12 | 16 | 21 | 26 | 32 | 39 | 47 | 54 | 62 | 70 | 88 |
| Største ankers min. vægt (kg) | 3 | 4 | 6 | 8 | 11 | 14 | 17 | 21 | 26 | 31 | 36 | 43 | 53 | 63 |
| Ankertov eller kædelængde (m) | 15 | 17 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 54 | 62 | 71 | 80 |
| Ankertovs brudstyrke (kN) | 8 | 11 | 15 | 19 | 23 | 28 | 32 | 36 | 41 | 45 | 49 | 53 | 70 | 76 |
| Kædeforfangs længde (m) | 1,2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 13 | 13 |
| Kædeforfangs dimension (mm) | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 | 12,5 | 12,5 | 12,5 | 13 | 13 |
| Fortøjnings længde (m) | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 26 | 28 | 30 | 32 |
| Fortøjnings brudstyrke (kN) | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 26 | 28 | 30 | 32 |

Tabel 1. Fartøjer med en længde mindre end 16 m

Rule 17 Working decks under an enclosed superstructure on fishing vessels

1 Vessels with enclosed protection above the working deck, in which no freeing ports are fitted and to which there are doors or hatches which need to be open at sea in connection with the use of the vessel, shall be fitted with an effective drainage system with an adequate drainage capacity to remove wash-water and fish-waste.

2 All openings necessary for fishing operations shall have closing devices which can be quickly and effectively operated by one person.

3 If the catch is brought to such decks for handling or processing, it shall be placed in watertight stowage. Such stowage must be fitted with an effective drainage system. There shall be

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

satisfactory protection against accidental water ingress to the working deck, as determined by the Danish Maritime Authority.

4 There shall be at least two outlets from such decks.

5 The headroom at workstations and the ventilation system shall be as specified in Annex 5.

6 Side hatches and aft hatches to superstructured workspaces on the working deck which may be kept open during fishing operations shall be limited in size and shall normally have a doorstep height above deck of not less than 1000 mm.

7 The closing devices of such hatches shall be of at least the same strength as the superstructure in which they are placed and shall be capable of being closed quickly by a person at any time without the use of tools.

8 Side hatches that can be closed from the wheelhouse shall have an audible and visual alarm at the work station to warn when closing begins.

9 Side and stern hatches shall be clearly marked to indicate that hatches are to be kept closed when not in use during fishing operations and when there is a risk of water filling the working deck.

10 On the working deck of superstructured workspaces with a side hatch(es), in addition to pumps as specified in Subsection 13, drainage valves may be permitted in bilge wells for direct overboard drainage. The said drainage valves shall not be used in vessels which are required to navigate in areas specified in Annex 3, Rule 6(1), where there is a risk of ice accumulation. The drainage valves shall be designed and arranged as shown in the sketch below and the following conditions shall be met:

10.1 Drain valves shall be recessed in the hull.

10.2 Drainage valves shall be watertight from the outside when closed and shall be easily accessible for cleaning and inspection.

10.3 Drainage valves shall also be capable of being closed manually from a position at least 1 m above the deck.

10.4 Openings for drainage valves shall not exceed 0.06 m².

10.5 Drainage valves shall be located at least 500 mm above the deepest operating waterline.

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*Order no. 2447 of 13 of December 2021
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Drainage valves cannot be permitted in closed superstructures that are included as weathertight in stability calculations.

10.6 The hinges of drain valves shall be made of materials which are not attacked by corrosion.

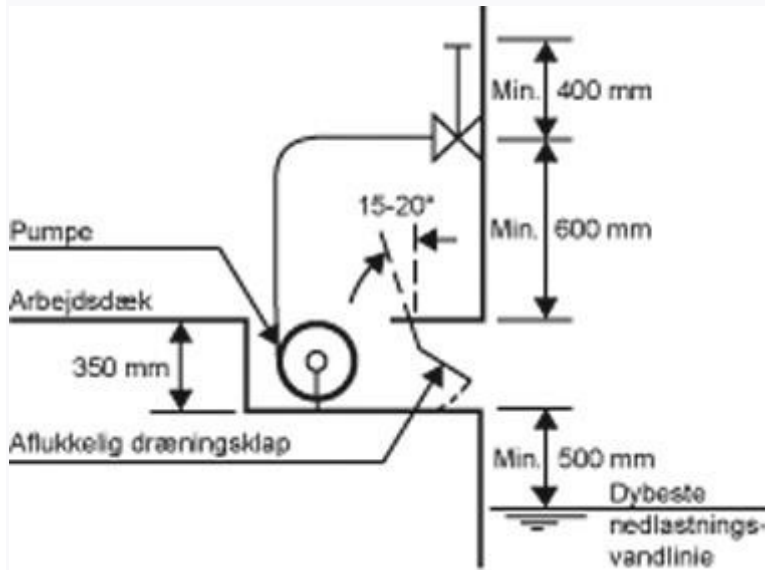


Fig. 4

11 Waste chutes from enclosed superstructures or completely enclosed workspaces on working decks shall be so arranged and designed as to be easily inspected. The internal openings of the shaft in the working deck compartments shall be located as high as possible, taking into account the trim and the deepest operating waterline, but not less than 600 mm above the deepest operating waterline. The inner opening shall be fitted with a weathertight filling hatch with gaskets and clamps. The shaft and hatch shall have at least the same material thickness as the plating or bulwark in which they are mounted, but not less than 8 mm. Every shaft and hatch must be approved by the Danish Maritime Authority, which may impose additional requirements based on the specific design. Normally, each egress opening shall have an automatically operating check valve or check valve fitted with a safe closing mechanism that can be operated from an accessible position. However, such valves are not required if the Danish Maritime Authority considers that the ingress of water through the opening is unlikely to lead to dangerous filling and that the thickness of the piping system is sufficient. The valve control shall be fitted with an indicator showing whether the valve is open or closed.

12 Any structure which may impede the rapid and effective drainage of decks of decked vessels shall not be permitted. Deckhouses with house sides against the sides, separate bulkheads/shielding on board for protection against weather during operation or similar structures on deck are only permitted under very special circumstances and after a concrete assessment by

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

the Danish Maritime Authority. In such enclosures, freeing ports are not considered to provide effective drainage under Rule 15. A bulwark with a height of more than 1.20 m will be considered as such shielding.

13 From bin arrangements on deck, there shall be good drainage from the bins and further overboard.

Rule 18 Draught marks

All decked vessels shall have draught marks in decimetres at the bow and stern on both sides.

Rule 19 Rudder

1 The rudder, rudder stock, rudder bearings, heel and rudder coupling, etc., shall be dimensioned either in accordance with recognised standards or in accordance with the provisions set out below.

2 Rudders with fittings, rudder stock, couplings, etc., shall be of adequate strength. Necessary bracing and reinforcement shall be provided where penetrations and fittings are installed.

3 The rudder shall be securely fastened against lifting. Bolts in rudder couplings, etc., must be secured so that they cannot become loose during operation and in the event of vibration, etc.

4 If the total vertical load on the rudder cannot be absorbed by the heel bearing, the rudder shall be fitted with a suitable rudder bearing capable of absorbing the vertical forces.

5 The rudder stock's stuffing box packing shall, in general, be placed at least 350 mm above the deepest waterline. The height of the stern bearing or heel bearing must be at least 20% larger than the diameter of the rudder stock or rudder pin, respectively. Where the distance between the rudder bearing and the quadrant exceeds 6 times the diameter of the rudder stock, a top bearing (support bearing) should normally be fitted.

6 The following terms are used for forces on the steering system:

K: steering force in N

P: driving force in N, $P = 110 \times A \times V^2$

A: the area of the rudder in m²

V: maximum speed of the vessel in knots

Sa: steering arm length in mm

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

S_b : the distance in mm from the pressure centre, T_c , to the nearest rudder bearing above.

A : the distance in mm from the centre of pressure to the centre of the rudder stock, measured perpendicularly from the rudder stock. Single plate rudders have pressure centres 40% aft of the leading edge of the rudder. The profile pipe has a pressure centre 30% aft of the rudder's leading edge.

U : maximum engine power in kW

M : moment in Nmm

d_v : solid rudder stock diameter in mm

$\sigma_{0.2}$: yield stress in N/mm²

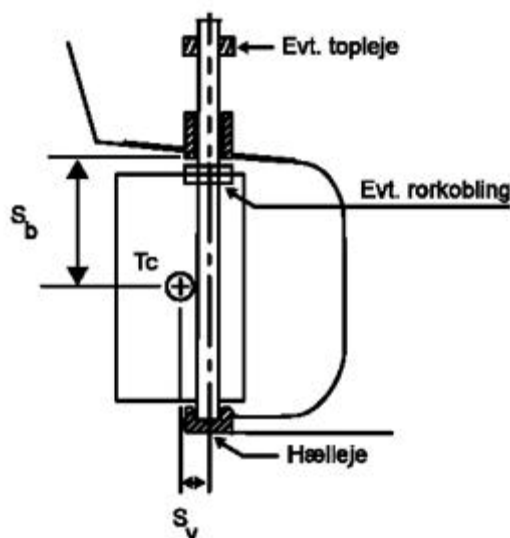
7 The steering power of vessels with rudders is:

$$K = \frac{P \times S_v}{S_a} \quad N$$

8 Rudder stocks

If the rudder has a heel with a heel bearing and a rudder heel with at least the same transverse stiffness as the rudder stock, the torque is calculated as follows:

$$M = 1,15 \times (0,25 \times P \times S_b + 0,5 \times P \times \sqrt{S_b + 2 \times S_v^2}) \quad Nmm$$

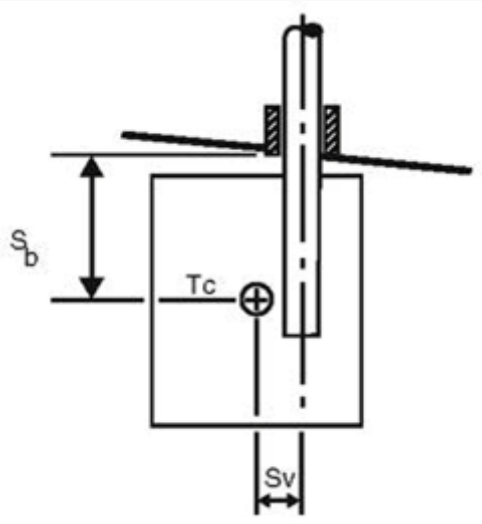


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Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority

Sketch of balance pipe with heel bearing

$$M = 1,15 \times (0,5 \times P \times S_b + 0,5 \times P \times \sqrt{S_b^2 + 2 \times S_v^2}) \quad \text{Nmm}$$



9 Rudder stocks for underslung rudders shall be calculated for combined torque and bending moment:

Sketch of an underslung rudder

10 The diameter of the rudder stock shall not be less than:

$$d_v = 2,2 \times \sqrt[3]{\frac{M}{\sigma_{0,2}}} \quad \text{mm}$$

11 Rudder stocks shall be sized according to the following formula:

$$d_v = \sqrt[3]{\frac{d_1^4 - d_2^4}{d_1}} \quad \text{mm}$$

where:

d_v : the diameter of the solid rudder stock

d_1 : outer diameter of the pipe in mm

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

d₂: is the inside diameter of the pipe in mm

12 The bearing of the rudder stock and its mountings shall be dimensioned for a force equal to the rudder force P.

The length/height of the bearings shall be as specified in Subsection 5, subject to a minimum of = d_v.

The minimum diameter of the rudder pin shall be $d = (5 + 0.6 \times d_v)$ mm.

For underslung rudder, an upper bearing should normally be placed at a distance of at least S_b above the lower bearing.

13 The upper bearing shall be located at a height of at least 350 mm above the deepest operating waterline and shall be fitted with a sealing ring. Where this is not practical, grease-filled stuffing box packing must be used.

14 The diameter of the bolts in the rudder coupling must not be less than:

$$d_b = \frac{0,65 \times d_v}{\sqrt{n}} \text{ mm}$$

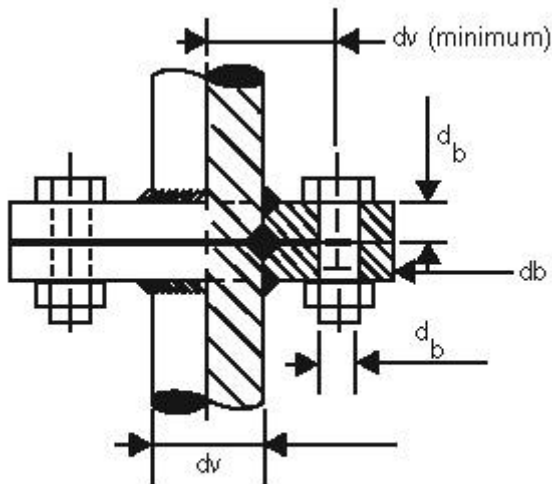
where

d_v: diameter of the rudder stock in mm

n: number of bolts, at least 4

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*



Skitse af rorkobling

15 The pitch radius of the coupling pins must not be less than the diameter of the rudder stock. The thickness of the coupling flange and the flange width outside the bolt holes must not be less than d_b . The coupling bolts shall be fitted bolts and the bolts shall be secured so that they cannot become loose during operation. Self-locking nuts are not accepted for this use.

16 Steel, aluminium and glass fibre reinforced polyester rudders shall have a continuous rudder stock from the rudder coupling down to the rudder pin.

17 The diameter of the rudder stock shall not be less than the diameter of the rudder pin as defined in Subsection 12. However, on underslung rudders, the diameter must be reduced linearly downwards from the rudder coupling.

18 Steel and aluminium rudders, in the form of plate or profile rudders, shall have horizontal braces across the rudder stock, a top and bottom bracing and additional horizontal bracing with max 600 mm spacing. The thickness of the bracing shall not be less than the sheet thickness of profile rudders referred to in Subsection 20.

19 Plate rudders must have a thickness that is at least:

$$t_e = 3 + 0.125 d_v \text{ mm}$$

where d_v : diameter of the rudder stock in accordance with Subsection 10.

20 Plates in profile rudders (double plate rudders) and horizontal bracing must have a minimum thickness of:

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

$td = k \times te$ mm

$k = 0.46$ for steel or aluminium

$k = 0.33$ for stainless steel

te: plate thickness according to Subsection 19.

21 Glass fibre reinforced polyester rudders shall preferably be profiled and have steel bracing welded to the rudder stock with a maximum spacing of 200 mm. The thickness of the steel bracing shall be at least equal to the thickness of the plate rudder in accordance with Subsection 19, the width at least ten times the thickness and the length not less than 75% of the distance from the rudder stock to the aft edge or forward edge of the rudder. The Danish Maritime Authority may approve GRP single plate rudders if they can be shown to have the same strength and stiffness as single plate rudders constructed in accordance with Subsections 23 to 24.

22 Glass fibre reinforced polyester rudders laminated in two parts shall be filled with reinforced polyester or equivalent material and the parts effectively glued together at the flanges at the edges. The thickness of the side pieces shall not be less than the thickness of the plate in the steel or aluminium profile rudder according to Subsection 20.

23 Wooden rudders shall be of oak and shall be attached to the rudder stock and rudder pin by steel forks of a thickness at least equal to $0.8 \times$ the thickness of the plate rudder in accordance with Subsection 19. The steel forks shall be welded continuously to the rudder stock and rudder pin and bolted to the rudder with at least three bolts at the top and two bolts at the bottom. The diameter of the bolts shall be that of the bolts of the rudder couplings according to Subsection 14.

19 Oak rudders must have a thickness that is at least:

$tt = 7.3 \times te$ mm

the: the thickness of the plate rudder according to Subsection 19.

Rule 20 Simplified strength requirements for GRP vessels

1 General

1.1 GRP vessels may be built in accordance with the provisions of this rule provided that:

1.1.1 The speed of the vessel does not exceed 15 knots.

1.1.2 The construction is built as single laminate.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.1.3 Strengthening, bulkheads and other strengthening elements are available for checking.

1.1.4 Thickness measurements may be carried out on the bottom, side and deck of the hull.

1.2 If the above conditions are not met, vessels shall be built in accordance with the rules of a recognised organisation.

2 Materials

2.1 The structure shall demonstrate that raw materials have been used in accordance with a recognised standard.

2.2 It must be demonstrated that the properties of the finished laminate meet a recognised standard.

2.3 In the absence of documentation, a sample of the material shall be taken for testing.

3 Execution

3.1 Laminate construction must be professionally correct with good workmanship. The laminate must be well cured and must not be discoloured.

3.2 Laminate exposed to water must be protected by gel or topcoat.

4 Dimensioning

4.1 In the table below, insert values for W and Loa in metres, but without dimension. The minimum dimensions shall be according to the following tables:

| Area | Stretch mm | Dimension mm |
|-------------------------|---------------------------------------------|---------------------|
| Keel and stern laminate | 80×W from centre line | Tk = 7.0+1.3×Loa |
| Bottom plating laminate | Up to the full depth operating waterline | Tb = 6.0+0.7×Loa |
| Bilge | 100 mm on each side | Tc = 6.0+0.8×Loa |

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Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority

| | | |
|--------------------------------------------------------------------------------------------|---------------------------------------|---------------------|
| Laminate in side plating, superstructures, strengthening and tank bulkheads and deckhouses | Above the deepest operating waterline | Td = 3.0+0.6×Loa |
| Laminate in decks | Over the entire stretch | Tc = 6.0+0.8×Loa |

4.2 Maximum frame spacing and minimum bending resistance for bracing. Frame spacing and minimum momentum of resistance must be according to the following table:

| Frame in | Max. frame distance s in mm | Momentum of resistance in cm ³ |
|----------|-----------------------------|----------------------------------------------------------------|
| Bottom | s = 5.4×Loa+400 | Wb =0.006×Loa×s×l ² ×10 ⁻⁶ |
| Side | s = 5.4×Loa+400 | Ws =0.0038×Loa×s×l ² ×10 ⁻⁶ |
| Deck | s = 26×Loa+300 | Wd =0.87× (0.01+0.002×Loa) ×s×l ² ×10 ⁻⁶ |

where,

l: length of the frame/beam in mm

s: frame spacing in mm

4.3 Floor plates shall be installed with a maximum spacing of 1.0 m and shall have a minimum height hb (mm) above the keel:

$$hb = \frac{B}{3} \times 100 \times S, \text{ mm}$$

but not less than 100 mm

where,

S: distance between floor plates in m

4.4 Bulkheads shall have sufficient strength to withstand the water pressure that may occur when one of the confined compartments is filled with water. If plywood is used, it must be of waterproof marine quality, and at least have a thickness as indicated below, over-laminated on both sides with at least 2 times 450 g/m² glass fibre mats.

Minimum thickness: t = (2×Loa - 2) mm

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

But not less than 100 mm

4.5 Bulkheads of other materials must be dimensioned for an equivalent strength.

Where the sides of the unsupported part of the hull exceed 1000 mm, braces with a minimum momentum of resistance shall in general be used:

$$W = 10 \times s \times l^2, \text{ cm}^3$$

where,

s: stay distance in m

l: the length in m of the unsupported stay.

5 Engine foundations

Engine foundations shall be properly sized to withstand the propeller thrust and drag forces. The longship girders of the engine foundation shall have at least the same strength as the floor plates and a sufficient length in front of and aft of the engine. The girders shall be terminated against the transverse floor plate, bulkhead or similar reinforcement. The foundation must have a strong transverse bracing, which must have a smooth transition to the hull.

GRP motor foundations shall have steel inserts at the foundation bolts.

6 Sandwich laminate

6.1 Only materials approved for this purpose by a recognised organisation may be used as core material. Veneer shall be of marine quality according to applicable standards. Homogeneous wood must not be laminated.

6.2 Foam cores shall be made of PVC foam or equivalent. Polyurethane foam must not be used. Foam cores with open cells in the surface should normally have polyester applied before laying against wet laminate. The wet laminate must be reinforced with at least 450 g/m² on flat surfaces and 900 g/m² on curved surfaces.

6.3 The ratio between the thicknesses of the thinnest and the thickest shell laminate shall normally not be less than 0.75.

6.4 The thickness of the outer laminate in the keel, stern, bottom and side shall normally not be less than 65% of the requirement for laminate thicknesses in single skin structures.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

6.5 In decks, including deckhouses, the minimum outer laminate shall be: $t_y = 2.0 + 0.1 \times L_{oa}$ mm.

7 Monitoring

7.1 The requirements of the above tables, documentation in the form of drawings and calculations, as well as the workmanship, shall be checked for each boat at the final survey.

Rule 21 Construction of GRP vessels

1 General

1.1 This rule applies to fibre-reinforced plastic vessels which are individually inspected under construction.

1.2 It is assumed that the manufacturer follows the instructions given by raw material manufacturers for the use of the various products used for the construction of glass fibre reinforced polyester vessels.

Rule 22 Simplified strength requirements for steel vessels

1 General

1.1 Steel vessels may be built in accordance with the provisions of this rule provided that:

1.1.1 The speed of the vessel does not exceed 15 knots.

1.1.2 Bulkheads, frames, floor plates and other strength members are available for inspection and thickness measurement can be carried out on the hull bottom, side and deck.

1.2 If the above conditions are not met, vessels shall be built in accordance with the rules of a recognised organisation.

2 Drawings and calculations or other design data shall be sent to the Danish Maritime Authority in accordance with Section 8(4) and (5).

3 Materials

3.1 The design shall demonstrate the use of ship-quality materials with class or works certification and with the following minimum characteristics:

3.1.1 Yield point 240 N/mm²

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3.1.2 Breaking strength 410 N/mm²

3.1.3 Fracture elongation 22%

4 Execution

4.1 Adjustment of materials, welding and detailing shall normally be carried out in accordance with Rule 23.

5 Dimensioning

5.1 The minimum dimensions shall be in accordance with the following table, interpolation being applied for vessels between 8.0 m and 15.0 m in length. Length as defined in Section 3(17), (the rule length). If this is more than 15 m, the column for L = 15.0 m is also used.

5.2 Dimensioning table for steel vessels

| Designation | Length ≤ 8.0 m | Length = 15.0 m | Comments |
|---------------|----------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Frame spacing | Max. 500 mm | Max. 500 mm | |
| Bar keel | Cross section area 15 cm ² | Cross section area 20 cm ² | Where bar keel is omitted Keel plate = 1.5×bottom thickness. Total width = 30×Length |
| Centre keel | Cross section area 15 cm ² Min. Thickness = 5 mm | Cross section area 20 cm ² Min. thickness = 6 mm | Required only where a bar keel is omitted |
| Floor plate | Height 200 mm Thickness = 4.5 mm | Height 250 mm Thickness = 6 mm | Required for every 3rd frame These can be used on others Framework floor plates |

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issued by the Danish Maritime Authority*

| | | | |
|-----------------------------------|----------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------|
| Flange on top of the floor plates | 50 x 5 mm | 50 x 6 mm | Can be omitted where concrete is poured to the top of the floor plates |
| Keel beam | UNP 100 or equivalent Area 13.3 cm ² | UNP 120 or equivalent Area 17 cm ² | Required only where a centre keel is omitted |
| Frames | 75 x 6 mm W = 12 cm ³ | 90 x 7 mm W = 17 cm ³ | Max span 2.50 m |
| Floor plates | 4.5 mm | 7.0 mm | Allowance for keel and stern plates + 1.0 mm (width 500-600 mm) |
| Plating | 4.5 mm | 6.0 mm | Allowance for keel and stern plates + 1.0 mm (width 500-600 mm) |
| Bulkheads | 4.5 mm | 6.0 mm | |
| | | | |
| Bulkhead stay | 50 x 6 mm W = 6 cm ³ | 50 x 7 mm W = 7 cm ³ | Max. spacing 600 mm Max. span 2.0 m |

| Designation | Length <= 8.0 m | Length = 15.0 m | Comments |
|-------------|----------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------|
| Deck | 4.0 mm | 6.0 mm | |
| Deck beams | 75 x 8 mm W = 15 cm ³ 90 x 8 mm W = 22 cm ³ | 75 x 8 mm W = 15 cm ³ 90 x 8 mm W = 22 cm ³ | Max. spacing 500 mm Max. span 2.5 m Max. Span 3.5 m |

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

| | | | |
|-------------------------------|--------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bulwark and clearance | 4.0 mm | 5.0 mm | Stay 50 x 6 mm Max. spacing 500 mm |
| Superstructure and deckhouses | 4.0 mm | 5.0 mm | Stay 50 x 6 mm Max. spacing 500 mm |
| Deck beams in superstructure. | 75 x 6 mm $W_{\min} = 10 \text{ cm}^3$ | 75 x 6 mm $W_{\min} = 10 \text{ cm}^3$ | Max spacing 500 mm. Max span 2.5 m |
| Knee and end connections | Knee 1.5 x profile depth. $t. = 6 \text{ mm}$ | Knee depth = 1.5 x profile depth. $t. = \text{profile thickness}$ | Where there is no knee, profiles must be welded at the end to the adjacent profile. |

5.3 Comments:

5.3.1 Span is calculated from support point to support point or to the centre of the knee.

5.3.2 W = momentum of resistance for profiles. This includes a plate area of 25 x plate thickness.

5.3.3 When using another frame/beam/stay spacing, compensation can be made in direct proportion.

5.3.4 When using other spans on frames/beams/stays, compensate with the ratios between the spans to the power of two.

5.3.5 When other types of profiles are used, they shall have at least the same momentum of resistance as that to be replaced.

5.3.6 Where beams are supported by girders, these shall be sized to carry the weight of the load supported by the deck area. The load on the working deck is the weight of the load it is designed

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

to carry, subject to a minimum of 8.0 kN/m². On superstructure decks, minimum 4.0 kN/m². The calculation must be done in accordance with the rules of a recognised organisation.

5.3.7 In sea water tanks, ballast tanks, RSW and CSW tanks, a corrosion allowance of at least 1.5 mm shall be added to the material thicknesses. Where these tanks are protected with an effective coating, the corrosion allowance can be reduced or eliminated.

5.3.8 Transverse main frames shall terminate in the bottom at the floor plate or tank top and at the top against the deck beam or deck with a knee or welded joint corresponding to the profile of the frame.

5.3.9 Longship main frames shall be terminated at web frames, bulkheads, aft or bow by a welded connection to the knee with a sufficient offset area.

5.3.10 Engine and gear foundations shall be properly sized to withstand propeller thrust and drag forces and according to the engine manufacturer's recommendation. The longship girders of the engine foundation shall have at least the same strength as the floor plates and a sufficient length in front of and aft of the engine. The girders shall be terminated against the transverse floor plate, bulkhead or similar reinforcement. The foundation must have a strong transverse bracing, which must have a smooth transition to the hull. The top flanges of the motor foundation shall be made of heavy sections in relation to the diameter of the foundation bolts and the manufacturer's instructions. The foundations must be well braced with knees and tilting knees.

6 Monitoring

6.1 The requirements of the above table, as well as the material, documentation and workmanship, including welding inspection, shall be checked for each vessel at the final survey.

Rule 23 Construction of steel vessels

1 General

1.1 The following rules apply to steel vessels, which are inspected individually during construction.

2 Materials

2.1 Documentation in the form of class certificates or works certificates shall be available to show that plates and profiles are of the types and qualities approved for the current building number. Additives and gas mixtures must be in accordance with recognised standards (e.g. the standards of a recognised organisation).

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issued by the Danish Maritime Authority*

2.2 The materials must be dry and free of corrosion.

2.3 Each plate shall have an average thickness at least equal to the nominal thickness of the plate.

3 Adaptation of materials

3.1 The construction and welding joints in the material shall be such that there is good access for the welding work.

3.2 Adjustment of plates and profiles must be so accurate that the welding joints have the correct dimension in relation to the material thickness.

3.3 Cutting of plates shall be carried out accurately so that a good weld joint can be achieved. If necessary, the edges must be ground.

4 Welding

4.1 All welding work shall be carried out in a professionally. Any defects or poor workmanship must be corrected before the material is covered with paint, lining or similar.

4.2 Welding of hulls shall be carried out under supervision and be checked by an authorised welder.

4.3 When welding in cold or damp weather, the steel must be preheated before welding. Preheating must be done at temperatures at or below -5°C . Water must not be present in or near the weld (joint) during welding.

4.4 When butt welding sheets thicker than 4 mm, either a 30° joint shall be used or welding shall be carried out in accordance with recognised norms and standards for the execution of butt welds.

4.5 Edge seam welding shall always be double continuous welding on the following:

4.5.1 Foundations, ends and knees for bracing:

4.5.2 "a" measurement shall not be less than those specified in the following table:

| Plate thickness t | A measurement in mm |
|-------------------|---------------------|
| Under 4.0 | 2.5 |
| 4.0 – 6.5 | 3.0 |

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

| | |
|-----------|-----|
| 6.5 – 8.0 | 3.5 |
|-----------|-----|

5 Welding of various structures.

5.1 The following types of welds shall be used for welding the various structures:

| Hull component | Welding type |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Beam knees and other supports | Continuous double edge seam |
| Plating, decks, bulkheads and other plate impact joints | Fire-penetration butt weld |
| Floor plates and bulkheads | Continuous double edge seam |
| Keel and stem | Continuous double edge seam |
| Foundations for machinery and equipment | Continuous double edge seam |
| Tank restraints | Continuous double edge seam |
| Deck and superstructure | Continuous double edge seam |
| Keel beam, frames, beams, bulkhead stiffeners | Interrupted double edge seam. However, not in water tanks where welding is performed as under tank restraints. |

5.2 Double interrupted weld (chain weld) can be used elsewhere.

| t mm | l mm | e mm | a mm |
|-------|------|------|------|
| 3-4.5 | 50 | 75 | 3.0 |
| 5-6.5 | 65 | 100 | 3.5 |
| 7-8.5 | 75 | 125 | 3.5 |

where

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

t: plate thickness

l: welding length (double edge seam)

e: Distance between welds

5.3 One-sided interrupted welding (Z-welding) can be used for fixing bracing instead of chain welding when the same amount of weld is applied. However, 150 mm double weld at the ends.

5.4 Edge seams, other than those specified in Subsection 4.5, shall normally have an “a” dimension of at least 3.5 mm.

6 Execution of details

6.1 There must be continuity in the bracing. Knee plates shall be used where necessary to provide a sufficient mounting area.

7 Bracing that passes watertight divisions:

7.1 If welds and connections at through-elements that pass watertight divisions are not made correctly, there is a high risk of leakage. To ensure the watertight integrity of continuous bracing that is chain or zig-zag welded, the weld must be closed with a notch in the bracing, or with a short full-penetration weld on both sides of the watertight division, (bulkhead, deck, floor plate).

8 Welding of plate collars:

8.1 Tank decks (e.g. high tanks, dry tanks, tilting and trim tanks):

8.2 Collars are welded from both sides. Where it is not possible to weld from the rear for space reasons, the collar is sharpened against the profile and plating.

8.3 Reinforced deck: where frames are passed through reinforced decks, the collars are welded from both sides. Deck in general: collars are welded from above only. Where plate frames go through decks, collars are welded from both sides.

8.4 Bulkheads: Watertight (WT) bulkheads (incl. VT floor plates): all plate collars are welded from both sides. Where bulkheads form bearers for beams (bulkheads replace beam bearers or plate bearers), collars are welded from both sides.

8.5 Light bulkheads including superstructures and deckhouses: the collars are welded from the mounting side only. Where the plate clamps and girders pass through the bulkheads, the plate collars must be welded from both sides (the bulkheads then replace the tilting buckles).

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

8.6 Bracing shall be welded to supports, even where the stiffeners are continuous.

Rule 24 Simplified strength requirements for aluminium vessels

1 General

1.1 Aluminium vessels may be built in accordance with the provisions of this rule provided that:

1.1.1 The speed of the vessel shall not exceed 15 knots.

1.1.2 Bulkheads, frames, floor plates and other strength members are available for inspection and thickness measurement can be carried out on the hull bottom, side and deck.

1.2 If the above limitations are not met, the vessel shall be built to the rules of one of the recognised organisations.

2 Drawing approval

2.1 If the vessel is built as unclassified, drawings and calculations or other design basis must be submitted to the Danish Maritime Authority before construction of the vessel commences, cf. Section 8(4) and (5).

3 Materials

3.1 The design shall demonstrate the use of ship-quality materials with class or works certification and with the following minimum characteristics:

$$\sigma_{0.2} = 170 \text{ N/mm}^2$$

Hvor materiale med anden $\sigma_{0.2}$ anvendes skal der korrigeres (ganges med) $\sqrt{\frac{170}{\sigma_{0.2}}}$ med faktorerne:
 $f_1 = \sqrt{\frac{170}{\sigma_{0.2}}} \cdot V170/\sigma_{0.2}$ for plader, og

$$f_w = V170/\sigma_{0.2} \text{ for momentum of resistance } W \text{ of profiles.}$$

4 Execution

4.1 Production facilities and the adjustment of materials, welding, riveting, bonding and detailing shall normally comply with the provisions of Rule 25.

5 Dimensioning

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5.1 The minimum dimensions shall be in accordance with the following table, interpolation being applied for vessels between 8.0 m and 15.0 m in length. Length as defined in Section 3(17), (the rule length). If this is more than 15 m, the column for L = 15.0 m is also used.

Dimensioning table for aluminium vessels

| Designation | Length ≤ 8.0 m | Length = 15.0 m | Comments |
|-----------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Frame spacing | Max. 300 mm | Max 300 mm | |
| Bar keel | Cross section area 18 cm ² Min. thickness = 16 mm | Cross section area 24 cm ² Min. thickness = 20 mm | Where a bar keel is omitted Keel plate = 1.5×bottom thickness. Total width = 30×Length, mm |
| Centre keel | Cross section area 18 cm ² Min. thickness = 6 mm | Cross section area 24 cm ² Min. thickness = 8 mm | Required only where a bar keel is omitted |
| Floor plates | Height 200 mm Thickness = 5.0 mm | Height 250 mm Thickness = 6.0 mm | Only required for every 3rd frame On other frames, framework floor plates |
| Flange on top of the floor plates | 50 x 5 mm | 50 x 6 mm | Can be omitted where concrete is poured to the top of the floor plates |
| Keel beam | UNP 100 or equivalent Area 13.3 cm ² | UNP 120 or equivalent Area 17.0 cm ² | Required only where a centre keel is omitted |

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

| | | | |
|-----------------------------------|----------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Frames | 90 x 8 mm W = 21 cm ³ | 100 x 8 mm W = 27 cm ³ | Max. span 2.50 m |
| Floor plates | 4.5 mm | 7.0 mm | Allowance for keel and stern plates + 1.0 mm (width 500-600 mm) |
| Plating | 4.5 mm | 6.0 mm | Allowance for stern plates + 1 mm (width 500-600 mm) |
| Bulkheads | 4.5 mm | 6.0 mm | |
| Bulkhead stay | 50 x 6 mm W = 6 cm ³ | 50 x 8 mm W = 8 cm ³ | Max. spacing 300 mm Max. span 2.0 m |
| Deck | 4.0 mm | 6.0 mm | |
| Deck beams | 90 x 8 mm W = 21 cm ³ | 90 x 8 mm W = 21 cm ³ | Max. spacing 300 mm Max span 2.5 m |
| Bulwark and clearance | 4.0 mm | 6.0 mm | Supports, max. distance 600 mm |
| Superstructure and deckhouses | 4.0 mm | 5.5 mm | Stay 50 x 6 mm Max. spacing 300 mm |
| Deck beams in the superstructure. | 75 x 6 mm W = 10 cm ³ | 75 x 6 mm W = 10 cm ³ | Max spacing 300 mm Max span 2.5 m |
| Knee and end connections | Knee 1.5 x profile depth. t. = 6 mm | Knee 1.5 x profile depth. t. = profile thickness | Where there are no knees, profiles must be welded at the end to the adjacent profile in full circumference. |

5.2 Comments:

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5.2.1 The span is calculated from support point to support point or to the centre of the knee.

5.2.2 W = momentum of resistance for profiles. This includes a plate area of $25 \times$ plate thickness.

5.2.3 When using other frame/beam/stay spacing, compensate in direct proportion between the specified spacing and the used spacing.

5.2.4 When using other spans on frames/beams/stays, compensate with the ratios between the stated max. spans and those used to the power of two.

5.2.5 When other types of profiles are used, they shall have at least the same momentum of resistance as that to be replaced.

5.2.6 Where beams are supported by girders, these shall be sized to carry the weight of the load supported by the deck area. The load on the working deck shall be the weight of the load and equipment it is intended to carry, subject to a minimum of 8.0 kN/m^2 and on the superstructure deck a minimum of 4.0 kN/m^2 . The calculation must be done in accordance with the rules of a recognised organisation.

5.2.7 Transverse main frames shall terminate at the bottom against the floor plate or tank top and at the top against the deck beam or deck with a knee or welded joint corresponding to the profile of the frame.

5.2.8 Longship main frames shall be terminated at web frames, bulkheads, aft or bow by a welded connection to the knee with a sufficient offset area.

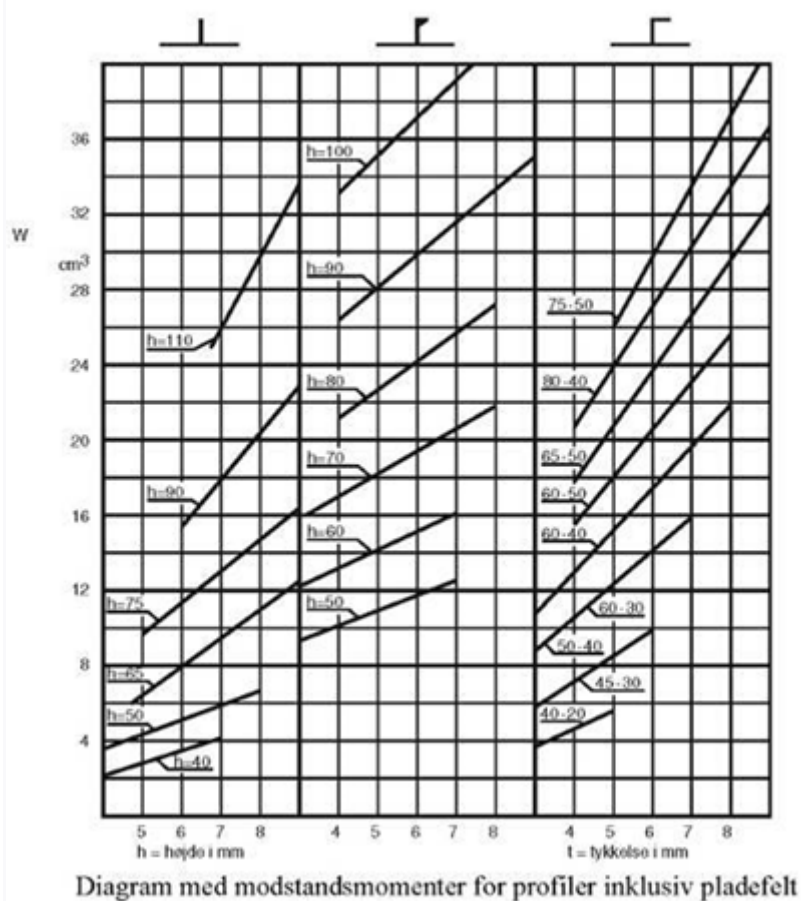
5.2.9 Engine and gear foundations shall be properly sized to withstand propeller thrust and drag forces and according to the engine manufacturer's recommendation. The longship girders of the engine foundation shall have at least the same strength as the floor plates and a sufficient length in front of and aft of the engine. The girders shall be terminated against the transverse floor plate, bulkhead or similar reinforcement. The foundation must have a strong transverse bracing, which must have a smooth transition to the hull. The top flanges of the motor foundation shall be made of heavy sections in relation to the diameter of the foundation bolts and the manufacturer's instructions. The foundations must be well braced with knees and tilting knees.

6 Monitoring

6.1 The requirements of the above table, as well as the material, documentation and workmanship, including welding inspection, shall be checked for each vessel at the final survey.

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issued by the Danish Maritime Authority



Rule 25 Construction of aluminium vessels

1.1 The following rules apply to steel vessels, which are inspected individually during construction.

2 Storage of materials

2.1 Plates, profiles and other aluminium materials must be stored horizontally in such a way that the materials are not damaged or deformed.

2.2 Welding equipment and electrodes, filler materials, etc., must be stored dry and clean.

2.3 Aluminium materials must not be stored together with other metallic materials.

3 Production rooms

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3.1 Machining and welding of aluminium must be carried out in a dry place under a roof and protected from weather and wind.

3.2 The workplace must be clean and free of other metallic materials.

3.3 Where temperatures below 0°C are likely to occur, the production room shall be such that it can be sealed and heated.

4 Materials

4.1 Documentation in the form of class certificates or works certificates shall be available to show that plates and profiles are of the types and qualities approved for the current building number. Additives and gas mixtures must be in accordance with recognised standards (e.g., the standards of a recognised organisation).

4.2 Materials used must be correct and undamaged and have specified and approved dimensions.

4.3 Plates and profiles to be used for hulls and superstructures shall be sea water resistant, rolled, drawn or extruded products, which shall normally have the following material composition limitations:

| | | |
|--------------|--------------|--------------|
| Cu Max. 0.2% | Fe Max. 0.5% | Mg Min. 2.0% |
|--------------|--------------|--------------|

4.4 Examples of materials that will meet these requirements:

| Alloy no. | 5052 | 5083 | 5086 | 5154 | 5454 |
|------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Type designation | AlMg2.5 | AlMg4.5 Mn0.7 | AlMg4 Mn0.2 | AlMg3 | AlMg2.7 Mn |
| Standards | EN AW ASTM DIN 1725 | EN AW ASTM DIN 1725 | EN AW ASTM DIN 1725 | EN AW ASTM DIN 1725 | EN AW ASTM DIN 1725 |

5 Shaping of materials

5.1 Hardened aluminium materials shall not normally be formed by the application of heat and cold forming shall only be used when there is low tension in the material. Aluminium materials usually need to be straightened or shaped by rolling.

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5.2 Bending of sheets shall normally be carried out by rolling. Bending to 90° shall not be done unless the inside radius of curvature, R, is at least:

$$R = F \times t$$

where

F: bending factor according to the table below

t: the material thickness.

Condition: condition digits according to the standard used, e.g. DIN 17007.

| Alloy | Condition | F | F | F | F | F |
|-----------|-----------|--------|--------|--------|--------|--------|
| | | t =1.5 | t =3.0 | t =4.5 | t =6.0 | t =9.0 |
| AlMg2.5 | 0.2 | 0 | 0 | 1 | 1 | 1.5 |
| | 0.14 | 1 | 1.5 | 2 | 3 | 3 |
| | 0.18 | 3 | 4 | 5 | 6 | 7 |
| AlMg4.5Mn | 0.2 | 0.5 | 1 | 1 | 1.5 | 2 |
| | 0.32 | 1.5 | 3 | 3 | 3.5 | - |

5.3 Cutting materials must be done in such a way that the edges are straight and without nicks or burrs.

6 Welding

6.1 Welding of aluminium shall not be carried out at temperatures below +5°C.

6.2 Welding of hulls and decks shall only be carried out by welders who are certified to work with the materials and equipment used.

6.3 Welding electrodes/wire of AlMg4.5Mn or AlMg5 shall normally be used unless other materials are shown to give better results.

6.4 All welding shall have a full, penetrable and neat surface with no pores or edge cuts.

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issued by the Danish Maritime Authority*

6.5 All plates and the attachment of watertight bulkheads and machine foundations shall be continuously welded.

6.6 If interrupted welds are used, the weld lengths must be at least as long as the interruptions and always continuous at the ends.

6.7 The guidelines for welding joints given in Rule 23 shall also apply to aluminium vessels.

6.8 The weld shall be in accordance with the dimensioning approved in advance

6.9 The weld on representative parts of the hull shall be checked by liquid penetrant or an equivalent method. Surface cracks must not occur.

7 Riveting

7.1 Riveting may be used in the deck and superstructure, but not in the hull plating.

7.2 Pop riveting is not permitted in loaded structures unless it has been tested and approved in advance.

7.3 Nails should normally have a diameter of at least 2 times the plate thickness and a spacing of no more than 12 times the plate thickness. The distance to the plate edge must be at least 6 times the plate thickness.

8 Gluing

8.1 Gluing may only be used if a static and dynamic test has been carried out in advance with the type of bonding in question and its use has been approved.

8.2 Only glue that has been shown to have good long-term performance when exposed to a humid environment within the current temperature ranges may be used.

8.3 There must be an approved procedure for the gluing process.

9 Other connections

9.1 Connections between aluminium and other materials, with the exception of acid-proof stainless steel, shall be completely isolated from each other, e.g., by neoprene gaskets and plastic bushings.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Annex 2

Stability and seaworthiness

- Rule 1 General provisions**
- Rule 2 Stability criteria**
- Rule 3 Filling the fish hold**
- Rule 4 Special working methods**
- Rule 5 Operating conditions**
- Rule 6 Ice accumulation**
- Rule 7 Heeling test**
- Rule 8 Stability information**
- Rule 9 Protection against displacement of catch**
- Rule 10 Marking of maximum permissible draught during operation**

Rule 1 General provisions

Vessels shall be so designed and constructed that the provisions of this Annex can be complied with under the operating conditions described in Rule 5. Calculations of the curves of the righting arm shall be made according to generally accepted principles.

Rule 2 Stability criteria

1 The following minimum stability criteria must be met:

1.1 The area under the curve of the righting arm (GZ curve) shall not be less than 0.055 radian up to an angle of heel of 30°, and not less than 0.09 radian up to an angle of heel of 40° or the angle of inflow Θ_f if this angle is less than 40°. Furthermore, the area under the righting arm curve (GZ curve) between the angles of heel 30° and 40°, or between 30° and Θ_f if this angle is less than 40°, shall not be less than 0.030 radian. Θ_f is the angle of heel at which openings in hulls, superstructures or deckhouses which cannot be quickly closed weathertight begin to be under water. In applying these criteria, small openings through which continuous filling cannot take place shall not be considered as open.

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issued by the Danish Maritime Authority*

1.2 The righting arm GZ shall be at least 200 mm at an angle of heel greater than or equal to 30° . For fishing vessels, this GZ requirement may be reduced by $2x(24-L)\%$.

1.3 The maximum righting arm GZ_{\max} shall occur at an angle of heel preferably greater than 30° but not less than 25° .

1.4 The metacentric height GM shall not be less than 350 mm.

2 If means other than stabilisers are available to limit the roll angles, it shall be demonstrated to the satisfaction of the Danish Maritime Authority that the stability criteria required in Subsection 1 are still met in all relevant operating conditions.

3 Ballast shall be of solid material and securely fixed to the vessel. The Danish Maritime Authority may approve water ballast if it is carried in tanks specially designed for this purpose. Where water ballast is used as fixed ballast to ensure compliance with Subsection 1, details shall be provided in the stability information.

3.1 All conditions in the stability booklet shall include evidence that the use of the antiroll tank still meets the criteria.

3.2 The stability booklet shall contain instructions on when the tank should be emptied.

3.3 In the event of an emergency where there is a risk that the vessel will have a permanent list, ice accumulation, an offset load, etc., it shall be possible to empty the antiroll tank via manually operated valves on each side. It must be demonstrated that the tank can be emptied with one valve open in max. 3 min. The tank is filled as described in the stability booklet, typically 40%.

Rule 3 Filling the fish hold

The angle of heel at which continuous filling of fish holds can occur through hatch openings which are left open during fishing and cannot be quickly closed shall be at least 20° , unless the stability criteria of Rule 2(1) can be met with the fish holds concerned partially or completely filled.

Rule 4 Special working methods

1 Vessels employing special working methods during which the vessel is subjected to increased external stresses shall comply with the stability criteria of Rule 2(1), with increased requirements as necessary.

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issued by the Danish Maritime Authority*

2 Vessels fitted with loading and unloading equipment shall not heel more than 10° under the maximum working load when the equipment is in its least favourable position, under the relevant operating conditions.

3 Beam trawlers with a maximum bollard pull of $l^2 \times 0.015$ tonnes or more, where the bollard pull is measured directly by physical test at full power of the main engine, shall meet the following increased requirements:

3.1 The requirements of Rule 2(1.1) for the area under the curve of righting arm GZ shall be increased by 20%.

3.2 The requirement in Rule 2(1.2) for righting arm GZ shall be increased by 20%.

3.3 The requirement in Rule 2(1.4) for metacentric height GM shall be increased to 500 mm.

4 Decked fishing vessels shall have a righting arm GZ positive up to an inclination of 65° when all closing devices are assumed to be closed. Existing mussel fishing vessels are not subject to this requirement.

5 A tug with a propulsion power exceeding 150 kW, designed to tow other craft and fitted with a hook, winch, bollard or similar device, shall, when towing, have an area between the curves of the righting arm (GZ curve) and the heel arm of at least 0.001 radian up to an angle of heel of 40°. The heel arm is calculated according to the following formula:

$$k = \frac{0.07CT(h\cos\Theta - 0.8rs\sin\Theta + 0.5d)}{\Delta}$$

k : Heel arm in m.

C : 4 times l/L , but not more than 1.0

L : The tug's length between perpendiculars in m.

l : The horizontal distance between the point of attack and the aft perpendicular in m.

T : The tug's static bollard pull in kN.

h : Height of the point of attack above the waterline in m.

Θ : The tug's angle of heel.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

r: The distance in m from the centre line of the tug to the hook's point of attack when the tow is cross-shipped.

d: The tug's mean draught in m.

Δ : The tug's displacement in tonnes.

6 Vessels fishing with an arrangement which, during a turn, automatically moves the pull point of the gear to the side to which the vessel is turning, or creates a risk of doing so if the gear becomes bottom-set, shall comply with the following requirements:

6.1 It must be possible to release the gear quickly from the steering position.

6.2 The towing point of the gear shall be located as low as possible and never higher than the clearance (maximum 1 m above the deck). By way of equivalence, existing vessels may, instead, comply with the increased stability requirements of Rule 4(3.1) to (3.3) in all relevant operating conditions.

7 Mussel fishing vessels shall be fitted with a device which, during the recovery of the catch, automatically releases the gear if the heel exceeds the critical heel angle. The critical heeling angle shall be provided by the vessel stability information and shall be determined for the operational condition occurring in practice, where the arm for the maximum righting moment GZ_{\max} occurs at the minimum heeling angle. The critical heeling angle is 7° less than this heeling angle.

8 New and existing mussel fishing vessels may be exempted from the requirement for automatic anti-heeling, as described in Subsection 7, if the vessel undergoes a physical test in which it is demonstrated that the vessel's winch at maximum tractive force with the boom in the most unfavourable position (maximum tilt from centre) inflicts on the vessel a heel less than 15 degrees, though:

a. The tractive force on the winch is measured with a dynamometer, and

b. The test shall be carried out in a condition corresponding to departure from port, according to the stability booklet.

Tractive force, tilt, and associated heeling are entered in the vessel's stability information.

Rule 5 Operating conditions

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1. The number and type of operating conditions to be considered shall meet the requirements of the Danish Maritime Authority and shall include, as appropriate, the following:

Fishing vessels:

1.1 Light ship condition.

1.2 Departure towards the fishing ground with 100% bunkers, stores, ice, fishing gear, etc.

1.3 Departure from the fishing ground with a full catch.

1.4 Arrival at port with a full catch and 10% stores, bunkers, etc.

1.5 Arrival at port with 10% stores, bunkers, etc., without a catch.

Cargo vessels:

1.6 Departure without cargo, but with persons and 100% stores, bunkers, etc.

1.7 Arrival without cargo but with persons and 10% stores, bunkers, etc.

1.8 Departure with full cargo, persons and 100% stores, bunkers, etc.

1.9 Arrival with full cargo, persons and 10% stores, bunkers, etc.

2 In addition to the specific operating conditions specified in Subsection 1, the Danish Maritime Authority shall be satisfied that the stability criteria prescribed in Rule 2 are also met in all other operating conditions occurring in practice, including those which give the lowest values of the stability parameters included in the criteria. The Danish Maritime Authority shall also be satisfied that any special circumstances arising from a change in the use or trade area of the vessel which affect the stability requirements of this Annex have been taken into account.

3 With regard to the operating conditions referred to in Subsection 1, the calculations shall include the following:

3.1 Allowance for the weight of wet fishing nets, gear and similar on deck.

3.2 Allowance for ice accumulation, if provided under the provisions of Rule 8.

3.3 Uniform distribution of catch and cargo, unless this is not consistent with practice.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3.4 Catch and load on deck if provided for in the operating conditions in Subsections 1.2, 1.3, 1.7, 1.8 and Subsection 2.

3.5 Water ballast, if carried either in tanks specially designed for the purpose or in other tanks also designed for the carriage of water ballast.

3.6 Correction for free liquid surfaces and, where applicable, for free surfaces of the catch.

Rule 6 Ice accumulation

1 For vessels with a trading permit in areas¹⁾ where ice accumulation is frequent, the following allowances for ice shall be included in the stability calculations:

1.1 30 kg per m² on exposed road surfaces and walkways. For vessels with a trading permit in the area north of 63° N and between 28° W and 11° W, the allowance for ice shall be increased to 40 kg/m².

1.2 7.5 kg per m² of projected lateral area above the waterline on both sides of the vessel. For vessels with a trading permit in the area north of 63° N and between 28° W and 11° W, the allowance for ice shall be increased to 10 kg/m².

1.3 The projected lateral areas of discontinuous surfaces of railings, rigging poles (except masts) and rigging of vessels not carrying sails and the projected lateral area of other small objects shall be included by increasing the total projected lateral area of continuous surfaces by 5% and the static moment of this area by 10%.

2 Vessels with a trading permit in areas where ice accumulation may occur shall be:

2.1 Designed to minimise ice accumulation.

2.2 Equipped with such means of ice removal as may be required by the Danish Maritime Authority, such as suitable mallets to remove ice in numbers equal to the crew of the vessel.

Rule 7 Heeling test

1 Every vessel, when completed, shall be subjected to a heeling test and the actual displacement and the position of the centre of gravity shall be determined for the light ship condition.

2 If changes are made to a vessel which affect its light ship condition and the location of the centre of gravity, the vessel shall, if the Danish Maritime Authority considers it necessary, be subjected to a new heeling test and the stability information shall be revised.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 The Danish Maritime Authority may permit a heeling test for a particular vessel to be omitted when stability information is available from an inclining test carried out with a sister vessel and the Danish Maritime Authority is satisfied that reliable stability information for the omitted vessel can be derived from that information.

4 The heeling test and the determination of the condition required under Subsection 1 shall be carried out at least every 10 years.

Rule 8 Stability information

1 The stability information shall be provided in the working language of the ship to enable the master to judge easily and safely the stability of the ship under different operating conditions. The information shall include specific instructions to the master warning of those operating conditions which may adversely affect the stability or trim of the vessel. The stability information must be prepared by a company authorised to do so by the Danish Maritime Authority, and a copy must be sent to the Danish Maritime Authority.

2 For new fishing vessels subject to Rule 10, the stability information shall also include a sketch clearly showing the correct location of the marks indicating the operating waterline corresponding to the maximum permissible draught during operation.

3 The valid stability information shall be kept on board. The information shall be readily available at all times and shall be inspected at the time of survey of the vessel to ensure that they are consistent with the actual use of the vessel.

4 If changes are made to a vessel which affect its stability, revised stability calculations shall be made and a copy of the stability information shall be submitted to the Danish Maritime Authority.

Rule 9 Protection against displacement of catch

The catch shall be carefully secured against displacement which could cause the vessel to trim dangerously or heel. Furthermore, larger fish containers must be securely fastened.

Rule 10 Marking of maximum permissible draught during operation

1 This rule applies to new fishing vessels undergoing their first survey on or after 1 July 2021 and fishing vessels whose main dimensions are changed or whose light weight or gross tonnage is increased by more than 10%. The rule does not apply to Greenlandic vessels.

2 A mark shall be placed on each side of the ship indicating the operating waterline corresponding to the maximum permissible draught during operation.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 Each mark shall consist of a horizontal line 300 mm long and 25 mm wide, laid amidships so that the lower edge is flush with the deepest operating waterline.

4 The markings shall be clearly visible and painted in white or yellow on a dark background or in black on a light background. They shall be welded, scored or otherwise permanently fixed to the sides of the ship.

5 The ship shall always be loaded in accordance with the approved loading conditions according to the stability booklet.

Annex 3

Machinery and electrical installations

Section A General provisions

Rule 1 General provisions

Section B Machine installations

Rule 2 Propulsion machinery

Rule 3 Reversing capability

Rule 4 Compressed air systems

Rule 5 Measures concerning fuel oil, lubricating oil and other flammable oils

Rule 6 Protection of fuel oil pipes

Rule 7 Bilge pumping, ballast arrangements, and water level alarms

Rule 8 Exhaust system

Rule 9 Steering systems

Rule 10 Refrigeration systems for catch preservation

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 11 Cooling water system and sea connections

Section C Electrical installations

Rule 12 Main electrical power source

Rule 13 Emergency power source

Rule 14 Precautions against shock, fire and other hazards of an electrical nature

Rule 15 Electrical systems

Rule 16 Earth connections

Rule 17 Lighting systems

Rule 18 Lightning conductors

Section D Periodically unmanned engine rooms

Section E Other technical installations

Rule 19 Hydraulic systems

Section A General provisions

Rule 1 General provisions

Machinery and electrical installations shall be designed and installed in accordance with good engineering practice and comply with the rules of this regulation or equivalent rules accepted by a recognised organisation.

Machinery and equipment shall be protected, installed and maintained so as to minimise any danger to the vessel and persons on board. Special attention should be paid to moving parts, hot surfaces and other hazards.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.3 Engine rooms shall be so arranged that there is safe and free access to all machinery and associated control equipment, as well as to all other parts which may require operation. Such rooms should be adequately ventilated.

1.4 Means shall be provided for starting the machinery from a standstill without external assistance.

1.5 The design, equipment and operation of the ship shall take into account the flashpoint of the fuel oil.

1.6 Plastic pipes and rubber hoses shall not be used for any purpose in engine rooms, where their damage in the event of fire could present a safety hazard.

Section B Mechanical installations

Rule 2 Propulsion machinery

Vessels of length L less than 12 metres and open vessels

2.1 Propulsion engines shall be of a type suitable for propulsion of the vessel.

Decked vessels of a length L of 12 metres or more

2.2 Propulsion engines shall be designed, built and maintained in accordance with the rules of a recognised organisation.

All vessels

2.3 The propulsion engine shall have a rating plate indicating the manufacturer, type designation, power and manufacturer's production number.

2.4 The propulsion machinery shall be installed in a separate engine room or engine casing, separated from other compartments in the vessel by watertight bulkheads.

2.5 In engine rooms, no windows or other form of clear glass shall be fitted in the ship's side, engine casings or decks.

2.6 All gears, shafts and couplings used for the transmission of power to machinery essential for the propulsion, safety and operation of the ship or for the safety of persons on board, shall be so designed and constructed as to withstand the maximum working stresses to which they may be subjected under all operating conditions. Due account shall be taken of the type of machinery by which it is operated or of which it forms a part.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2.7 For engine outputs of 375 kW or more, there shall be at least one spare cooling water pump, separately driven. In freshwater cooling systems, back-up pumps can be omitted if there is a back-up connection to the saltwater system, with the possibility of circulating fresh cooling water.

2.8 The propulsion machinery shall be capable of being operated from the steering position, from which it should be possible to monitor the following controls:

2.8. Propulsion machinery RPM

2.8.2 Lubricating oil pressure of the propulsion machinery

2.8.3 Gear lubricating oil pressure and hydraulic oil pressure, if applicable

2.8.4 Cooling water temperature

2.8.5 Cooling water failure in exhaust systems

2.8.6 Battery charge control device

Control instruments shall be marked with areas for abnormal operating conditions and fitted with adjustable lighting. Alarms shall be established for the above functions with the exception of propulsion machinery RPM.

2.9 The ventilation system for the engine room shall consist of at least 2 ventilation ducts, suitably located, and of a dimension ensuring adequate air renewal and an appropriate temperature throughout the engine room. The height above deck of ventilator frames shall be as great as is reasonably practicable, but not less than 760 millimetres on weather and working decks and 450 millimetres on superstructure decks, respectively. At least one of the ventilation ducts must be led to the bottom of the engine room at an appropriate point.

2.9.1 For natural ventilation, ducts should be as short as possible and should be routed without unnecessary bends.

2.9.2 If the total cross sectional area of both the intake and exhaust ducts is at least 7 cm²/kW, the air supply to the engine room is considered adequate. However, if the engine manufacturer prescribes a larger cross sectional area for the ducts, this prescription shall be followed.

2.9.3 In the case of mechanical ventilation, the fan shall have the capacity required by the engine manufacturer's air flow requirements and the intake duct shall have a cross-sectional area such that the air velocity does not exceed 6 m/sec.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2.9.4 The fans shall be capable of being stopped from an easily accessible position outside the engine room.

2.10 All internal combustion engines shall be so arranged that starting can be done in a safe manner.

2.10.2 If a hand lever is used to start the engine, it shall be self-releasing or otherwise suitably arranged.

2.10.3 Where compressed air is used to start the engine, there shall be 2 independent air compressors, a manual pump being acceptable as one option. Every compressor must be fitted with a safety valve. The compressor intake must be positioned so as to limit the intake of oily air.

2.10.4 Where the direction of propulsion is changed by gear shifting of the machinery, energy shall be provided for at least 12 starts of each propulsion engine without the application of new energy.

2.10.5 Where the engine is not geared, i.e., where reversing or reversible propeller blades are used, the energy absorbed by the compressed air start need only be sufficient for 6 starts.

2.10.6 Where the engine is started solely by electrical energy, there shall be at least 2 independent accumulator batteries which can be connected by contacts to both the starting and charging arrangements (movable changeable cables are not permitted).

2.10.7 Any starter battery must be capable of being fully charged within 6 hours. If a starter battery is used for other purposes, the battery capacity must be increased accordingly and the starter system wiring must be kept completely separate from other circuits.

2.10.8 For electric start, each of the 2 independent batteries shall have sufficient capacity for 6 starts.

2.10.9 The battery capacity shall be doubled in vessels assigned to trade areas off Greenland.

2.11 Engine suspension shall be carried out in accordance with the engine supplier's specifications. Where flexible suspension of propulsion engines is used, the flexible part of the propeller shaft shall be longer than 40 x the diameter of the shaft where flexible shaft coupling is not used. Flexible couplings must be designed in such a way that emergency operation is possible.

2.12 Propeller shaft systems which are not classified shall be sized according to the engine supplier's specifications.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2.13 All moving parts, including couplings and flange assemblies on propeller shafts, shall be adequately guarded, including under the floor. Flywheels must be shielded and prevented from spilling cargo water into the room.

2.14 Any floor plates in the engine room shall be of steel or light metal with a non-slip surface, and shall be fixed and secured.

2.15 Surfaces with a temperature above 65°C must be insulated or shielded. Pressure oil pipes and hoses must be shielded from the hot parts of the engine and from the electrical installation.

Rule 3 Reversing capability

The vessel shall have sufficient reversing capability to ensure adequate manoeuvrability under all normal conditions.

Rule 4 Compressed air systems

4.1 Means shall be provided to prevent overpressure in any part of compressed air systems and, wherever water jackets, air compressors and coolers may be subjected to dangerous overpressure due to air leaking into them from parts under atmospheric pressure, there must be appropriate pressure relief devices.

4.2 The main compressed air system for starting the propulsion internal combustion engines shall be adequately protected against the effects of backfires and internal explosions in the starting air pipes.

4.3 All outlet pipes from starting air compressors shall lead directly to the starting air reservoirs, and all starting pipes from the starting air reservoirs to the main or auxiliary machinery shall be completely separated from the compressor outlet pipe system.

4.4 Measures shall be taken to minimise the ingress of oil into the compressed air systems and to drain these systems.

4.5 Compressed air shall be collected in one or more specially designed compressed air containers, which shall be made of drawn steel pipes or of steam boiler plate (certificate plate) and assembled by welding. Such containers shall comply with recognised rules as regards construction, strength and material dimensions, except that the minimum material thickness shall be 5 mm.

4.6 The working pressure, test pressure, manufacturer's or supplier's name, year of construction and serial number of each container shall be marked in a legible manner to identify the container.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4.7 Containers shall be securely mounted and accessible for external inspection throughout their extent. As a general rule, they shall be fitted with a shut-off valve, a bottom drain tap or valve, a pressure gauge, a safety valve, a rupture disc or a fusible plug and the necessary purge ports.

4.8 Safety valves shall be of sufficient size to prevent the working pressure of the container being exceeded and shall in no case be less than 10 mm in diameter. The safety valve may be located on the inlet line of the vessel or on the compressor and may be common to several vessels of the same pressure. Any container whose connection to the safety valve can be interrupted by intermediate means of shut-off shall be fitted with a rupture disc or fusible plug, which is activated before the container test pressure and melts at a temperature not exceeding 100°C.

4.9 Where the Danish Maritime Authority finds that the amount of air collected in the compressed air containers in relation to the size of the room will entail a special risk in the event of a fire, rupture discs, fusible plugs and safety valves mounted on the containers must be enclosed by a sufficiently dimensioned blowpipe that is led to the deck.

4.10 Draining of water and oil must be possible from the lowest point of the container.

4.11 On the pressure gauge, the working pressure must be indicated by a red line. The pressure gauge scale shall be capable of indicating at least 125% of the working pressure.

4.12 Containers with an internal diameter of more than 150 mm shall have purge ports of a size such that purging and internal inspection can be carried out in a satisfactory manner. In no case shall the diameter of such purge ports be less than 75 mm. Containers with a length of 2.5 m or more shall have a purge port at each end, or fitted with a manhole.

4.13 Inspection and pressure tests of pressure vessels.

4.13.1 Pressure containers for the storage of atmospheric air or other gases under pressure shall be pressure tested in accordance with applicable standards and the manufacturer's instructions.

4.13.2 Pressure containers which are not accessible for a satisfactory internal inspection shall be subjected to a periodic pressure test every 5 years. The equipment used for the production, transfer and storage of compressed air shall also be pressure tested if, on inspection, it is found to be in such a condition that its continued use is deemed to be dangerous.

4.13.3 The shipowner/master shall ensure that the periodic inspections, etc., including pressure tests as described in Subsection 4.13.2, are carried out by a person/company familiar with the task and with the relevant regulations. The inspections shall be documented on board by the ship's management.

4.14 Compressed air lines shall be made of steel or copper pipes.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4.15 Shut-off valves on compressed air lines from containers to the starting valves of geared engines shall be easily accessible.

4.16 The Danish Maritime Authority may, after specific assessment, permit short hose connections of approved material.

Rule 5 Measures concerning fuel oil, lubricating oil and other flammable oils

5.1 Fuel oil tanks shall have adequate ballast plates and internal bracing. Tanks of 50 litres or more shall also be fitted with the necessary flushing covers of at least 150 mm diameter. Tanks of 1500 l and above must be fitted with manhole covers. It is recommended that the tanks are made high and narrow to avoid excessive free surfaces and to prevent the oil from escaping from the suction nozzle when the vessel rolls.

5.2 New fuel oil tanks shall be pressure tested to at least the pressure to which they are subjected during use, but not less than 0.25 Bar.

5.3 Movable steel, stainless steel, aluminium and GRP bulk fuel oil tanks shall be sized and constructed in accordance with applicable standards.

5.4 Aluminium fuel oil tanks shall be of a seawater-resistant material certified by a recognised organisation or of equivalent quality. Aluminium tanks must be installed outside engine rooms and rooms used for storing paint or similar stores. However, tanks forming part of the double bottom of the vessel are permitted to be installed in the engine room. Where aluminium tanks are located adjacent to spaces with heat generating installations, the separation bulkhead shall be fire insulated as specified in Annex 4, Rule 2(2).

5.5 Filling pipes and air pipes on fuel oil tanks shall be of appropriate size. They shall be led to the weather deck and so arranged and designed that water cannot penetrate into the tanks. Air pipes for fuel oil tanks shall project above superstructure decks on superstructured vessels. Filling pipes shall be tightly connected to the deck and arranged so that any oil spillage and overpressure during filling cannot escape to the interior of the vessel and to prevent pollution of the marine environment. Filling and air pipes must have the same diameter. On tanks over 200 l, the internal diameter must be at least 38 mm. Internal lines between fuel oil tanks may be permitted.

5.6 Each tank shall be capable of being sounded. The filling pipe can also be used as a sounding pipe. A buffer plate shall be placed under the sounding pipe. Air pipes, sounding pipes and filling pipes shall be marked at their outlet on deck.

5.7 A sounding device connected to the tank below its top shall be fitted with a self-closing valve of steel or other approved material. Only standpipes with flat glass may be used.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

5.8 Taps and valves fitted to fuel oil tanks shall be steel or other approved material. Taps and valves must be fitted with an accessible control key or hand wheel.

5.9 Oil pipes from fuel oil tanks, which in the event of leakage may discharge oil, shall have a tap or valve, directly fitted to the tank, which in the event of fire can be closed from an easily accessible position above the deck. Remote shutoff by cables with internal plastic coating shall not be permitted. For tanks located in the foreship, it is accepted that the quick release valve is located in the engine room, provided that the pipe is embedded in concrete in the cargo hold.

5.10 Short, approved, hose connections may be used when they are securely mounted on long studs fastened with 2 stainless steel clamps at each end or fastened with connectors built into the hose. 1 clamp may, however, be accepted if the pipe stud is fitted with a collar. Hose connections should be kept as short as possible, and laid out visibly for the entire length.

5.11 Filters, water separators and the like, which cannot be cleaned during engine operation, shall have a by-pass capability. Filter arrangements shall be arranged so that they are not sucked empty when fuel oil tank shut-off devices are closed.

5.12 Fuel oil meters and the like which are inserted into the system, shall be fitted with a by-pass option.

5.13 Parts of measuring equipment, filters and separators may be made of aluminium, provided that it is thick-walled and has a melting point of not less than 400°C.

Rule 6 Securing fuel oil pipes

1 Fuel oil pipes, their valves and other accessories, as well as filters and preheaters, shall be steel or another approved material, except that a limited use of hoses may be permitted. Such hoses with terminations shall be of approved fire resistant materials of sufficient strength.

2 In engines with a power output greater than 55 kW, all external pressurised fuel lines between the high pressure fuel pumps and the fuel injectors shall be protected with a double-walled piping system capable of retaining fuel in the event of a high pressure line failure. A double-walled pipe comprises an outer pipe in which the fuel line is located so as to form a unit. The double-walled piping system shall have means for collecting fuel from leaks and devices for giving an alarm in the event of a fuel line rupture.

3 All surfaces with a temperature above 220°C, which in case of leakage in the fuel oil system may be sprayed with oil, shall be properly insulated.

4 Fuel oil pipes shall not be located immediately above or near high temperature devices including boilers, steam pipes, exhaust manifolds, silencers or other equipment requiring

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

insulation. As far as possible, fuel oil pipes should be located away from hot surfaces, electrical installations or other ignition sources and should be shielded or adequately protected by other means to avoid oil splashes or oil leaks at the ignition source. The number of joints in such piping systems must be kept to a minimum.

5 Components of a diesel engine fuel system shall be designed taking into account the maximum (peak) pressure that will occur during operation, including any high pressure pulsation that occurs and is returned to the fuel supply and drain lines by the fuel injection pump. Connections within fuel supply and drainage lines shall be made taking into account their ability to prevent leakage of oil under pressure while in service and after maintenance.

6 In machinery installations with several engines fed from the same fuel source, provision shall be made to isolate the fuel supply and drain lines to each engine. The means of cutting off the supply shall not interfere with the operation of the other engines and shall be operable from a position which would not be inaccessible in the event of a fire in one of the engines.

Rule 7 Bilge pumping, ballast arrangements, and water level alarms

7.1 It shall be possible to drain the vessel's watertight compartment with a permanently installed hand bilge pump on deck. For a small watertight compartment, drainage to an adjacent watertight compartment may be permitted, provided the drain is fitted with a lockable check valve.

7.2 A hand bilge pump may be used to drain two adjacent compartments by switching with a tap operated one from the deck or wheelhouse.

7.3 All drainage pipes shall be of steel, copper or approved flexible hose. Suction pipes shall be fitted with suction cups, which may be omitted when quick-opening and quick-closing diaphragm pumps are used. Flexible hoses shall not be used on the suction side of a combined drainage and flushing system.

7.4 Pumps shall be resistant to mechanical overload and valves, diaphragms, etc., shall not be of natural rubber where pumps drain from engine rooms or other oily cargo water.

7.5 Hand pumps must have sufficient capacity and be suitable for the purpose.

7.6 Vessels of length L of 12 metres and over shall be fitted with a mechanically driven bilge pump with a capacity of not less than 10 m³/hour in addition to the hand-operated bilge pumps. The pump must be able to suck directly from the engine room via a separate suction line or over a valve box fitted with check valves.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

7.6.1 In vessels constructed after 1 July 2014, the mechanically driven bilge pump required by Subsection 7.6 shall have at least the capacity of one of the fire pumps prescribed in Rule 12 of Annex 4.

7.7 Engine rooms in new and existing vessels shall be fitted with an alarm which is activated when the water level in the room is above normal. The alarm unit shall be located at the steering position and the signal shall be visually observable and audible.

7.8 Combined draining/flushing systems shall be designed so that drain water cannot be discharged into the flush system by mistaken operation or otherwise. Precautions shall be taken to prevent water entering the vessel through bilge and draining/flushing systems.

7.9 Where the working deck of the superstructured workspace with side hatches is lowest, there shall be at least one bilge well in each compartment bounded by bulkheads on each side of the deck at the side. Where the width of the workspace is less than $\frac{1}{2} \times W$ for the entire length of the space it is acceptable to have a bilge well on one side of the deck only. The volume of each bilge well shall be at least the greater of:

(a) $V = 0.5 \times A \times l \times w$,

where

V: volume in dm^3

A: area of external side window in m^2

l: length of the workspace in m

w: width of the workspace in m

b) Minimum $V = 60 \text{ dm}^3$

7.9.1 The depth of bilge wells shall not be less than 350 mm.

7.9.2 Drainage from working decks in superstructured workspaces with side drains shall be by means of a separate pump in each bilge well.

7.9.3 The pumps shall be of a type which operates in submerged conditions and can withstand running in "dry" condition. They shall be self-starting and shall have individual automatic and manual stop and start functions.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

7.9.4 The bilge well and pump shall be so located and constructed that the suction side of the pump is kept as free as possible from the accumulation of seaweed, fish waste and the like. The pump must also be capable of pumping fish waste overboard with the water.

7.9.5 The bilge pump capacity Q in m^3/h in each bilge well shall not be less than the greater of the calculated value of a) or b):

(a) $Q = 3 \times W \times A$,

where

Q : capacity in m^3/h

A : total area in m^2 of doors and hatches which may be left open during fishing, or when taking in the catch or fishing gear.

W : width of the vessel in metres;

or

(b) $Q = 1.5 \times$ maximum flushing capacity of the workspace plus the total water capacity used in the fish processing operation on deck.

7.9.6 Overboard drains from pumps shall be located at least 1300 mm above the working deck. They shall have a closable flap valve which can be operated from an easily accessible position at least 1 metre above the working deck.

7.9.7 Pump discharge pipes shall have a diameter and wall thickness commensurate with the capacity of the pump. The wall thickness must be at least 5 mm.

7.9.8 On the working deck, each bilge well, and at least one on each side of the working deck, shall have a water level alarm which shall sound an alarm in the wheelhouse. The alarm must be activated when a bilge well is full.

7.9.9 Drainage from completely enclosed workspaces on the working deck shall be by separate pumping into bilge wells and drains as specified in Subsections 1-9.

As an alternative, bilge lines from bilge wells may be connected to the ordinary bilge system if this is suitable for this purpose.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

The bilge capacity from each bilge well shall in both cases be at least $1.5 \times$ maximum flushing capacity of the working deck plus the total water capacity used in the fish processing operation on the deck.

7.9.10 If RSW tanks or CSW tanks with refrigerated seawater or similar tank systems are used, such tanks shall be fitted with a separate, fixed arrangement for filling and emptying seawater.

7.9.11 If such tanks are also used for dry cargo transport, they shall be fitted with a drainage system and with adequate means to prevent water from the drainage system from entering the tank.

Water level alarms in fishing vessels

7.10 Existing fishing vessels subject to this Order and with a trade area outside F1 and F2 shall, in addition to other required water level alarms, be fitted with an alarm which is activated when the water level in the foreship rises to 50 cm above the top of the keel. The alarm can be positioned to activate at a low water level.

7.10.1. In new fishing vessels, water level alarms shall be installed in all major enclosed compartments below deck. The alarm should sound when the water level rises above normal. Alarms are not required in tanks where fish are transported in bulk. The Danish Maritime Authority decides in each case, in connection with the design approval of a newly built or moored fishing vessel, in which enclosed compartments below deck the water level alarm must be installed.

7.10.2. The alarm unit shall be located both at the steering position and in the crew living quarters and the signal shall be visually observable and audible. The alarm unit shall have a time delay not exceeding 30 seconds.

Rule 8 Exhaust system

8.1 Each engine shall have a separate exhaust system which shall be routed as directly as possible to the open air.

8.2 The piping shall be made of solid steel pipes, laid so that expansion can take place without damaging stresses and without damaging the pipe due to vibration.

8.3 For flange joints, only gaskets designed for exhaust pipes may be used. Exhaust pipes located where equipment is normally stored must be fitted with a screen ensuring 10 cm of free ventilated air space around the pipe.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

8.4 The exhaust pipe penetrations must be carried out in a safe manner so that heating and ignition of the surrounding material cannot occur.

8.5 The insulation around the exhaust pipe must not be oil-absorbent.

8.6 The exhaust system of the engine shall be made of steel pipes or of another approved material. When using water-cooled hoses in the exhaust system (wet exhaust system), there shall be an alarm for a water cooling failure. Exhaust systems consisting of uncooled hoses must not be used.

8.7 The exhaust system must be designed in such a way that water cannot fill the engine.

8.8 If the exhaust is less than 350 mm above the deepest operating waterline, the pipe shall be fitted with an easily accessible shut-off valve located directly on the hull of the vessel.

Rule 9 Steering systems

9.1 The steering gear, rudder and rudder stock shall be of adequate strength and capable of steering the vessel at maximum speed. The construction and installation shall be such that it is not damaged by a full astern or by manoeuvring during fishing. Steering systems and steering wheels must comply with the provisions of a recognised standard.

9.2 The steering gear shall be protected so that it does not come into contact with cargo or with other fixed, moving or hot parts of the vessel or the like which could lock or impede steering.

9.3 If steering is used, the arrangement shall be such that full deflection from side to side is obtained at not less than 2 and not more than 5 turns of the steering wheel, while the steering deflection is not suddenly altered by the release of the steering wheel while the vessel is in motion.

9.4 The arrangement shall have suitable rudder stops, limiting rudder fluctuation to approximately 35° to each side.

9.5 There shall be emergency steering on all remotely operated rotor shafts.

9.6 All engine well penetrations, such as steering cable holes, must be effectively sealed with sleeves or similar.

9.7 Hydraulic hoses and pipes must be protected from contact with hot parts, protected from mechanical wear and secured at a distance of approximately 300 mm.

9.8 Oil filling and vents must be easily accessible.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

9.9 An emergency steering position below deck is acceptable provided that a suitable communication system to the steering position is installed. On vessels with two propellers, emergency steering is not required if it is demonstrated by a manoeuvring test that the vessel can be safely manoeuvred with the propellers.

9.10 On vessels where the main steering arrangement consists of two independent systems, one of which is not dependent on the vessel's power supply, and where there are no flexible hoses in the hydraulic system, emergency steering is not required.

9.11 If the main steering gear is mechanically operated, there shall be a device for emergency steering. In the case of remote steering, there shall be means for easy and rapid connection to the rudder stock so that safe emergency steering is achieved when the vessel is at least maintaining manoeuvring speed.

9.12 Where a steering gear other than a rudder is fitted, its design and operation shall ensure that the manoeuvrability required by Rule 3 is achieved.

9.13 Steering gear (machinery) which is remotely controlled shall be fitted with a rudder angle indicator at the steering position. The rudder angle indicator shall be independent of steering systems.

Rule 10 Refrigeration systems for the preservation of catches

10.1 Refrigeration systems shall be designed, constructed and tested to take due account of the safety of the system and also the release of refrigerants stored in quantities or concentrations which are harmful to human health or the environment, and shall be installed by an authorised refrigeration company.

10.2 Refrigeration systems in which toxic or flammable refrigerants are used shall be provided with drainage arrangements leading to a place where the refrigerant presents no danger to the vessel or persons on board.

10.3 Any compartment containing refrigeration equipment, including condensers and gas tanks using toxic refrigerants, shall be separated from any adjacent compartment by gas-tight bulkheads. Any room containing refrigeration equipment, including condensers and gas tanks, shall have a leak detection system fitted, which shall have an indicator outside the room, close to the entrance, and fitted with an independent ventilation system.

10.4 Rooms containing condensers, gas tanks and refrigeration equipment using toxic refrigerants such as ammonia shall have a water sprinkler system fitted.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

10.5 Where such a location is impracticable because of the size of the vessel, the refrigeration system may be installed in the engine room provided that the quantity of refrigerant used is not likely to endanger persons in the engine room if all refrigerant escapes and provided that an alarm is installed to warn of a dangerous accumulation of vapours in the event of a leak in the room.

10.6 Alarms to the wheelhouse or control stations or to evacuation exits shall be fitted in refrigerated engine rooms and in cold rooms to prevent the people becoming trapped. At least one of the exits from such places should be openable from the inside. Where practicable, exits from rooms containing refrigeration equipment using toxic or flammable refrigerants shall not lead directly to any living quarters.

10.7 Where a refrigerant harmful to humans is used in a refrigeration system, there shall be at least two sets of breathing apparatus, one of which shall be located in a place which is unlikely to be inaccessible in the event of leakage of the refrigerant. Breathing apparatus acquired as part of the fire-fighting equipment of the vessel may be considered as complying with this provision or part of this provision, provided that the location of the apparatus serves both purposes. If self-contained breathing apparatus is used, additional containers must be provided.

10.8 Adequate guidance on the safe operation and emergency procedures of the refrigeration system shall be provided by appropriate notices on board the vessel.

Rule 11 Cooling water system and sea connections

11.1 For seawater cooling, cooling water pumps shall be capable of drawing from at least two independent sea connections.

11.2 All pipes connected to the sea below the deepest operating waterline, as well as pipes for outboard cooling coils, shall be of steel, copper or other approved material and shall be fitted with readily accessible shut-off devices mounted directly on the side of the vessel. Any flexible hose connections must be as short as possible, visible throughout their length and of an approved type. Sea connections shall be made of steel, bronze or other approved tough material in accordance with Annex 1, Rule 14.

11.3 Sea connections shall have a fixed operating key or hand wheel. The connections must be accessible (possibly through the floor) and fitted with an indicator showing the open/closed position.

11.4 If seawater is used for cooling of internal combustion engines, a filter shall be fitted on the inlet side of the cooling water line which can be cleaned without the use of tools. The filter housing shall be made of steel, bronze or other approved tough material. A shut-off check valve shall be fitted to the inside of the shell plating where the cooling water outlet is led overboard.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

This valve may be omitted if the outlet pipe is led in a loop of at least 0.35 m above the deepest operating waterline.

Section C Electrical installations

Rule 12 Main electrical power source

Vessels of length L less than 12 metres and open vessels

12.1 There shall be at least two main electrical power sources consisting of a generator capable of being driven by the propulsion engine and an accumulator battery. The generator shall be capable, during the operation of the vessel, of continuously supplying power to the electrical installations required by these rules. The accumulator battery shall be capable of supplying energy to the installations essential for the propulsion and safety of the vessel for at least eight hours.

Accumulator batteries should be placed as high and as appropriately as possible in a dry place with adequate ventilation.

Accumulator batteries must be installed in accordance with generally accepted principles or requirements accepted by a recognised organisation.

For decked vessels of length L of 12 metres and over:

12.2 Where electrical power is the sole means of ensuring the operation of the auxiliaries essential for the propulsion and safety of the vessel, a main source of electrical power shall be provided comprising two sets of generators, one of which can be driven by the propulsion engine.

Rule 13 Emergency source of electrical power

This rule applies to decked vessels of length L of 12 metres and over:

13.1 An emergency source of electrical power shall be provided above the deepest operating waterline outside the engine room and arranged so as to ensure its functions in the event of fire, flooding or other failure of the main electrical installation system. The emergency source of electrical power must be arranged in such a way as to ensure that it would function in the event of fire or other causes of failure of the main electrical installations.

13.2 The emergency source of electrical power, which may be either a generator or an accumulator battery, shall be capable, with due regard to starting current and the transient nature of certain loads, of supplying simultaneously for a period of at least three hours

13.2.1 The following radio equipment shall be capable of being simultaneously supplied.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

13.2.1.1 VHF-DSC and one of the following installations, if the vessel has a trade area outside sea area A1:

13.2.1.2 MF-DSC, or

13.2.1.3 MF-HF-DSC, or

13.2.1.4 Recognised mobile satellite service system

13.2.2 Internal communication equipment, fire detection systems and signals required in an emergency; and

13.2.3 The ship's lights, if these are exclusively electric, and the emergency lights:

13.2.3.1 At boat launching points on deck and outboard;

13.2.3.2 In all corridors, stairways and exits;

13.2.3.3 In rooms containing machinery or sources of emergency power;

13.2.3.4 At control stations; and

13.2.3.5 In rooms for handling and processing fish.

13.3 The arrangements associated with the emergency source of electrical power shall comply with the following:

13.3.1 If the emergency source of electrical power is a generator, it shall have both an independent fuel supply and an efficient starting device in accordance with the requirements of the Administration. Unless another independent means of starting the emergency generator is provided, the sole stored energy source shall be protected to prevent it from being completely exhausted by the automatic starting system.

13.3.2 If the emergency source of electrical power is an accumulator battery, it shall be capable of covering the emergency load without recharging, while maintaining the battery voltage throughout the period of use within plus or minus 12% of its rated voltage. In the event of failure of the main power source, this accumulator battery shall be automatically connected to the emergency switchboard and immediately operate at least the installations referred to in Subsection 13.2. The emergency switchboard shall have an auxiliary switch fitted enabling the battery to be connected manually in the event of failure of the automatic connection system.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

13.4 The emergency switchboard shall be installed as near as practicable to the emergency power source and shall be located in accordance with Subsection 13.1. If the emergency power source is a generator, the emergency switchboard shall be located in the same position unless operation of the emergency switchboard would be impaired.

13.5 Any storage battery must be located in an effectively ventilated room, which must not be the same room as that containing the emergency switchboard. The emergency switchboard shall be supplied during normal operation from the main switchboard through a supply line protected at the main switchboard against overload and short circuit. The emergency switchboard shall be so arranged that, in the event of failure of the main power supply, the emergency supply will be automatically connected. If the system is designed for reactance, the supply line must also be protected at the emergency switchboard at least against short-circuit.

13.6 The emergency generator and its power machine and any accumulator battery shall be so arranged as to ensure that they can operate at full rated power when the vessel is in the upright condition and when the vessel is rolling up to an angle of 22.5° either way and at the same time is moving up to 10° at the bow or stern or is at any combination of angles within these limits.

13.7 Indicators of the state of charge of the batteries shall be in an appropriate place on the main switchboard or in the wheelhouse for the state of the batteries constituting the emergency power source, as well as of any batteries required to start an emergency generator. An indicator shall be in a suitable position on the main switchboard or in the wheelhouse to show when the battery which constitutes the emergency power source is being discharged.

13.8 The emergency source of electrical power and the automatic starting equipment shall be so designed and arranged as to enable the crew to carry out adequate testing while the vessel is in operation.

Rule 14 Precautions against shock, fire and other hazards of an electrical nature

14.1 Electrical installations shall be so arranged that passengers, crew and the vessel will be protected against electrical hazards.

14.2 Wiring systems and electrical equipment shall be installed so as to avoid or reduce interference with radio operations.

14.3 In new ships, all electrical wiring shall be of a fire-retardant type and so installed that its original fire-retardant characteristics are not impaired. In new and existing ships, wiring of a fire-retardant type shall be used when replacing and installing electrical components.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

The Danish Maritime Authority may permit the use of special types of wire not meeting the above requirements when necessary for special purposes, such as radio frequency wires: also see rule F IV/14.7.

14.4 Where wiring is not metal shielded or armoured and there could be a risk of fire in the event of an electrical fault, special precautions must be taken.

14.5 Electrical wiring must be made of weatherproof materials. Electrical equipment exposed to the elements should be protected against moisture and corrosion, as well as mechanical stress.

14.6 Light fittings shall be so arranged that the wiring is not subjected to harmful temperature rises or to excessive heating of the surrounding material.

14.7 In rooms where highly flammable mixtures may accumulate and in rooms intended primarily to contain an accumulator battery, electrical equipment shall not be installed unless the Danish Maritime Authority is satisfied that it is:

14.7.1 Essential for operational purposes;

14.7.2 Of a type which cannot ignite the mixture in question;

14.7.3 Appropriate for the room in question; and

14.7.4 Suitably approved for safe use under the conditions of dust, fumes and gases likely to be encountered.

14.8 Where there is a potential explosion hazard in or near a room, all electrical equipment and fittings installed in that room shall be explosion proof.

Rule 15 Electrical systems

15.1 The electrical system shall be installed as a 2-wire insulated system. Hulls, engine/motor parts and the like shall not be used for return lines. For propulsion engines with a power less than 100 kW, a relay may be permitted so that the engine is used as a conductor at the moment of starting.

15.1.1 Only systems and installations for the cathodic protection of the hull of the vessel are exempt from the provision of Subsection 1.

15.2 Main and emergency switchboards shall be so arranged as to provide safe access to apparatus and equipment. The sides and back and, where necessary, the front of the switchboards shall be adequately protected. There shall be insulating mats at the front and rear.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

15.3 Pipes carrying liquids shall not be installed above or close to power boards or other electrical equipment. Where such arrangements cannot be avoided, precautions must be taken to prevent leaks from damaging the electrical equipment.

15.4 Main and emergency switchboards shall be fitted with voltmeters and ammeters for all generators and with earthing lamps.

15.5 Distribution boards shall be made of flame-resistant material. The distribution board shall not be placed in the bottom of the vessel or in rooms where gas cylinders are installed.

15.6 The cross section of the conductors in the fixed installation shall be such that the voltage drop in the individual cable does not exceed 6%, except that the minimum cross section shall be 1.5 mm².

15.7 All conductors in insulated cables shall be multi-wire and of copper and in accordance with IEC standards or of a type approved by a recognised organisation.

15.8 Cables and wires shall be laid in such a way that they are not subjected to greater mechanical and/or environmental stress than is strictly necessary. Where necessary, cables must be protected against the forces encountered.

15.9 Cable lead-ins in decks or watertight bulkheads shall be watertight to IP 67.

15.10 For the installation of electrical equipment on the outer hull and watertight bulkheads, through bolts and screws shall not be used. Similarly, equipment which gives rise to galvanic corrosion must not be used for the installation.

15.11 The supply cable between the accumulator batteries and the distribution board must be secured as close as possible to the accumulator.

15.12 Equipment in different compartments shall be of an enclosure type in accordance with IEC standards or of a type approved by a recognised organisation.

15.13 Where electrical power other than low voltage supply is the only means of maintaining the auxiliary functions required for the propulsion and safety of the vessel, the main switchboard shall be so constructed that it is possible to make a selective disconnection of minor loads in order to reduce the risk of overloading and premature start-up of the emergency energy source.

15.14 Main and sub-circuits shall be divided into groups. In new ships, these groups shall have 2-pole circuit breakers and fuses for each outgoing circuit, the last sub-circuits may have single pole circuit breakers. Switches and fuses must be sized according to the maximum load and heat

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

generation of the circuit. The dimensioning of cables shall be in accordance with IEC standards or of a type approved by a recognised organisation

15.14.1 Each separate circuit shall be protected against short circuit, as well as against overload in accordance with IEC standards or of a type approved by a recognised organisation

15.14.2 Table for loading and securing cables when the ambient temperature is 15°C lower than the temperature class of the cables.

15.15 The capacity of each circuit shall be indicated. Likewise, the rated overload protection shall be clearly indicated on the switchboards and, where applicable, on the distribution boxes.

15.16 There shall be an efficient means of charging accumulator batteries, by means of a generator driven either by the propulsion engine or by an auxiliary engine. Systems for charging accumulator batteries must have protection against transient voltages, overcurrent and reverse current.

There shall be an arrangement for continuous charging of the accumulator batteries when the main or auxiliary engines are in operation. The arrangement shall consist of a load-current board fitted with voltmeters and ammeters for each system. The arrangement shall allow switching between charging and discharging of the battery packs by means of a change-over contact arrangement. Where possible, the switch should be of a type that would automatically ensure that when one group of batteries in a system is selected for discharge, the other group in the system is automatically placed for charging.

15.17 Accumulator battery groups shall have switches located in an easily accessible place. In new ships, the switches must be 2-pole and spark-free.

15.18 Wires between a battery group and an insulating contact and between the contact and a starter motor shall be as short as possible and shall be double insulated.

15.19 Where the main power source is an alternating current system, alternators shall be fitted with a device for automatic regulation of the voltage.

15.20 The Danish Maritime Authority may approve parallel operation of alternators. Synchronisation and load sharing devices shall be installed. The system must also be fitted with protection against return power.

15.21 Board sections of switchboards supplied directly from a separate alternator shall have an ammeter, a frequency meter and a voltmeter installed so that the voltage can be measured in all phases.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

15.22 A visual and audible alarm for the vessel's navigation lights shall be installed at the steering position. The alarm shall be activated if one or more of the navigation lights is accidentally switched off. The power supply shall be provided with a fuse and a 2-pole circuit breaker for each navigation light.

15.23 Where electric motors are installed in connection with deck machinery, the control shall automatically return to the stop position when released. Emergency stops must also be installed at the workplace. The mechanical part of the deck machinery shall have an appropriate fail-safe braking system.

15.24 All electric motors shall have a start/stop device located in such a way that the person operating the motor can easily operate it.

15.25 Electrically driven fans and pumps for transporting fuel oil shall be fitted with remote controls located outside the engine room concerned, so that the fans and pumps can be stopped in the event of a fire in the room in which they are located.

15.26 When connecting from shore to the vessel's electrical system at voltages greater than 50 volts, the connection shall be electrically isolated from the vessel's electrical system.

15.27 A suitable strong rubber cable should be used as the shore connection cable. The connecting device must be mounted in a suitable place, protected from the weather. For multiphase shore connection, the connection arrangement shall have means for controlling the voltage and phase sequence. It shall be ensured that the vessel's distribution system cannot be connected simultaneously to the vessel's power source and to the external power source. The type of current and voltage that may be connected to the vessel's distribution system shall be indicated at the point of connection.

15.28 For any new installation or after a major repair, an insulation measurement must be carried out by a person/company authorised for this purpose: see the Danish Safety Technology Authority's regulations in this area.

Rule 16 Earth connections

16.1 Taking into account the design of the system and the working voltage, the Danish Maritime Authority may require the installation of a system of earth fault indicator lamps or devices.

16.2 Unprotected metal parts of electrical machinery or apparatus which are not intended to be live but which are liable to become so through faults shall be connected to the hull of the vessel or to a copper earthing plate mounted on the hull of the vessel with an area of at least 0.2 m² unless such machinery or apparatus is:

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

16.2.1 supplied with a voltage not exceeding 50 V d.c. or 50 V r.m.s. between conductors; autotransformers shall not be used to achieve this voltage; or

16.2.2 supplied at a voltage not exceeding 250 V through safety isolating transformers serving only one utility item; or

16.2.3 designed according to the principle of double insulation.

16.3 On hulls of electrically insulating material, there shall be a copper earthing plate of at least 0.2 m², in a position where it will be permanently underwater under all heeling conditions. Inside the hull, the earthing plate should be connected to a copper conductor of at least 64 mm².

16.4 Radars, radios and other navigation equipment required to be earthed shall be earthed separately and the connection shall be as short as possible.

16.5 Where there is a flexible, non-conductive connection between the gearbox output shaft and the propeller shaft, the connection shall be made by means of a piece of braided copper conductor.

Rule 17 Lighting systems

17.1 Lighting for engine rooms, control stations and workstations shall be supplied from at least two separate groups and shall be so arranged that failure of one of the groups will not put the room into darkness.

17.2 Lighting for rooms not normally occupied, such as cargo holds and storerooms, shall be operated from a location outside those spaces.

Rule 18 Lightning conductors

18.1 Lightning conductors shall be placed on all wooden masts. They shall be made of unbroken copper wire having a cross section of not less than 75 mm² and attached to a 12 mm diameter copper nail projecting at least 150 mm above the top of the mast.

18.2 In the case of metal hulls, the lower end of the lightning conductor shall be earthed to the hull.

18.3 In the case of wooden hulls or hulls of other non-metallic material, the lower end of the lightning conductor shall be connected to the earthing plate. All sharp bends should be avoided and only bolted or riveted joints should be used.

Section D Periodically unattended engine rooms

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Chapter 4 of Notices from the Danish Maritime Authority E, fishing vessel construction and equipment, etc., may be used as a guide, particularly with regard to fire protection, fire detection, protection against flooding and alarm systems in general.

Section E Other technical installations

Rule 19 Hydraulic equipment

19.1 Hydraulically powered installations and their associated piping systems and accessories shall be designed and constructed so as to be suitable for their intended function. They shall be so placed and protected as to present the least possible danger to persons on board, and with due regard being given to moving parts, hot surfaces and other hazards. Component selection and system design must take into account what the installation will be exposed to. The short-term pressure variations (pressure peaks) must not exceed the maximum nominal value of the components. The entire installation must be carried out in such a way that noise and vibration from the installation are not transmitted to the ship's structure (structural noise).

19.2 Where steel pipes are used as pressure pipes, these shall be seamless pipes. Electrical resistance welded pipes may only be used in individual cases after special permission from the Danish Maritime Authority. The steel pipes shall comply with the applicable recognised pipe standard, taking into account the maximum pressure of the installation. Where flexible hoses are used, they must be of a suitable, recognised approved type, e.g. SAE/ISO, and be installed without twisting and kinking. Hose couplings shall be of a suitable and recognised approved type.

19.3 Joints of pipe lengths or joints between pipe and lights/fittings shall be by bolted flange joints, by welding or by means of collar fittings or another type of cutting fittings with O-ring. Flange joints and fittings must be adapted to the working pressure. Pipes in hydraulic systems must be treated according to D. V. S. No. 08004 and D. V. S. No. 08005. If they have been welded or heat-baked, they must be acid-etched to metallic purity. The pipes on the outlet side of the pumps must be protected against overpressure greater than the calculated working pressure. When safety valves are used on the outlet side of the pump for this overpressure protection, the design shall be such that the outlet side of the valve is led back to the suction side of the pump or to another suitable place, usually the tank. The safety valves must open if the working pressure increases by more than 10%. Pipes located on the low-pressure side of a reducing valve shall be protected against overpressure by means of safety valves or similar devices when these pipes and their connected components are not designed for the pressure on the high-pressure side of the reducing valve. The flow capacity of the safety valves shall be such that the pressure in the pipes does not exceed the working pressure by more than 10% at any time. Engines and motors shall be protected by shock valves as close to the engine/motor as practicable.

19.4 Pressure tests shall be carried out before putting an installation/subcomponent into service and shall be supervised by the approval authority.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

19.4.1 Pressure piping and various fittings shall be pressure tested to at least 1.5 times the working pressure.

19.4.2 Cylinders shall be pressure tested with a pressure P_e as a function of the working pressure P .

$P_e = 1.5 P$, where $P < 40$ bar.

$P_e = 1.4 P + 4$, where $P \geq 40$ bar

The test pressure shall not be less than 4 bar.

19.5 System pressure for winches, net rollers, etc., shall not exceed 250 bar continuously at the pump without special permission from the Danish Maritime Authority.

19.6 Taking into account the maximum permissible noise limits in the ship, the flow velocities in hydraulic system pressure lines shall not exceed 3 m/sec on factory decks and decked working decks and 4 m/sec. elsewhere, except that a flow rate of up to 5 m/sec may be permitted in installations such as bow thrusters and mooring winches which are used for short periods. For the same reason, the flow rate in suction lines shall not exceed 0.8 m/sec.

19.7 Pipe diagrams and calculations shall be submitted to the approval authority showing that the above provisions have been complied with.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Annex 4

Fire protection, fire detection and fire extinguishing

- Rule 1 Definitions**
- Rule 2 Construction and fire insulation in general**
- Rule 3 Additional requirements for structural fire protection**
- Rule 4 Ventilation systems**
- Rule 5 Installations for heating**
- Rule 6 Cooking appliances**
- Rule 7 Miscellaneous**
- Rule 8 Storage of gas cylinders and dangerous materials**
- Rule 9 Means of escape/evacuation routes**
- Rule 10 Automatic fire alarm systems**
- Rule 11 Fixed fire detection and fire extinguishing systems for engine rooms**
- Rule 12 Fire pumps - number, capacity and location**
- Rule 13 Fire mains**
- Rule 14 Fire hydrants, hoses and nozzles**
- Rule 15 Portable fire extinguishers**
- Rule 16 Possibility of rapid deployment of fire-fighting equipment**

Rule 1 Definitions

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1 Living quarters: all rooms used for the accommodation of persons, including corridors and sanitary rooms.

2 Service room: room used for a galley or pantries with cooking facilities, cupboards and storerooms.

3 Control room: the room in which the radio station, the main navigating equipment, the emergency power plant or the central fire detection or fire control installations are grouped.

4 Engine room: room forming part of the structure of the vessel in which internal combustion engines are installed for propulsion and/or oil boilers for central heating, other than small oil boilers of the potboiler type and similar, or rooms in which internal combustion engines are installed for purposes other than propulsion, having a total power output of 375 kW or more.

5 Engine casing: room in which the sides and top are in contact with the open air and in which internal combustion engines and/or oil furnaces for central heating are installed.

6 Class A subdivisions, Class B subdivisions and Class B-15: As defined in Notices from the Danish Maritime Authority E and the Order on the construction and equipment of ships, etc., implementing the International Convention for the Safety of Life at Sea (SOLAS) 1974.

7 Class F subdivisions, as defined in Notices from the Danish Maritime Authority E, Chapter V, Rule 2(6).

8 Non-combustible material: a material which is neither capable of burning nor of giving off flammable vapours in such quantity as to be capable of spontaneous combustion when heated to approximately 750°C, as determined by the IMO Fire Test Procedures Code.

Rule 2 Construction and fire insulation in general

1 The bulkheads and decks of engine rooms, including doors and hatches and the sides and tops of engine casings, shall be fire-insulated to class B-15.

2 In aluminium vessels and vessels of combustible materials, any bulkheads, decks and sides of the vessel at 300 mm below the minimum draught shall be insulated against fire in engine rooms of class F or B-15. Alternatively, a finishing coat of an approved polyester or topcoat with fire retardant properties or a protective coat of an approved fire retardant paint or a protection of non-combustible materials may be accepted on vessels of length L less than 12 m. Polyurethane foam shall not be used on board for insulation or parts of GRP structures.

3 Fire insulation shall in general be fitted on the engine side, but in steel vessels the position is optional.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4 Aluminium oil and bilge water tanks which are located in engine rooms or the sides of which are adjacent to engine rooms shall be fire insulated to Class B-15 or coated with an expanding fire insulating paint having an equivalent fire insulation value. The tank sides against the hull are not required to be insulated.

5 Oil and bilge water tanks of GRP material shall be placed in engine rooms or engine casings only if they form part of the ship's structure, the top of the tank is below the light waterline and the free sides facing the engine room or engine casings are insulated to the satisfaction of B-15.

6 Oil and bilge water tanks of GPR material located outside engine rooms shall be insulated as in Subsection 5 if their location near boiler rooms, oil furnaces, radiators or similar means that they may be subjected to the same external thermal effects as if they were located in an engine room.

7 The surface of insulation applied to the internal boundaries of engine rooms and engine casings and to rooms into which petroleum products may penetrate shall be impervious to oil or oil vapour.

8 Pipe, cable and hose penetrations to or from engine rooms and engine casings shall be as fire resistant as the bulkhead/deck/sides.

9 Materials readily degradable by the action of heat shall not be used in connection with sea connections located below the deepest operating waterline of the vessel.

10 All insulation materials in the living quarters and wheelhouse shall be non-combustible. In rooms used for the storage or processing of fish, combustible insulation shall be protected by impermeable non-combustible coverings.

Rule 3 Additional requirements for structural fire protection

This rule applies to vessels of length L of 12 metres and over.

1 If steel decks or steel bulkheads in living quarters form the top or side of a fuel oil tank, they shall be covered with a non-combustible material at least 40 mm thick. There shall be no manholes or other openings for fuel oil tanks in the living quarters.

2 External bulkheads, decks and sides of ships demarcating living quarters shall be insulated with at least 50 mm of approved non-combustible insulation material. Bulkheads between living quarters and engine rooms or holds shall, in steel vessels, be of steel or equivalent material, insulated with a non-combustible material having a thickness of at least 40 mm and a density of 110 kg/m³ or more. In wooden vessels, they may be constructed of two layers of wood with two layers of felt or similar in between, or of 60 mm wood cladding with insulation boards, or - as an alternative - be built to class "B-15" standard.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 All unprotected surfaces in corridors or stairwells and surfaces of bulkheads and ceiling linings in all accommodation, service and control rooms and exposed surfaces in enclosed or inaccessible spaces (behind bulkheads, ceiling linings, panels and linings) in living quarters, service and control compartments shall have low flame spread characteristics.

4 All unprotected surfaces of glass fibre reinforced plastic construction in living quarters, service rooms, control rooms, and engine rooms of similar fire risk shall have a finish of approved polyester with fire retardant properties or be covered with an approved fire retardant paint or be protected by non-combustible materials.

5 If a door is fitted between the living quarters and the engine room, it shall be a self-closing steel door or equivalent. Where only electric cooking equipment is used in the galley, the galley and mess may be considered as a common room divided into two appropriate compartments.

6 The lower deck covering in the living quarters, service and control rooms shall be of approved material which will not readily ignite or give rise to poisoning or explosion hazards at elevated temperatures.

7 In the living quarters, service and control rooms, pipes passing through 'A' or 'B' class divisions shall be of an approved material having regard to the temperatures such divisions are required to withstand. If the Danish Maritime Authority permits oil and flammable liquids to be led through living quarters and service rooms, the pipes carrying the oil or flammable liquids shall be of an approved material, taking into account the fire risk.

8 Materials, such as plastics and similar materials, which degrade readily under the action of heat shall not be used for overboard scuppers, sanitary drains and other drains close to the waterline where the failure of the material in the event of fire could create a flooding hazard.

Rule 4 Ventilation systems

This rule applies to vessels of length L of 12 metres and over.

1 Means shall be provided to stop mechanical ventilators and close the main openings to the ventilation system from a position outside the room where they operate.

2 Ventilation openings in and under doors in bulkheads to corridors may be permitted; except for doors to stairwells. The openings shall only be located in the lower half of a door, and the total net area of the opening or openings shall not exceed 0.05 m². An opening cut in a door shall be fitted with a grate of non-combustible material.

3 Ventilation ducts to engine rooms or galleys shall not normally pass through living quarters, service or control rooms. However, the Danish Maritime Authority may permit such an

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

arrangement on condition that the ducts are of steel or equivalent material and are so installed as to maintain the fire integrity of the subdivision.

4 Ventilation ducts to living quarters, service or control rooms shall not normally pass through engine rooms or galleys. However, the Danish Maritime Authority may permit such an arrangement on condition that the ducts are of steel or equivalent material and are so installed as to maintain the fire integrity of the subdivision.

5 Storerooms containing significant quantities of highly flammable products shall have ventilation systems that are separate from other ventilation systems. There shall be ventilation at both the top and the bottom of the room, and the ingress and egress openings of ventilators shall be located in safe areas. Suitable wire mesh to retain sparks should be fitted over the intake and outtake of the ventilation.

6 Ventilation systems serving engine rooms shall be independent of systems serving other rooms.

Rule 5 Heating installations

1 All heating installations must be carried out in a safe manner. Particular attention shall be paid to personal safety and fire prevention.

2 Electric radiators shall be located and designed to minimise the risk of fire. Electric heaters and blowers shall be of a type approved for fixed installation and shall be enclosed in perforated steel sheeting designed to allow objects to slide out of the heating zone automatically.

Rule 6 Cooking appliances

1 The provisions of the Danish Maritime Authority's technical regulation on F-gas installations and cooking appliances for spirits or kerosene in ships shall apply mutatis mutandis to all vessels covered by these rules.

2 Apart from cookers and water heaters, appliances with an open gas flame are not permitted. Rooms containing such cookers or water heaters must have adequate ventilation to remove fumes and possible gas leaks to a safe place.

3 If galleys or pantries are fitted with cooking/steaming appliances with an open gas flame or other heat sources with a total output of 5 kW or more, these shall be installed in accordance with the manufacturer's instructions. All surfaces facing the heat source shall be covered with stainless steel or similar non-combustible material, to a distance of at least 750 mm from the heat source.

Rule 7 Miscellaneous

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1 All waste containers, except those used for processing fish, shall be made of non-combustible material without openings in the sides or bottom.

2 Machinery operating fuel oil transfer pumps, fuel oil pumps and other similar fuel pumps shall be remotely controlled so that, in the event of a fire in the room in which they are located, they can be stopped from a position outside that room.

3 Spill trays shall be provided where necessary to prevent oil leaking into the gutters.

4 On all vessels, paints, varnishes and other materials used on unprotected interior surfaces shall not be capable of producing excessive quantities of smoke or toxic gases or vapour.

Rule 8 Storage of gas cylinders and dangerous materials

1 Cylinders for compressed, liquefied or dissolved gases shall be carefully secured and clearly marked using the prescribed identification colours with a clear, legible identification of the name and chemical formula of the contents, which shall be suitably attached to the cylinder.

2 Cylinders containing flammable or other dangerous gases and empty cylinders shall be stored in a properly secured manner on an open deck and all valves, pressure regulators and pipes leading from such cylinders shall be protected against damage. The cylinders must be protected from extreme temperature fluctuations, direct sunlight and snow accumulation. However, the Danish Maritime Authority may permit such cylinders to be stored in compartments complying with the provisions of Subsections 3 to 5.

3 Only rooms containing liquefied gas and highly flammable liquids, such as volatile paints, paraffin, benzene, etc., shall be directly accessible from the open deck. Pressure regulators and safety valves shall discharge into the compartment. Where containment bulkheads in such compartments adjoin other enclosed compartments, they shall be gastight.

4 Except as may be necessary for the operation of the room, electrical wiring and fittings shall not be permitted in compartments used for the storage of highly flammable liquids or liquefied gases. Where such electrical fittings are fitted, these shall be explosion proof as far as use in a flammable atmosphere is concerned. There shall be no heat sources in such rooms and "No Smoking" and "No Open Flames" signs shall be posted in conspicuous places.

5 Separate storage compartments shall be provided for each type of compressed gas. Rooms used for the storage of such gases shall not be used for the storage of other flammable substances, nor shall they be used for tools or components forming part of the gas distribution system. However, the Danish Maritime Authority may consider alternative arrangements, taking into account the size and shape of the vessel, as well as the type, volume and intended use of the compressed gases.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 9 Means of escape/evacuation routes

This rule applies to new vessels of length L equal to or greater than 12 m.

1 There shall be two evacuation routes from engine rooms, as far apart as possible. Ladders and stairs must be made of steel. If the size of the engine room makes this impossible, one of these evacuation routes may be dispensed with, taking into account the location and size of the room. In such cases, special care shall be taken with the layout and the remaining exit shall have direct access to the open deck. A hatch/door to a free deck must have a clearance of min. 600 × 600 mm.

2 If access to emergency exits is through separate compartments (control room, or similar), doors to such compartments shall not be capable of being locked unless they are fitted with latches which can be removed in the direction of the evacuation. Necessary ladders, steps and handrails shall be installed to facilitate access through the emergency exit.

Rule 10 Automatic fire alarm systems

This rule applies to vessels of length L of 12 metres and over.

1 In all vessels of combustible construction or where the interior of the living quarters, service and control rooms is constructed of combustible material, an automatic fire alarm system shall be installed in these rooms, taking into account the size of the rooms, their arrangement and location in relation to the control rooms.

Rule 11 Fixed fire detection and fire extinguishing systems for engine rooms

1 Engine rooms shall be protected by an approved fixed fire detection and fire extinguishing system. The fire display, which shall have a visual and audible alarm, shall be placed at the steering position and centrally in the living quarters. The energy supply of the installation must be located outside the protected room.

2 Every vessel fitted with bunks shall have a fire detection system for monitoring the engine room as specified in Subsection 1.

3 Approved fire extinguishing systems may be carbon dioxide systems (CO₂ systems). However, other extinguishing media with equivalent extinguishing effect, such as water systems, mixed atmospheric gases or aerosols may also be used.

4 CO₂ systems shall not be installed in wooden vessels.

5 Fixed fire-fighting systems, including fire detection systems, shall be inspected as appropriate in accordance with the legislation in force¹⁾, but at least every two years. The inspection can be

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

carried out by a person/company who is familiar with the task and has the necessary knowledge of the regulations that exist in this area. The inspection shall be documented on board.

Rule 12 Fire pumps - number, capacity and location

This rule applies to vessels of length L of 12 metres and over.

1 Vessels shall have at least one engine-driven fire pump. Within trade area F5, and/or in Greenland within trade area F5 as defined in Annex 10, an engine-driven emergency fire pump shall also be fitted.

2 Sanitary pumps, ballast pumps and general service pumps may be approved as fire pumps, provided that they are mechanically driven and are not normally used for pumping oil and that, if they are occasionally used for pumping oil, they have suitable change-over devices so that the pumps shall be so designed that they cannot, even by accident, be set to draw from tanks capable of being used for substances other than ballast water and/or from the bilge system of the vessel, while at the same time supplying pressure to the fire hydrant of the vessel. Arrangements based on the shielding of certain pipelines by means of blind flanges are not acceptable.

3 Where pumps not intended to be fire pumps are permitted to be used as a fire pump in accordance with Subsection 2, their use shall not restrict the ability to pump bilge wells at any time.

4 Where pumps are used as fire pumps, they shall be capable of delivering to the fire hydrant only when only one is required, or to the fire main.

5 Where maximum allowable suction height requirements can be met, the emergency pump may consist of a portable diesel-driven pump with independent fuel oil supply for three hours' operation. The necessary tools for starting, priming, connecting hoses, etc., must be placed in the vicinity of the pump. Pumps requiring shut-off shall have a hopper and shut-off valve. Sanitary, ballast and general service pumps are acceptable as fire pumps provided they are not normally used for pumping oil. When used as fire pumps, the pumps shall be capable of supplying the fire main only.

6 The required fire pumps may consist of several pumps, provided that they can operate satisfactorily in parallel and maintain the specified capacity under the conditions referred to in Subsection 4.

7 The required fire pump shall be capable, with the two fire hydrants furthest from the pump in operation, each fitted with a single length of hose, with a 12 mm nozzle, of maintaining a pressure of at least 0.25 N/mm² at the fire hydrants. Transportable pumps shall be capable of maintaining at the capacity specified in Subsection 5 a pressure at the pump nozzle of at least 0.25 N/mm².

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

8 The capacity Q of each of the required fire pumps shall be at least in accordance with the calculation method below, but not less than 16 m³/hour.

$$Q = (0,15\sqrt{L(B+D)} + 2,25)^2 \text{ m}^3/\text{time}$$

where L, W and D are in metres and as defined in Section 3.

However, the capacity of each fire pump need not exceed 30 m³/hour.

9 The sea valves and other necessary valves of fire pumps shall be so located that a fire elsewhere than in the room in which the pump is located will not prevent the use of the pump.

10 If the fire pumps are capable of developing a pressure in excess of the maximum allowable working pressure in the pipework, fire hydrants or fire hoses, or if they can render flexible hoses uncontrollable, they shall be fitted with safety valves to prevent harmful overpressure.

11 All fixed fire pumps shall be fitted with a non-return valve.

Rule 13 Fire mains

This rule applies to vessels of length L of 12 metres and over.

1 The vessel shall have fire mains to ensure effective distribution of the prescribed quantity of water. The maximum pressure at a fire hydrant shall not exceed the pressure at which the effective handling of a fire hose can be demonstrated.

2 Fire mains shall be made of steel or other material not easily degraded by the application of heat and shall be so located as to minimise the risk of mechanical damage to the pipes. Where there is a risk of damage due to frost, precautions shall be taken to avoid such damage.

3 It shall be possible to disconnect the fire main from an engine room and from an easily accessible place outside that engine room.

Rule 14 Fire hydrants, hoses and nozzles

This rule applies to vessels of length L of 12 metres and over.

1 One or more fire hydrants shall be so arranged as to permit the easy and rapid connection of fire hoses and such that at least one jet of water can be directed at any part of the vessel normally accessible during navigation, this required jet of water being from a single length of fire hose.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 In addition to the fire hydrant required by Subsection 1, there shall be a fire hydrant for engine rooms outside the room and near the entrance.

3 For each prescribed fire hydrant, there shall be one fire hose. There must be at least one additional fire hose. The individual lengths of fire hose shall not exceed 20 m.

4 Fire hoses shall be made of an approved material. Each fire hose shall have couplings and a combined nozzle. The couplings of fire hoses and nozzles shall be fully interchangeable and nozzles shall in any case have a diameter less than 12 mm.

Rule 15 Portable fire extinguishers

Subsections 1-2 and 4-6 of this rule apply to all vessels.

1 There shall be an approved ABC fire extinguisher of at least 5 kg at the steering position.

2 In vessels with living quarters, an approved ABC fire extinguisher of at least 5 kg shall also be placed in the immediate vicinity of the entrance to the living quarters.

3 In vessels of 12 m in length L and over, at least two portable fire extinguishers (1 of 12 kg and 1 of 5 kg) of a type suitable for extinguishing fires involving fuel oil shall be near or in the engine room. The largest of the fire extinguishers should be located near the entrance to the room.

4 An approved fire blanket must be set up for cooking appliances.

5 The Danish Maritime Authority may, on a case-by-case basis, require that special-purpose vessels be fitted with fire extinguishers or other portable fire extinguishing equipment in addition to that mentioned in Subsections 1 and 2.

6 Hand-held fire extinguishers must be inspected annually in accordance with approved standards.

Rule 16 Possibility of rapid deployment of fire-fighting equipment

1 Fire detection and fire extinguishing equipment shall be maintained in good working order and be in continuous use or ready for immediate use when the vessel is in service. Fire pumps, including any emergency fire pump, shall be tested monthly.

Annex 5

Protection of crew, working environment, and safety, etc.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 1 General protective measures

Rule 2 Deck openings

Rule 3 Bulwark, guardrails and protective measures

Rule 4 Stairs and ladders

Rule 5 Overview

Rule 6 Access to cargo holds

Rule 7 Gangways

Rule 8 Working at height

Rule 9 Working and passageway conditions

Rule 10 Lighting

Rule 11 Deck machinery in general

Rule 12 Winches

Rule 13 Cargo handling in fishing vessels

Rule 14 Ice handling in fishing vessels

Rule 15 Guide rod arrangements on fishing vessels

Rule 16 Nets and wire drums on fishing vessels

Rule 17 Trawl boards on fishing vessels

Rule 18 Other deck machinery on fishing vessels

Rule 19 Fish processing plants

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 20 Measures to counter the health risks associated with industrial fish cargoes

On new and existing vessels, all workplaces and areas where persons move about on board must be arranged in such a way that the work can be carried out in full compliance with health and safety standards. This shall include ensuring compliance with the provisions of this Annex.

This Annex contains supplementary provisions to the regulations on the working environment in ships in force from time to time, including those contained in Notices from the Danish Maritime Authority A, technical regulation on the working environment in ships (hereinafter Notices A).

Rule 1 General protective measures

1 There must be a tensioning system that effectively covers all needs. The necessary wires, lines, eyebolts and clamps must be provided.

2 Cover openings with frames or doorsteps of less than 600 mm height and a drop of 2 m or more shall, when the hatch is open, have protective devices such as hinged or portable railings or nets of 1000 mm height. In decked vessels, deck openings to cofferdams can be designed as flush hatches. Hatch covers shall be capable of being secured and shall have the same strength as the surrounding deck. Deck covers to cofferdams shall have protective measures as specified above. The Danish Maritime Authority may exempt smaller openings, such as fish openings (ice covers), from complying with these provisions.

3 All deck surfaces shall be so arranged and treated as to minimise the possibility of persons slipping. In particular, decks in working areas, such as engine rooms, galleys, by winches, net and dragnet drums, self-tailers and fish handling areas, as well as at the foot and top of ladders and in front of doors, shall have special anti-slip surfaces.

4 In wooden vessels, it is acceptable to have only sporadic slip protection at the working areas and at the foot and top of ladders and at doors.

5 Where the crew is working or travelling in places where there is an increased risk of falling overboard, appropriate precautions shall be taken, such as the use of a work vest, life jacket, lifeline or other suitable equipment. In vessels with more than one person on board, work may be carried out only when fully adequate supervision is in place.

6 Where the work cannot otherwise be planned and organised so that it can be carried out in an entirely safe manner, the work may be carried out only if personal protective equipment is used, in accordance with the applicable Notices A.

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Rule 2 Cover openings

1 Hinged hatch covers, manholes and other openings shall be protected against accidental closure by the use of a self-locking device. Heavy covers on emergency exits shall be fitted with counterweights or similar and be so designed that they can be opened from both sides of the hatch.

2 Access hatch shall not be smaller than 600 X 600 mm or have a diameter of less than 600 mm.

3 Where practical, appropriate handles shall be placed over emergency exits.

Rule 3 Bulwark, guardrails and protective measures

1 Effective bulwark, rails or guardrails must be fitted to all exposed parts of the working deck and to the superstructure decks if they are working platforms. The height of the bulwark or railing above the deck shall be at least 1 metre. If this height interferes with the normal functions of the vessel, the Danish Maritime Authority may approve a lower height after a specific assessment. However, for existing vessels, a minimum height of 750 mm may be accepted if deemed appropriate.

2 At the deepest operating waterline it shall be ensured that there is adequate protection for the crew from water washing over the deck. In determining the protection, account shall be taken of the trade area, type and use of the vessel, including whether the trade area is seasonally restricted.

3 The opening under the bottom bar of the guardrail shall not exceed 230 mm. The distance between the other bars shall not exceed 380 mm and the distance between the railing supports shall not exceed 1.5 m. In a vessel with a rounded bulwark, guardrail supports shall be placed on the flat part of the deck. Guard rails must be free of sharp points, edges and corners, and must be of sufficient strength.

4 Handrails and other handholds shall ensure the safe passage or working of crew.

5 Cantilever trawlers which hoist over the stern and are not fitted with bulwarks shall be fitted with suitable protection such as doors, gates or lifting ports at the top of the stern ramp at the same height as the adjacent bulwark or railing. If this height would interfere with the normal functions of the vessel, the Danish Maritime Authority may approve a lower height of at least 750 mm. When such protection is not in place, a chain or other means of protection must be provided across the ramp.

6 For other fishing vessels fishing with trawls, it may be permitted not to have any bulwark aft, provided that the vertical distance from the deepest operating waterline to the edge of the working deck is at least 1800 mm and affords adequate protection for the crew from water washed over the deck, and that there is an unbroken clearance from starboard to port side of a maximum height of

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*Order no. 2447 of 13 of December 2021
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1000 mm, and that the other precautions are such as to provide an equivalent level of safety. Other precautions are not limited to, but can be for example, that the distance from the net drums to the clearance is a minimum of 1000 mm. The width of the hole in the bulwark shall be minimised by the installation of guide rods spaced not more than 400 mm apart or stowage boards of sufficient strength to withstand the sea, with an edge of at least 50 mm in height in the hole towards the ship's side or equivalent, and by welding on strainers covering at least 500 mm from the ship's side aft towards the net rollers. The deck between drums and the clearance is slip-proofed particularly well. When no gear is being set or recovered through the hole, three chains or wires shall be placed from port to starboard side with solid fastenings at the side, as well as where there is a fixed bulwark amidships. The opening below the lowest chain or wire shall not exceed 230 mm and the distance between the other chains or wires shall not exceed 380 mm. An approved work vest or work suit with an approved buoyancy device must be worn when working in the area.

7 Where gratings are used in the clearance, the distance between the surface of the grating and the top of the clearance shall be at least 600 mm.

Rule 4 Stairs and ladders

1 Stairs and ladders of sufficient size and strength, with railings and anti-slip steps, shall be provided for the safety of the crew in accordance with the requirements of the Danish Maritime Authority.

Rule 5 Overview

1 The wheelhouse shall provide a view of all working positions on the weather deck.

2 Where it is not technically possible to ensure visibility, as referred to in Subsection 1, CCTV shall be installed using a system suitable for maritime use and where the location of the camera is approved by the Danish Maritime Authority.

3 Where it is not possible to establish sound visual and audible communication between the place of work and the wheelhouse, a suitable and reliable communication system shall be established.

4 Operating handles for winches and other machinery, such as net drums, shall be so arranged as to provide adequate space for the operator. The operator must have a full view of the working area of the winch and machinery in question from the manoeuvring position (operating position).

5 Where it is not possible to have a direct view of these working areas, it may be acceptable in certain cases to use indirect view by means of a CCTV system suitable for maritime use and where the location is approved by the Maritime Administration.

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issued by the Danish Maritime Authority*

Rule 6 Access to cargo holds

1 Access between decks shall be by fixed ladders. If the ladders are to be removable, they must be fitted with brackets so that they are secure and stable when fitted.

2 Hatches - where the force required to open the hatch covers is 160 N or more - shall be fitted with a device capable of assisting in the opening of the hatch. All hatches must be capable of being fastened securely in the open position.

3 In cargo holds, there shall be a ladder or fixed steps all the way down to the bottom of the cargo. Grab handles shall be fitted where appropriate. The ladder must be secured against slipping and falling over, e.g., with hangers.

4 The cargo hold ladder or fixed steps shall be at least 250 mm wide and the footing shall be at least 90 mm deep. The foot must not be able to slide sideways outside the step.

5 There shall be at least one means of escape from cargo holds where the vessel's crew is working at sea. This evacuation option can be the cargo hatch. Such a hatch shall be capable of being opened and closed from both sides.

6 Access to the cargo hold shall be arranged so as to permit a person wearing smoke detection equipment to enter the compartments

7 There shall be a fixed stairway in the hold throughout the depth of the hold in all vessels. The stairs must be fitted with handles on both sides. If the height of the cargo hold is less than 3 m, the stairs may be replaced, based on a specific assessment, by a fixed ladder complying with the provisions of Subsection 4. Where the height of the cargo hold is less than 2.2 metres, a removable ladder with a restraint may be accepted based on a specific assessment.

Rule 7 Gangways

1 Gangways shall be such that access to and from the vessel can be done safely.

2 The master of a vessel to be crossed over shall ensure that it can be done safely. In vessels with fully or partially superstructured freeboard decks, arrangements shall be made to provide a safe means of access to the vessel or to other vessels moored side by side in port.

3 The necessary anti-slip and hand-hold arrangements, such as handles, handrails and steps shall be provided, as well as the necessary lighting of the arrangement.

Rule 8 Work at a height

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*Order no. 2447 of 13 of December 2021
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1 On masts on which hoists, aerals, lanterns or other devices which may require supervision or repair are mounted, proper ladders and, where appropriate, working platforms must be fitted. The ladder steps must not be made of round bars.

2 All ladders having an angle with the horizontal greater than 70 degrees and a height above deck greater than 5 metres shall, from a height of 2.20 metres above deck, be fitted with approved fall protection arrangements. There must be appropriate fall protection equipment on board.

3 Suitable railings or handrails shall be provided at the top of A-masts and at other places where persons may move in connection with repair work and the like.

4 It must be possible to inspect and maintain the block and suspension for the tackle wire safely.

Rule 9 Working and passageway conditions

1 Clear passage must be ensured in traffic routes. In order to meet the clear passage requirement, the width of the traffic route should be, as far as possible, at least 600 mm. There must also be adequate space at workplaces of min. 600 × 600 mm. This applies, for example, in front of net drums, by winches and the like. For existing vessels, there shall be clear passage if technically feasible. If, after a specific assessment by the Danish Maritime Authority, it is not possible to ensure free passage, other technical measures must be sought to reduce or minimise the risk of workplace injuries.

2 It shall be ensured as far as possible that all work functions on the vessel, e.g., fish processing, can be carried out in conditions that provide effective protection from wind and weather.

3 In the engine room, there shall be clear access to all essential parts and components for maintenance and repair. There must also be free access to the staircase or emergency exit.

4 Where equipment for processing or conveying the catch prevents clear passage, the equipment shall be movable or otherwise flexible to allow clear passage during periods when processing of the catch is not taking place.

5 Enclosed and partially enclosed work areas used for hoisting and fish processing shall have adequate ventilation. Where actual processing of fish (filleting, cooking or similar), storage of fish and use of chemicals takes place, a permanently installed mechanical ventilation system shall be installed, ensuring a minimum air change of six times per hour. The Danish Maritime Authority may exempt partially enclosed working areas from the above requirements if, based on a specific assessment, it is considered that there is sufficient natural ventilation.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

6 A safety helmet or other equivalent head protection acceptable to the Danish Maritime Authority shall be provided for each member of the crew. The Danish Maritime Authority may, based on a specific assessment, waive this requirement where it is obviously unreasonable.

Rule 10 Lighting

1 There shall be good lighting in all gangways, workspaces and working areas on the vessel. The lighting must be of a strength and quality that ensures that the work can be carried out in a fully safe and healthy manner and must at least comply with the applicable DS/EN standard for light and lighting.

2 The amount of light must be sufficient to distinguish details. The light must create appropriate contrast ratios and must not dazzle.

3 There shall be stationary lighting in cargo holds to ensure adequate illumination under all conditions - both for orientation and during cargo hold operations. For existing vessels, it may be permitted, after specific assessment by the Danish Maritime Authority, to install cargo hold lighting in a different but equally sound manner as with a stationary plant.

4 The lighting must not obstruct the view from the wheelhouse.

Rule 11 Deck machinery in general

1 Winches, conveyor belts, net drums, trawl boards and other deck machinery shall be so designed, constructed, fitted and equipped for safety purposes that they can be erected, used, maintained and repaired without risk to safety and health under the anticipated operating conditions.

2 The use of winches, conveyor belts, net drums and other deck machinery shall be carried out in a manner which is fully responsible for safety and health and in accordance with the rules in force at any time concerning the use of technical aids.

3 Winches, conveyors, net drums and other deck machinery shall, if technically and practically possible, be so arranged that the motive power stops when the protective devices are removed.

Rule 12 Winches

1 Winches must be constructed and shielded as far as possible so that moving parts cannot cause injury. All protective devices must be of adequate strength.

2 Guide blocks shall be fitted with safety bars and guards or other equally effective precautions to protect against injury.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 If technically possible, wires along the deck shall be laid in pipes or otherwise covered equally securely. The positioning shall be such that passage on deck can be entirely safe.

4 Winches must be reversible. Operating handles must return automatically to neutral when released and be fitted with locking devices to prevent unintentional starting. Operating handles for net holders, longline winches and dragnet drums may be exempted from the requirement to move to a neutral position based on a specific assessment in accordance with the instructions and guidance issued by the Danish Maritime Authority from time to time.

5 Wire drums shall be fitted with approved measures for locking the rope.

6 If a winch can be operated from more than one location, the location from which the winch is operated shall be visible at each operating location. The winch may only be operated from one location at a time.

7 Winches shall be so constructed that the force required to operate handwheels, handles, switches, rods and the like does not exceed 160 N and, where foot pressure is used, does not exceed 320 N.

8 Every part of the gear, including wires, chains and the like, must be of sufficient strength to withstand the expected loads.

9 Gear used for fishing shall be of sound construction, made of suitable materials of sufficient strength and free from defects. They must be securely and suitably fastened, supported or suspended, taking into account their use.

10 Repair or replacement of any part of the above equipment shall not result in a reduction of the original strength.

11 Winches must be fitted with mechanical brakes capable of effectively holding the load. Brakes must be fitted with simple and easily accessible adjustment devices. Any winch drum which can be disconnected from the winch drive shaft shall be fitted with a brake independent of the drive shaft.

12 Winches shall have a means to prevent overloading. Failure in the power supply must not lead to uncontrolled release of the load.

13 Shields must be fitted to all warping heads. The Danish Maritime Authority may, after specific assessment, exempt warping heads from this requirement.

14 Where a winch can be operated from the steering position (wheelhouse), there shall be emergency stops at suitable positions, e.g., by the winch and at the other fixed working positions

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

on deck and in the wheelhouse. The emergency stop shall be capable of stopping the movement of the winch and the winch shall be locked to prevent uncontrolled run-out of the wire.

15 The hoist shall not be capable of pulling with more force than the minimum allowable working load in any part of the hoist system.

16 Trawl winches shall be fitted with a mechanical winding system. The Danish Maritime Authority may, after a specific assessment in accordance with the Danish Maritime Authority's instructions and guidance in force from time to time, exempt self-winding winches from this requirement.

17 There shall be suspended blocks with safety chains or safety wire of at least twice the breaking strength of the suspension point of the blocks.

Rule 13 Cargo handling on fishing vessels

1 Receiving bins/boxes where free-hanging hoists are used shall be fitted with a solid tube railing around the bin/box. Where necessary, there shall be a platform at an appropriate height on the guardrail to allow the bag to be opened and tied in a good working position.

2 Fish handling must take place at a good working height. Where necessary, aids and fittings shall be easily adjustable.

3 To reduce the risk of slippery deck surfaces, fish offal shall be collected in separate bins or baskets, or led overboard by means of slings, conveyors or similar arrangements.

4 Technical measures shall be established to ensure that the handling of fish and ice on deck, from the deck to the hold and in the hold itself can be carried out in such a way as to avoid or minimise unnecessary physical stresses.

Rule 14 Ice handling on fishing vessels

1 Conveyor belts for transporting ice for mixing with catch/fish are only allowed on board fishing vessels when the individual system has been separately approved both at the planning stage and definitively by the Danish Maritime Authority. The submission for approval at the planning stage shall be accompanied by a separate workplace assessment for the conveyor belt.

2 Ice handling must be carried out without undue physical strain. This can be done, for example, by installing an ice machine with sufficient capacity, ice silo with raisable bottom or other technical aids for handling the ice to avoid heavy lifting and awkward working postures when handling ice.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 15 Guide rod arrangements on fishing vessels

1 Guide rod arrangements on fishing vessels used wholly or in part for the capture of industrial fish shall be mechanically and/or hydraulically operated in the case of longline net drums. For the same group of vessels with transverse net drums, a specific assessment shall be made by the Danish Maritime Authority as to whether a mechanical guide rod arrangement is necessary. Guide rod arrangements, including holders or carriages for guide rods which can be operated mechanically, must be secured in such a way that the crew cannot get trapped. For existing fishing vessels, the Danish Maritime Authority may, after a specific assessment, waive the requirement if poor space conditions or other inappropriate consequences of the requirement apply.

2 The arrangement of the guide rods shall be such that the trawl or wire cannot jump over the guide rod and the guide rods cannot "unscrew" from the attachment.

3 Guide rods shall be of suitable material, such as iron or steel.

Rule 16 Nets and wire drums on fishing vessels

1 Drums must be positioned in such a way as to prevent them jamming.

2 The passage between the bulkhead, deckhouse or similar and the fully rolled-up drum with net shall be at least 600 mm. However, for existing vessels, the Danish Maritime Authority may, after a specific assessment, allow a smaller passage if it is deemed justified.

3 If the drum is operated locally at the winch, the operating handle shall be so positioned as to eliminate the risk of a crushing accident to the person operating the winch. The operating handle must not be positioned in such a way that it is possible both to operate the winch and to be in a dangerous workplace.

4 All operating handles must return automatically to neutral when released and be fitted with locking devices to prevent unintentional starting.

Rule 17 Trawl boards on fishing vessels

1 Precautions shall be taken to prevent unintentional swinging of the trawl boards, the roller and the chain block: for example, by installing one or more movable protective rods or pipe clamps at the hangers.

2 There shall be effective means to secure trawl boards, roller and chain blocks during the changing of wires, etc.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

3 There shall be a suitable platform or similar arrangement from which the changing/securing of wires, shackles, sensors and all other work associated with the trawl boards, the roller block and the chain block can be carried out safely.

4 For existing fishing vessels where the master does not have a full view of the trawl boards when shifting/securing, either an electronic communication system shall be used between the bridge and the working deck or CCTV shall be established with a system suitable for maritime use and where the location of the camera is approved by the Danish Maritime Authority.

Rule 18 Other deck machinery on fishing vessels

1 On beam trawlers, the winch arrangement shall be such that the winch drums for the trawl wires can be disengaged under load independently of the hydraulic pump and brakes by means of a single handle in the wheelhouse, irrespective of the beam size. However, sufficient friction braking must be maintained to avoid uncontrolled free running. Similarly, there shall be a corresponding decoupling device at an appropriate place by the winch

2 All winches must be able to work under all conditions.

Rule 19 Fish processing plants

1 Fish processing plant means a plant which mechanically sorts, cleans, fillets, ices, cooks, packages, transports or otherwise processes the catch.

2 Fish processing plants shall be so constructed that persons working on or by the plant are not unintentionally injured. The installation must be secured in all foreseeable situations, such as during normal operation, repair, maintenance, and cleaning.

3 Protective screens must not be removable without the use of tools unless one of the following special measures has been taken.

3.1 It must not be possible to open the protective screen until the motive power has been switched off and the plant stopped. The plant must not then be able to start until the protective screens have been reinstalled.

3.2 When the guard is opened, the motive power must be automatically switched off and the plant stopped in less time than it takes to bring a body part into the danger zone. The plant must not start until the guard is in place and must not be able to restart automatically.

3.3 For existing fishing vessels, the Danish Maritime Authority may accept existing plants that do not comply with the provision, provided that the plant is deemed to be equally safe. If plants are replaced on board, they must be considered new and comply with the provision.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4 Fish processing plants must be capable of being stopped easily, quickly and safely by an emergency stop device if dangerous situations arise during operation of the plant. Emergency stops must function at all operating areas, even when part of the plant is disconnected.

5 Plants which, for technical reasons, cannot be designed or shielded to prevent the risk of personal injury, shall have emergency stops at the danger points. In case of dangerous casters, the emergency stop must be combined with a brake. Restarting of the plant must only be possible with the normal starting devices and only after the emergency stop has been manually set to the "clear" position. Emergency stop devices must be permanently fitted. Where the Danish Maritime Authority considers that there is an increased risk that a plant may be started unintentionally with the risk of personal injury, the Danish Maritime Authority may require that the plant in question has a key-operated power shut-off.

6 Repair and cleaning of a plant shall, as far as practicable, be carried out with effective shielding fitted. If this is not possible, a key-operated changeover must be carried out after removal of the guard to make the plant run. The plant must then be able to only run under a dead-man switch operation.

7 The plant must not, after a stop has been pressed, be left with an accumulated pressure which, in the event of repair or intervention, could cause dangerous machine movement.

8 Fish processing plants, conveyor belts, etc., shall comply with the following:

8.1 Emergency stops must be placed in suitable locations.

8.2 In addition to the emergency stops referred to in Subsection 8.1, the plants have emergency stops fitted which automatically operate in the event of an intervention, an accident, cleaning, inspection or similar.

9 Where several conveyor belts operate in succession, emergency stops shall be located at suitable intervals in accordance with the instructions of the Danish Maritime Authority. Each emergency stop must stop all conveyors in the line.

10 The arrangement shall ensure free access for inspection, operation and cleaning of the fish processing plant. The working areas of such plants should not be less than 750 mm wide. However, after a specific assessment, the Danish Maritime Authority may allow smaller widths if it is deemed justified.

11 Insulation materials for fish processing plants, including pipe connections, shall not be flammable and shall be durable and stable in a vibrating environment. They must not have external surface temperatures which are harmful or uncomfortable for the crew to touch.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Insulation materials must be securely fastened. This provision shall not apply to vessels purchased before 1 August 1990. The materials must also be approved for use in the food industry.

12 Machinery and installations working under pressure shall meet the requirements for pressure containers set out in Annex 3.

13 Machinery and other installations from which vapour, gas, dust or other noxious or irritating substances are formed shall be fitted with exhaust systems. Exhaust system suction openings must be located as close as possible to the source of the vapour, gas, dust or emission of noxious or irritating substances. The piping must be arranged in such a way that the vented products are not harmful to health. Steam or down pipes from equipment such as lobster, crab, shrimp and liver boilers and equipment using heated water should be placed as high as possible. Discharge pipes must be at least 50 mm in diameter, and be led to the open air. Vapour from the discharge must not obstruct the view from the bridge.

14 Shut-off valves or other devices shall be so arranged that they are easily accessible and safe to operate.

15 Machinery and equipment in work areas shall be mounted on strong, fixed foundations securely connected to the vessel structure.

16 Moving parts of machinery and other installations and equipment likely to constitute a hazard must be effectively screened off.

17 Fish processing plants using water shall have effective drainage systems that take into account their particular susceptibility to blockage.

18 Machinery and installations requiring routine maintenance at a height of more than 2 m shall, where technically possible, have 600 mm wide platforms protected by handrails not less than 1 m high.

19 Loading and unloading of fish into the plant must be done at a safe and comfortable working height.

20 Filling openings for machinery and other installations shall be within easy reach of the crew. Covers on filling openings must have suitable means of closure so that steam, hot water or vapour is prevented from escaping. The cover shall have a counterweight or other secure arrangement to hold it in the open position when required.

Rule 20 Measures to deal with the health hazards associated with industrial fishing cargoes

1 For the purposes of this rule, the following definitions shall apply:

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

(a) Formalin: the liquid formaldehyde HCHO dissolved in water.

(b) Respiratory protective devices: a protective device which ensures that a person can be supplied with fresh air from a stationary compressed air battery, compressor system with pressure tank or personal pressure cylinders.

(c) Industrial fish: fish caught exclusively for use in the fishmeal and fish oil industries.

(d) Hydrogen sulphide: gas species H₂S (hydrogen sulphide).

2 Vessels used for the capture and/or transport of industrial fish shall comply with the provisions laid down in this rule.

3 To prevent putrefaction in fish cargoes and the consequent development of toxic gases, the provisions laid down by the Ministry of Environment and Food of Denmark shall apply. If the Ministry of Environment and Food of Denmark authorises the use of new preservatives not previously used, the shipowner must notify the Danish Maritime Authority before the preservatives in question are used. The products must not be used until the rules of the Danish Maritime Authority for the use of the preservatives in question are available.

4 The provisions laid down from time to time by the Danish Working Environment Authority shall apply to the prevention of health hazards in connection with the unloading of industrial fish.

5 Formalin must be stored on an open deck in approved containers.

6 To check the air in the ship's rooms, there shall be type-approved measuring apparatus on board capable of measuring the contents of oxygen and hydrogen sulphide and of formalin, if these are present on board.

7 Type-approved safety equipment consisting of at least two safety harnesses with associated lifelines and at least one breathing apparatus shall be on board. In existing ships, existing equipment that has already been approved can continue to be accepted.

8 When working with formalin, wear rubber or plastic gloves and goggles or a face shield.

9 Access to cargo holds, stores or similar spaces below deck shall not be permitted until it has been established by measurement that the air in the space is not toxic or dangerous to health.

10 After it has been established by measurement that the air in the hold is not toxic or dangerous to health and that the air has a sufficient oxygen content (minimum 21%), the person who is to enter the hold shall wear a safety harness with an associated lifeline. A line holder must be at the hatch as a watch at all times.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

11 The master of the ship shall, at appropriate intervals during the voyage, keep the hold of industrial fish under observation with a view to releasing harmful excess pressure.

12 On the lower side of hold hatches and access hatches (apart from ice covers) leading to fish holds used to store industrial fish, a warning sign made of durable, seawater-resistant material shall be affixed. Alternatively, a sign can be placed on the wheelhouse next to the place where the ship is normally boarded.

The text on the sign must be:

| |
|-----------------------------------------------------------------|
| |
| DANGER |
| TOXIC AND ASPHYXIATING GASES |
| It is forbidden to go down before measurements have been taken. |
| A safety harness and lifeline must be used. |
| There must be a watch at the hatch. |

13 For work that involves the stowage of catch and cleaning of cargo holds with industrial fish, a specific workplace assessment shall be made.

14 Persons engaged in stowing the catch and cleaning holds of industrial fish shall be instructed in the use of the measuring and safety equipment referred to in this rule. Drills with the equipment shall be carried out each time a new crew member is taken on board and assigned to stowing catches and cleaning holds of industrial fish, but at least once every three months. Proof of the time and place of the exercises shall be available on board.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Annex 6

Rescue equipment and arrangements

- | | |
|---------------|-----------------------------------------|
| Rule 1 | Definitions |
| Rule 2 | Life jacket |
| Rule 3 | Floatation suits |
| Rule 4 | Lifebuoys |
| Rule 5 | Life rafts |
| Rule 6 | Pyrotechnics |
| Rule 7 | Means of reboarding and recovery |

Rule 1 Definitions

Approved life raft: life raft approved and conformity marked (wheelmark) in accordance with the current Order on marine equipment.

Approved flotation suit: thermally insulated flotation suit or protective suit approved and conformity marked (wheelmark) in accordance with the Order on marine equipment, or previously approved by the Danish Maritime Authority.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Recognised standards: standards adopted by the International Maritime Organisation (IMO), the International Organisation for Standardisation (ISO), the European Committee for Standardisation (CEN), the Danish Standard (DS) and the recognised organisations.

Authorised body: a body designated by the competent national authority of a Member State in accordance with the Order on marine equipment.

Rule 2 Life jackets

Each person on board must have a life jacket of an approved type fitted with an approved light.

Rule 3 Floatation suits

1 Fishing vessels subject to this Order shall carry an approved floatation suit for each person on board.

2 Floatation suits shall be stowed in the vicinity of the life-saving devices and, as far as possible, so that they are accessible from the open deck.

Rule 4 Lifebuoys

1 Vessels of 12 m in length and over shall carry 2 approved lifebuoys. One must be fitted with an electric flare, the other with a line of at least 27.5 m that can float on the water.

2 Vessels of less than 12 m in length shall carry one approved lifebuoy. The lifebuoy must be fitted with a self-activating electric light and a line of at least 27.5 m that can float on the water.

3 Lifebuoys shall be marked with the name and home port of the vessel in legible block letters in the Latin alphabet.

Rule 5 Life rafts

1 Each vessel shall have one or more approved "SOLAS" life rafts having a total capacity to accommodate all persons on board. Fishing vessels with a scantling number of less than 100 may use life rafts with a capacity for 4 persons approved by the Danish Maritime Authority. Each raft must have a SOLAS B package.

2 Life rafts shall, as far as practicable, be stowed so that they can be immediately transferred for launching from any side of the ship.

3 Life rafts shall be stowed with the lifeline permanently attached to the vessel and with automatic release so that the raft floats free and inflates automatically if the vessel sinks. Life rafts shall, as

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

far as practicable, be stowed so that they can be immediately transferred for launching from any side of the vessel. The lashings of rafts must have approved hydrostatic release devices.

4 Fishing vessels with a trade area within GMDSS sea area A1 and with a length PP less than 15 metres, may use a raft designed and approved in accordance with ISO 9650-1A - provided that the rafts have a third-party certification from a recognised organisation or an authorised body. Such rafts can also be used with a service interval of up to 2 years.

4.1 Subsection 4 does not apply to vessels operating in Greenland. Such rafts, like other life rafts covered by this rule, shall be fitted with a CR medical kit in accordance with Notices A.

5 Work barges engaged in bottom trawling and not more than 3 nautical miles from the nearest shore shall not be required to carry life rafts when accompanied by a vessel with rafts capable of accommodating all persons on the vessel and barge.

6 Vessels operating in restricted, protected areas may be exempted by the Danish Maritime Authority from the life raft requirement under special conditions, after a specific assessment; this does not apply to fishing vessels.

7 Life rafts on vessels operating exclusively in areas of shallow water may omit the weak link in the longline if the longline is at least twice the maximum water depth in the area of operation.

8 Life rafts and hydrostatic release devices, other than one-way hydrostatic release devices, shall be inspected at an approved service station at intervals not exceeding 12 months. Where this is not practicable, the Danish Maritime Authority may extend the period to 17 months.

Rule 6 Pyrotechnics

1 Each vessel shall carry at least 3 parachute flares emitting red light. When navigating west of 6° East and north of 58° North, there must be at least 6 parachute flares.

2 Parachute flares shall be of an approved type and shall be so located as to be readily accessible. Their location shall be clearly marked. The parachute flares must be renewed according to the manufacturer's instructions.

Rule 7 Means of reboarding and recovery

1 An arrangement shall be established to ensure that crew members who fall overboard can be rescued and brought back on board. Single-handed fishing vessels shall be fitted with fixed or retractable ladders.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 In vessels with more than one person on board, a sling or harness shall be provided for the rescue of an unconscious person who has fallen overboard. When the person who has fallen overboard is placed in the sling or harness, it must be possible to recover them on board by mechanical means. In very small vessels with a small freeboard or vessels used for special purposes, the Danish Maritime Authority may exempt the vessel from the requirement for mechanical assistance. The arrangement is to be tested during a survey. The rules set out in Annex 7 on training and drills with life-saving devices and their documentation shall apply to the overboard recovery arrangement.

Annex 7

Emergency procedures, musters, and drills

Rule 1 Main alarm signal, muster lists and emergency instructions (muster rolls)

Rule 2 Evacuation training and drills

Rule 1 Main alarm signal, muster lists and emergency instructions (muster rolls)

1 The main alarm signal shall consist of a series of seven or more short tones followed by a long tone emitted by the whistle, siren or other means of effective sound transmission.

2 All vessels shall have clear instructions available on what each person on board should do in an emergency. An emergency instruction shall be issued before the vessel departs. If there is a change in the crew which necessitates a change in the emergency instruction, the master must either revise the roll or prepare a new one.

Rule 2 Evacuation training and drills

1 At least one MOB, evacuation and fire drill shall be held each month. The drills shall include all rescue and fire-fighting equipment on board. Rescue and fire-fighting equipment must be checked during the exercises. Information on exercises held shall be available on board, (indicating exercise, time, place, participants and a brief evaluation.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Annex 8

Radio communications

| | |
|---------------|-------------------------------|
| Rule 1 | Scope |
| Rule 2 | Terms and definitions |
| Rule 3 | Equipment requirements |
| Rule 4 | Watch team |
| Rule 5 | Energy sources |
| Rule 6 | Maintenance |
| Rule 7 | Radio personnel |
| Rule 8 | Radio log - ship's log |

Rule 1 Scope

1 This Annex shall apply to all vessels with the exception of:

1.1 Open vessels,

1.2 Ships making a voyage of not more than half an hour from the port of departure to the port of arrival,

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.3 Tugs and other vessels operating in port areas.

2 The provisions of this Annex shall not prevent a vessel or survival craft, in an emergency, from using any means at its disposal to attract attention and make known its position and obtain assistance.

Rule 2 Terms and definitions

For the purposes of this Annex, the following definitions shall apply:

1 DSC: Digital Selective Calling, which is a technique using digital codes that enables a radio station to establish contact with and transmit information to another station or group of stations, and which complies with the relevant recommendations of the International Radio Regulations Committee (ITU-R).

2 Recognised mobile satellite service: service operating through a satellite system and recognised by the IMO for use in the Global Maritime Distress and Safety System (GMDSS)

3 EPIRB (Emergency Position Indicating Radio Beacon): satellite emergency radio beacon.

4 MMSI (Maritime Mobile Service Identity): 9-digit number identifying the ship in, among others, DSC equipment and EPIRB.

5 Float-free EPIRB: EPIRB placed in a holder arranged so that the EPIRB automatically floats free of the vessel and is activated if the vessel sinks.

6 SART (Search And Rescue Transponder): transmitter/receiver activated by signals from a 3-cm radar and emitting signals detected by 3-cm radars.

Alternatively, a buoy transmitting an AIS signal (AIS-SART) as adopted by IMO Resolution MSC. 246(83).

It is used for localisation in emergency situations.

7 NAVTEX: receiver for automatic reception of maritime safety information (MSI) in English on 518 kHz.

8 Sea Area A1: area, defined as such by a Contracting Government, within the radiotelephone coverage of at least one VHF coast radio station, where DSC alerting is continuously available.

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*Order no. 2447 of 13 of December 2021
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9 Sea Area A2: area, outside Sea Area A1, defined as such by a Contracting Government, within the radiotelephone coverage of at least one MF coast radio station, where DSC alerting is continuously available.

10 Sea Area A3: area, outside sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite, where continuous alerting is possible.

11 Sea area A4: area outside sea areas A1, A2 and A3.

12 Uninterrupted watch: the radio watch in question may be interrupted only for short periods when the vessel's reception capability is impaired or blocked by its own communications, or if the equipment is undergoing periodic maintenance or overhaul.

Rule 3 Equipment requirements

1 Vessels shall have radio equipment fitted as specified in the table below:

| Sea area | VHF-DSC | MF-DSC | HF-DSC | Recognised mobile satellite service | EPIRB Float-free | SART | Portable VHF | NAVTEX |
|----------|---------|--------|--------|-------------------------------------|---------------------|------|--------------|-----------------|
| A1 | 1 | | | | R | R | R | R |
| A2 | 1 | 1 | | | 1 | 1 | R | 1 ¹⁾ |
| A3 | 1 | 1 | 1 or 1 | | 1 | 1 | R | 1 |

¹⁾ For the time being, there is no requirement for a NAVTEX receiver in vessels approved for operation in trade area F4, see Section 4(1)(4).

1 = required equipment

R= recommended equipment

2 With regard to the functional requirements for the individual radio equipment in the above table and their installation, the provisions of the radio chapters of Notices from the Danish Maritime Authority B(IV) shall apply. Reference is made to this rule.

3 In vessels operating in trade areas A3 and A4, DSC equipment shall be of Class A or B. In vessels operating in trade areas A1 and A2, the VHF-DSC equipment shall be of class A, B or D and the MF-DSC equipment of class A, B or E.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4 All relevant radio equipment (DSC and INMARSAT) shall be continuously and automatically provided with information on the ship's position.

5 For navigation in Greenland waters, the Danish Maritime Authority may exempt vessels when they are engaged in navigation exclusively within sea areas A2 and A3, from the requirements for VHF DSC on condition that such vessels maintain, whenever practicable, a continuous listening watch on VHF channel 16.

6 The radio installation shall have reliable, permanently installed electrical lighting which provides adequate light for the radio installation's operating facilities.

7 The radio installation shall be clearly marked with the vessel's name, call sign, MMSI number and, if applicable, the numbers of a recognised mobile satellite service. A notice shall also be provided at the radio installation to instruct unskilled persons how to start the radio and make emergency calls during an emergency.

8 The radio equipment in this Annex shall comply with the requirements of the Order on marine equipment.

9 Radio equipment which complies with the requirements of the Radio Equipment and Electromagnetic Compatibility (R&TTE) Act and associated relevant regulations (CE marking) is exempt from the requirement of Subsection 8.

Rule 4 Watch team

1 Every vessel shall, when at sea, maintain a continuous watch:

1.1 on VHF DSC channel 70 if the vessel is equipped with VHF DSC. ;

1.2 on the emergency and safety frequency for DSC: 2187.5 kHz if the vessel is equipped with MF-DSC;

1.3 on the DSC emergency and safety frequencies: 2187.5 kHz and 8414.5 kHz and on at least one of the DSC emergency and safety frequencies: 4207.5 kHz, 6312 kHz, 12577 kHz or 16804.5 kHz, depending on the time of day and the geographical position of the vessel, if the vessel is equipped with MF-HF-DSC. This watch can be kept by means of a receiver that can scan.

1.4 for shore-to-ship distress alerts via satellite, if the vessel is equipped with a recognised mobile satellite service ship-to-ground station system.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 Every vessel shall, when at sea, maintain a radio watch for the reception of maritime safety information (MSI) broadcasts on the appropriate frequency or frequencies on which the broadcast is made to the particular area in which the vessel is located.

3 Each vessel shall, when at sea, maintain a continuous listening watch on VHF channel 16 to the extent practicable. This watch shall be kept at the position from which the vessel is normally navigated.

Rule 5 Energy sources

1 When the vessel is at sea, sufficient electrical power shall be available at all times for the operation of the radio installations and for the charging of all batteries used as part of one or more power sources for the radio installations.

2 There shall be an audible and visible alarm in the wheelhouse, which shall be activated in case of a failure of the energy source (low voltage alarm).

3 The radio installations must be connected to a separate radio battery. The radio battery shall be located above the deepest operating waterline (for fishing vessels the design waterline) outside the engine room and arranged so that its functions are ensured in the event of fire, flooding or other causes of failure of the main electrical installation. Accumulator batteries must be installed in accordance with generally accepted principles or requirements accepted by a recognised organisation.

4 A battery (emergency source of power) as required in Annex 3, Rule 12(12.2) and the radio battery in Subsection 3 may be one and the same battery provided that the requirements for both batteries are met.

5 The lighting and navigational equipment required by Rule 3(6) which are connected to the ship's radio equipment shall be connected to the same power source as the radio equipment. The Danish Maritime Authority may permit other essential safety equipment to be connected to the radio battery.

6 The following radio equipment shall be capable of being simultaneously powered from the energy sources for at least 6 hours:

6.1 VHF-DSC and one of the following installations, if the vessel has a trade area outside sea area A1:

6.2 MF-DSC, or

6.3 MF-HF-DSC, or

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

6.4 Recognised mobile satellite service ship-earth station

Rule 6 Maintenance

1 Sufficient technical documentation shall be provided on board to allow the equipment to be operated and maintained correctly.

2 Sufficient spare parts and tools must be available to maintain the equipment.

3 For vessels operating in sea area A3, maintenance of the equipment shall be ensured by using at least one of the following methods: duplication of equipment, shore-based maintenance or the possibility of maintenance while under way. The method chosen must be approved by the Danish Maritime Authority.

4 The equipment must be maintained in good working order.

5 Satellite EPIRBs shall:

5.1 be tested at least every 12 months for all operational performance issues, with particular emphasis on radiated emissions control on operational frequencies, coding and recording. However, in cases where it is considered justified and reasonable, the administration may extend this period to 12 months +/- 3 months. The test may be carried out on board the ship or at an approved testing station; and

5.2 be serviced by a shore-based maintenance provider at intervals not exceeding 5 years.

Rule 7 Radio personnel

1 Each vessel shall carry personnel qualified to conduct emergency and safety radio communications. These personnel must hold the appropriate radio certificates. A specific person among these personnel shall be designated as having primary responsibility for radio communications in emergency situations.

Rule 8 Radio log - ship's log

1 All incidents relating to the radio service which appear to be of importance to the safety of life at sea shall be recorded in the ship's log, if one is to be kept.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Annex 9

Safety of navigation

Rule 1 Definitions

Rule 2 Exceptions and equivalents

Rule 3 Maintenance of equipment

Rule 4 Requirements for shipborne navigation systems and equipment

Rule 5 View from the wheelhouse

Rule 6 Nautical charts and publications

Rule 7 Distress signals for use by vessels, aircraft and people in distress

Rule 8 Hazard notifications

Rule 9 Content of the hazard notifications

Rule 10 Distress alerts - obligations and procedures

Rule 11 Safe navigation and prevention of dangerous situations, and the master's discretion

Rule 12 Misuse of distress signals

Rule 13 Navigation lights, signal lights and audible signalling apparatus

Rule 1 Definitions

For the purposes of this Annex, 'suitable equipment' means equipment of a type suitable for the purpose and trade area concerned.

Rule 2 Exceptions and equivalences

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The Danish Maritime Authority may exempt any vessel from any of the requirements of this Annex if the nature of the voyage or the proximity of the vessel to land does not necessitate compliance with that requirement.

Rule 3 Maintenance of equipment

1 Sufficient measures shall be in place to ensure that the performance of the equipment required by this Annex is maintained.

2 While all reasonable steps shall be taken to maintain the equipment required by this Annex in an efficient, serviceable condition, failure of such equipment shall not be considered as rendering the vessel unserviceable or as a basis for delaying the vessel in ports where repair facilities are not readily available, provided that the master takes appropriate action with respect to the inoperative equipment or the unavailable information in planning and executing a safe voyage to a port where repairs can be made.

Rule 4 Requirements for shipborne navigation systems and equipment

1 All vessels shall have an approved magnetic head compass fitted capable of determining the course of the vessel independently of any power supply and of displaying it on the main steering position.

1.1 The magnetic compass must be located at a sufficient distance from magnetic material and objects such as loudspeakers and electronic equipment.

1.2 In small wheelhouses, the compass may be placed on the roof and in steel vessels the magnetic compass shall be placed in the centre line of the vessel and the compass heading shall be parallel to the centre line of the vessel.

1.3 The position and illumination of the compass shall ensure a good reading from the steering position and from the place from which the vessel is navigated, both during the day and at night.

1.4 The compass shall be properly aligned and its table or curve of residual deviations shall be available at all times.

1.5 In vessels equipped with a self-steering device activated by a magnetic sensor which does not display the steering course, there shall be an alternative display of the steering course in the form of a repeater or similar.

2 Ships with a trading area beyond area F2 shall be equipped to plan and display the ship's route on the intended voyage and to plot and record positions throughout the voyage; an electronic chart display and information system (ECDIS) may be recognised as meeting the chart requirements of

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issued by the Danish Maritime Authority*

this regulation, but in such case shall be used and supplemented by a suitable back-up arrangement taking into account the recommendations developed by the Organisation.

3 All vessels shall have suitable means for determining the depth of water beneath the vessel. Vessels with a trading permit for area F3, F4, F5 or F6 shall have a suitable echo sounder fitted. Where fish-finding equipment is carried on board the vessel, such equipment may be used for this purpose.

4 All vessels shall, where practicable, be fitted with an approved radar reflector.

5 Vessels operating at night, in fog, in bad weather, in icy waters, or with a trading permit for area F3, F4, F5 or F6 shall have an approved radar system fitted.

6 Vessels with a trading permit for areas F3, F4, F5 or F6 shall have an approved receiver fitted for a global navigation satellite system or a terrestrial radio navigation system or equivalent capable of automatically determining and updating the position of the vessel at any time during the intended voyage;

7 Vessels with a trading permit for areas F3, F4, F5 or F6 shall have an appropriate log. However, where the equipment described in point 6 includes a function for recording speed and distance travelled, that equipment may be used instead of a logbook.

8 Vessels with a trading permit for areas F3, F4, F5 or F6 shall have a suitable barometer fitted.

9 Fishing vessels with an overall length of more than 15 metres must be equipped with AIS in accordance with the Order on technical regulations concerning a traffic monitoring and information system in Danish waters and ports.

Rule 5 View from the wheelhouse

1 From the steering position, or from where the vessel is being navigated, there shall be adequate visibility ahead, astern and to the sides.

1.1 The horizontal field of vision from the steering position, or from where the vessel is being navigated, shall extend over an arc of not less than 225° from due course to at least 22.5° astern of the transverse on each side of the vessel.

1.2 No blind sector caused by fishing gear, or other obstructions in front of the transom, shall exceed 10°. The total arc of blind sectors shall not exceed 20°. The visible sectors between blind sectors must be at least 5°. However, the single blind sector in an arc from straight ahead and 10° on either side shall not exceed 5°.

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issued by the Danish Maritime Authority*

1.3 In a vessel with wheelhouse, it shall be ensured that in the fully equipped vessel, with full tanks and no cargo on board, a horizontal line can be drawn from the lower edge of the wheelhouse windows, clear of the upper edge of the vessel's stern or equivalent. Wheelhouse windows must be at least 0.50 m high and must cover an area between 1.35 m and 1.90 m above the floor. The bottom edge must be at least 1.32 m above the floor.

1.4 Instruments, control handles, indicator lights, etc., shall be so placed as to give the best possible operating function and view. Fittings must be made of non-reflecting material on the control console and in the field of vision.

2 On vessels built before the entry into force of this rule and vessels of unconventional design which, in the opinion of the Danish Maritime Authority, cannot comply with this rule, arrangements shall be made to achieve an equivalent visibility as near as practicable to that required by this rule.

Rule 6 Nautical charts and publications

1 It shall always be the master's responsibility to ensure that charts and nautical publications carried on board are relevant, up to date and adequate for the planning and conduct of the voyage in all conditions.

2 A chart or nautical publication is a specially prepared chart or book, or a specially prepared database from which such a chart or book may be extracted, which has been officially issued by or under the authority of a Government, an authorised hydrographic office or other relevant Government institution, and which has been prepared for the purpose of meeting the requirements of maritime navigation.

Distress signals for use by vessels, aircraft and people in distress

An illustrated chart describing the lifesaving signals¹⁾ shall be readily available to the officer in charge of any vessel covered by this Annex. The signals shall be used by vessels or persons in distress when communicating with rescue stations, maritime rescue units and aircraft engaged in search and rescue operations.

Rule 8 Hazard notifications

1 It shall be the duty of the master of any vessel which encounters ice or wreckage of a dangerous nature or any other immediate hazard to navigation or extreme weather conditions, or which is exposed to air temperatures below freezing in gale force winds causing severe icing of superstructures, or winds of force 10(24-28 m/sec.) or greater on the Beaufort scale, for which no storm warning has been received, to give notice thereof by all means in their power to vessels in the vicinity and to the competent authorities. The form in which the notification is given is not

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issued by the Danish Maritime Authority*

mandatory. It can be issued either in clear language (preferably in English) or using the International Signalling Book.

2 The transmission of messages concerning the hazards in question shall be at no cost to the vessels concerned.

3 All radio messages transmitted in accordance with Subsection 1 shall be preceded by the safety signal using the procedure prescribed in the Radio Regulations.

Rule 9 Content of the hazard notifications

Hazard notifications shall contain the following information:

1 Ice, wrecks and extreme weather conditions and other direct hazards to navigation:

1.1 Nature of ice, wreck or hazard observed.

1.2 Position of ice, wreck or hazard at last observation.

1.3 Date and time (Universal Co-ordinated Time) of last observation of the hazard.

2 Extreme weather conditions:

2.2 Date and time (Universal Co-ordinated Time) and position of vessel at time of observation.

2.3 As much of the following information as possible should be included in the notification:

- barometric reading²⁾, preferably corrected (expressed in millibars, millimetres or inches, indicating whether the reading is corrected or not);

- barometer trend (change in barometer reading over the last three hours);

- wind direction, indicated accurately;

- wind speed (Beaufort scale);

- the state of the sea

- swell and the direction from which it comes, indicated accurately. The period or length of the swell.

- the true course of the vessel and its speed.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Later observations

3 When a master has given notification of a tropical or other dangerous storm, it is desirable, but not obligatory, that observations should thereafter be made and broadcast, if possible hourly, but in any case not more than every three hours, while the vessel is under the influence of the storm.

4 Wind force 10 (25 m/sec) or greater on the Beaufort scale for which no storm warning has been received. This refers to storms other than the tropical storms referred to in Subsection 2. When such a storm is encountered, the report should contain information as specified in Subsection 2, but without the details of sea and swell.

5 Air temperatures below freezing during gale force winds causing severe ice formation on superstructures:

5.1 Date and time (Universal Co-ordinated Time).

5.2 Air temperature.

5.3 Sea water temperature (if possible).

5.4 Wind strength and direction.

Rule 10 Distress alerts - obligations and procedures

1 Every master of a ship who receives at sea a signal from any source that persons are in distress at sea and who is in a position to render assistance shall be obliged to come to their assistance with the greatest speed and, as far as possible, to inform them or the search and rescue service that they are doing so. The obligation to provide assistance applies irrespective of the nationality or status of such persons or the circumstances in which they are found. If the vessel receiving the distress signal is unable, or in the particular circumstances of the case deems it unreasonable or unnecessary, to come to the assistance of the persons in distress, the vessel's master shall enter the reason for not going to the rescue in the ship's log and, in accordance with the recommendations of the Organisation, inform the search and rescue service concerned.

2 The master of a ship in distress or the search and rescue service concerned shall have the right, as far as possible after consultation with the masters of the vessels which have responded to the distress signal, to select one or more of the vessels, which obliges the master or masters of the vessel or vessels concerned to comply with the request by coming to the assistance of the persons in distress as soon as possible.

3 Masters of vessels are released from their obligation under Subsection 1 when they become aware that their vessel has not been selected to provide assistance and that one or more other

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issued by the Danish Maritime Authority*

vessels selected to provide assistance is complying with the request for assistance. This position shall be communicated as far as possible to the other vessels selected to provide assistance and to the search and rescue service.

4 The master of a ship is released from the obligation imposed on them by Subsection 1 and, if the ship has been assigned to provide assistance, from the obligation imposed on it by Subsection 2, if they are informed by the persons in distress or by the search and rescue service or by the master of another ship which has reached those persons that assistance is no longer required.

5 Masters of vessels who have taken persons in distress on board at sea shall treat them humanely within the capabilities and limitations of the vessel.

Rule 11 Safe navigation and prevention of dangerous situations and the master's discretion

1 Before commencing the voyage, the master shall ensure that the intended voyage is adequately planned by using the necessary nautical charts and publications for the area concerned.

2 The itinerary must describe a route which:

2.1 takes into account any relevant ship's route system;

2.2 ensures that there is sufficient manoeuvring space for the vessel to make safe passage throughout the voyage;

2.3 anticipates all known navigational hazards and adverse weather conditions; and

2.4 takes into account the measures applicable for the protection of the marine environment and avoids, as far as possible, actions and activities which may cause damage to the environment.

3 The owner or charterer or the company operating the vessel or any other person shall not prevent the master of the vessel from taking or carrying out any decision which, in the professional judgement of the master, is necessary for the safe navigation and protection of the marine environment.

4 The owner or charterer or the company operating the ship or any other person shall not prevent or restrict the master of the ship from taking or carrying out any decision which, in the professional judgement of the master, is necessary for the safety of navigation and the protection of the marine environment.

Rule 12 Misuse of distress signals

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

The use of an international distress signal shall be prohibited except to indicate the distress of a ship, aircraft or person and the use of a signal which may be confused with an international distress signal.

Rule 13 Navigation lights, signal lights and audible signalling apparatus

Every ship shall be equipped with navigation lights, signal lights and audible signalling apparatus to such an extent that it is able to comply with the requirements of the International Regulations for Seagoing Navigation.

Annex 10

Special provisions for Greenland

- | | |
|---------------|------------------------------------|
| Rule 1 | Scope for Greenland |
| Rule 2 | Special rules for Greenland |
| Rule 3 | Radio communications |

Rule 1 Scope for Greenland

1 In addition to the other provisions of this rule, this Annex shall apply to Greenland-registered vessels.

2 Trade areas for Greenland-registered vessels shall be determined individually based on a specific assessment, applying the principles set out below.

2.1 Open vessels may be assigned a trade area within sea area F₂. However, open vessels that are not protected from sea ingress by full decks can normally only be allocated a trade area within F₁.

2.2 Decked vessels may be assigned a trade area which is safe taking into account the size, structure and design of the vessel.

2.2.1 Decked vessels of up to 10 m in length may normally be assigned to a trade area within F₃.

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issued by the Danish Maritime Authority*

2.2.2 Decked vessels over 10 m in length may normally be assigned to a trade area within F₄.

2.3 Decked vessels with a length of more than 15 m can only be allocated a trade area within operation area F₅ in exceptional cases.

2.4 For the areas around the settlements of Qaanaq, Ittoqqoormiit and Tasiilaq, the trade areas are assigned on a case-by-case basis.

3 "Trade area F₁" is fjord navigation, i.e. area within the outer isthmus (baseline).

4 "Trade Area F₂" is the local sea area of Greenland within 3 nautical miles of the outer isthmus (Baseline) in the area of Prince Christiansund on the East Coast to Kullorsuag (Devil's Thumb) north of Upernavik.

5 "Trade Area F₃" is the local sea area of Greenland within 12 nautical miles of the outer isthmus (Baseline) in the area of Cape Cort Adeler on the East Coast to Kullorsuag (Devil's Thumb) north of Upernavik.

6 "Trade Area F₄" is the local sea area of Greenland within 30 nautical miles of the outer isthmus (Baseline) in the area of Cape Cort Adeler on the East Coast to Kullorsuag (Devil's Thumb) north of Upernavik.

7 "Trade Areas F₅, F₆" is the sea area of Greenland within 100 nautical miles of the outermost isthmus (Baseline) in the area of Cape Cort Adeler on the East Coast to Kullorsuag (Devil's Thumb) at Upernavik.

Rule 2 Special rules for Greenland

1 For all commercial Greenland-registered vessels covered by these rules, the length "L1" is used as defined in Section 3, No. 15. The length "L1" is the length shown on the vessel's tonnage certificate as defined in the Order on measurement of small vessels.

2 Where movable GRP tanks are used for fuel oil, they shall be constructed in accordance with Subsection 5.3 of Rule 5 of Annex 3.

3 Venting arrangements for fuel oil tanks shall be such that a vacuum cannot be created in the fuel oil tank as a result of icing of the air pipe.

4 Cooling systems for inboard machinery shall be carried out with fresh water cooling only, except for the cooling of machinery in wooden ships.

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5 All vessels operating in Greenland trade areas shall carry approved floatation suits for all persons on board.

6 Instead of the life-raft prescribed in Annex 6, vessels with trade areas within F₂ may carry a towing dinghy of approved material capable of accommodating all on board. The towing dinghy must have a full set of oars and rowlocks, a bailer or a bucket and 3 hand flares.

7 The following rules shall not apply to Greenland:

Section 3(16) and (18) and Section 4.

Annex 4, Rule 11(3) on extinguishing media with equivalent extinguishing effect when using water systems

Annex 6, Rule 5(4) and (6).

Rule 3 Radio communications

1 Annex 8 on radio communications applies to Greenland-registered vessels.

2 However, vessels with a trading permit within the VHF coverage of the Greenlandic coastal radio stations shall have the following fitted:

2.1 VHF radio equipment

2.2 Float-free 406 MHz EPIRB

2.3 Radar transponder (SART)

3 The requirement for VHF radio equipment in Subsection 2.1 can be met either by traditional VHF radio equipment (without DSC) or by combined VHF-DSC radio equipment.

Annex 11

Additional rules for cargo vessels of 15 to 24 m in length

Rule 1 Scope

1 In addition to this rule, ships of 15 to 24 m in length shall comply with the additional requirements of this Annex.

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Chapter 1

Structure, watertight integrity and equipment

Section I

Rule 1 Scope

1 Section I, I A and I B shall apply to new cargo vessels of length L of 15 to 24 metres and scantling number 100 or above operating within 100 nautical miles of the nearest coast.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Definitions

1 Load Lines Convention: the International Convention on Load Lines of 5 April 1966, as amended by the Protocol of 1988.

2 Weathertight: regardless of the conditions on the sea, no water shall enter the vessel.

3 Watertight: the vessel has structural elements and devices capable of preventing the passage of water in any direction at the pressure level likely to occur intact and in leakage condition. In leak condition, the pressure head in the worst-case situation should be considered as at equilibrium, including the intermediate stages of water ingress.

4 Design pressure: hydrostatic pressures that each structure and device assumed to be watertight in the stability calculations is designed to withstand.

Section I A Structure

Rule 3 Structure

2.1 The strength and structure of the hull, superstructures, deckhouses, engine-room casings, companionways, all other superstructures and ship's equipment shall be sufficient to withstand all foreseeable conditions during the intended use of the vessel.

2 Vessels must be designed, built and maintained in accordance with the rules of a recognised organisation, cf. Section 3(45).

3 Vessels purchased from abroad may be approved if the shipowner can prove that they have been approved and surveyed by a recognised organisation in accordance with the rules of that

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organisation or, alternatively, that they have been approved by an EU Member State to standards which provide an equivalent level of safety.

Rule 4 Storage of construction drawings on board

1 A set of structural drawings of the vessel's construction and drawings showing all subsequent structural alterations shall be kept on board new vessels.

Rule 5 Anchoring, towing and mooring equipment

1 Vessels shall have arrangements, equipment and accessories with sufficient load safety to enable all anchoring, towing and mooring operations associated with the normal operation of the vessel to be carried out safely.

2 Arrangements, equipment and accessories used in accordance with Subsection 1 must meet the relevant requirements of a recognised organisation as referred to in Section 3(45), or equivalent requirements of an EU Member State which has carried out the approval.

3 For vessels arriving from another EU Member State, the arrangements, equipment and accessories referred to in Subsection 2 may alternatively comply with relevant requirements imposed by that EU Member State.

4 Any equipment or accessory required by this rule shall be clearly marked with any restriction on its use, taking into account the strength of its attachment to the vessel.

Rule 6 Structure of watertight bulkheads

1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be so constructed and dimensioned as to be capable in all cases at least of withstanding the pressure of a column of water reaching the freeboard deck.

2 Offsets and recesses in bulkheads shall have the same strength as the bulkhead in which they are located.

Rule 7 Initial testing of watertight bulkheads, etc.

1 Testing of watertight compartments not intended to be used for liquids or cargo holds intended to be filled with ballast by filling them with water is not mandatory. If such a test does not take place, a spray test shall be carried out where possible. This test shall be carried out as late as possible in the fitting-out of the vessel. Where a spray test cannot be carried out because of the risk of damage to machinery, electrical equipment, insulation or fittings, it may be replaced by a careful visual inspection of the weld seam, supplemented, where deemed necessary, by a liquid

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penetrant, ultrasonic or equivalent test. In all cases, the watertight bulkheads must be carefully examined.

2 The forepeak and inner plating (including those for duct cooling) shall be pressure tested with a column of water having a height corresponding to the requirements of Rule 6.

3 Tanks intended for the storage of liquids and forming part of the subdivision of the vessel shall be tested for watertightness and strength at a head of water corresponding to the pressure for which the tank is designed. However, in no case shall the water column be less than the top of the air pipe or less than 2.4 m above the tank top, whichever is greater.

4 The tests referred to in Subsections 2 and 3 are intended to ensure that the construction of the compartment is watertight and shall not be considered as a test of the suitability of a room for the storage of liquids or for other special purposes for which a more stringent test may be required, depending on the height to which the liquid may rise in the tank or its connections.

Rule 8 Peak and engine room bulkheads, shaft passages, etc.

1 There shall be a collision bulkhead, which shall be watertight up to the freeboard deck. This bulkhead shall be placed at a distance from the forward perpendicular of not less than 5% of the length of the vessel or 10 m, whichever is less, and not more than 8% or 5% + 3 m of the length of the vessel (L), whichever is the greater.

2 Where any part of the vessel below the waterline extends forward of the forward perpendicular, such as a bulbous bow, the distances specified in Subsection 1 shall be measured from a point either:

2.1 From the middle of this extension; or

2.2 at a distance of 1.5% of the length (L) of the vessel in front of the forward perpendicular; or

2.3 at a distance of 3 m in front of the front perpendicular;

depending on which point has the smallest dimension.

3 The bulkhead may have offsets or recesses, provided that the restrictions prescribed in Subsection 1 or 2 are complied with.

4 No doors, manholes, ventilation ducts or other openings in the collision bulkhead shall be fitted below the freeboard deck.

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issued by the Danish Maritime Authority*

5 Not more than one pipe shall be led through the forepeak bulkhead below the bulkhead deck for drainage from the forepeak tank and only on condition that the pipe is fitted with a screw valve operable from a position above the bulkhead deck and that the valve housing is located on the collision bulkhead inside the forepeak, as specified in Subsection 2.1.; however, see Subsection 5.1. However, the Danish Maritime Authority may accept that the valve is located on the aft side of the collision bulkhead, provided that the valve is readily accessible under all operating conditions and is not located in a cargo hold. All valves shall be of steel, bronze or another approved tough material. Valves made of ordinary cast iron or similar material cannot be approved.

5.1 If the forepeak is subdivided for the storage of two different kinds of liquids, the Danish Maritime Authority may permit the passage of two pipes through the collision bulkhead below the freeboard deck, both arranged as prescribed in Subsection 5, provided that there is no practical alternative to the arrangement of the second pipe and that the safety of the ship is maintained, taking into account the additional subdivision in the forepeak.

6 Where there is a long superstructure ahead, the collision bulkhead shall be extended weathertight to the deck immediately above the freeboard deck. This extension need not be fitted directly over the underlying bulkhead, provided that it is fitted within the limits prescribed in Subsection 1 or 2 and that the part of the deck forming the offset is rendered effectively watertight.

7 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be limited as much as is compatible with the design and normal operation of the vessel. All such openings shall be capable of being closed weathertight.

8 Bulkheads shall be fitted fore and aft separating the engine room from the cargo hold and living quarters and shall be watertight up to the freeboard deck.

9 In all cases, stern tubes shall be located in moderately sized watertight compartments. In the opinion of the Danish Maritime Authority, other precautions may be taken in cargo vessels to limit the danger of water entering the vessel in the event of damage to the stern tube arrangement.

Rule 9 Openings in watertight bulkheads and inner decks

1 The number of openings in watertight subdivisions shall be limited to the extent compatible with the design and normal operation of the vessel. Where it is necessary to penetrate watertight bulkheads and internal decks for reasons of access, pipe penetration, ventilation, electrical cables, etc., measures shall be taken to ensure that the watertight integrity is maintained. The Danish Maritime Authority may permit relaxations in the watertight integrity of openings above the freeboard deck, provided it is shown that any progressive filling can be readily controlled and that the safety of the vessel is not thereby impaired.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 Doors intended to ensure the watertight integrity of internal openings used in the sea shall be watertight sliding doors capable of being closed by remote control from the bridge and shall also be capable of being operated locally from each side of the bulkhead. Indicators shall be fitted at the control desk to indicate whether the doors are open or closed and there should be an audible alarm that sounds when the doors are closing. The power source, controls and indicators shall be operational in the event of a main power failure. Particular attention must be paid to limiting the impact of failures in the control system. Every power-operated sliding watertight door shall have an individual hand-operated mechanism. It shall be possible to open and close the door by hand from both sides at the door itself.

3 Access doors and hatch covers normally closed at sea to ensure the watertight integrity of internal openings shall have indicators locally and on the bridge to indicate whether such doors or hatch covers are open or closed. A sign shall be placed on each of these doors or hatch covers to ensure that they are not left open.

4 Watertight doors of satisfactory construction may be installed for the internal division of large cargo holds, provided that the Danish Maritime Authority considers such doors to be absolutely necessary. These doors can be hinged, roller or sliding, but do not need to be remote controlled. If any of the doors are accessible during navigation, they shall be installed with a device to prevent unauthorised opening.

5 Other closing devices which are kept permanently closed at sea in order to ensure the watertight integrity of the internal openings shall bear a sign on each closing device stating that they are to be kept closed. Manholes fitted with bolted covers need not be marked in this way.

Rule 10 Openings in the shell plating below the freeboard deck

1 The number of openings in the shell plating shall be limited to the minimum possible, taking into account the design and normal operation of the vessel.

2 The means of closing openings in the shell plating shall be arranged and function in a manner appropriate to their intended use and the location in which they are fitted and the arrangement shall be such as to satisfy in all respects the requirements of the Danish Maritime Authority.

3 Without prejudice to the requirements of the International Convention on Load Lines in force, no porthole shall be placed in such a position that its lower edge is below a line drawn parallel to the freeboard deck at the side and having its lowest point 2.5% of the moulded breadth of the vessel above the deepest load line or 500 mm, whichever is the greater.

3.1 All portholes the lower edge of which is below the freeboard deck shall, subject to Subsection 3, be so constructed that no person can open them without the permission of the master.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

4 Solid hinged storm flaps shall be fitted to the inside of all portholes in such a way that they can be easily and effectively closed watertight.

5.1 Portholes shall not be placed in compartments intended exclusively for the carriage of cargo or coal.

5.2 Portholes may, however, be placed in compartments used alternately for the carriage of goods and for the carriage of passengers, but the portholes in such compartments shall be of such construction as effectively to prevent any person from opening them or their storm flaps without the permission of the master.

6 No automatic ventilation porthole shall be fitted in the shell plating below the freeboard deck of cargo vessels without the special permission of the Danish Maritime Authority.

7 The number of scuppers, sanitary drains and other similar openings in the shell plating shall be reduced to the minimum practicable, either by allowing each egress opening to serve as many of these installations as possible or by some other satisfactory means.

8 All ingress and egress openings in the shell plating shall be provided with effective and accessible means of preventing the ingress of water into the vessel in the event of an accident.

8.1 Subject to the requirements of the applicable Load Line Convention and except as provided in Subsection 8.3, each individual drain pipe passing through the ship's side from compartments below the freeboard deck shall be fitted with either an automatically operating non-return valve fitted with a closing mechanism operable from a position above the freeboard deck, or with two automatically operating non-return valves without any additional closing mechanism, provided that the inboard valve is located above the deepest load line and is always accessible for examination during normal operation of the vessel. Where a valve with additional closing mechanism is fitted, the operating position above the freeboard deck shall always be easily accessible and means shall be provided to indicate whether the valve is open or closed.

8.2 The requirements of the applicable Load Line Convention apply to drains led through the ship's side from compartments above the freeboard deck.

8.3 Engine rooms, main and auxiliary sea connections in egress openings for the operation of the machinery shall be provided with readily accessible valves between the pipes and the shell plating or between the pipes and built-up boxes placed on the shell plating. Valves may be locally operated and shall have indicators to show whether they are open or closed.

8.4 Movable parts passing through the shell plating below the deepest load line shall be made watertight in a manner satisfactory to the Danish Maritime Authority. The stuffing box packing shall be placed in a watertight compartment of such size that the freeboard deck will not be

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issued by the Danish Maritime Authority*

submerged even when the compartment is filled. The Danish Maritime Authority may require that main or emergency power, lights, internal communications, signals or other emergency equipment continue to function elsewhere in the vessel even if the compartment is filled with water.

8.5 All fittings in the shell plating and valves required by this rule shall be of steel, bronze or other approved tough material. Valves made of ordinary cast iron or similar material cannot be approved. All pipes referred to in this rule shall be of steel or other equivalent material satisfactory to the Danish Maritime Authority.

9 In no case shall gangway, cargo and coal doors fitted below the freeboard deck be so arranged that their lowest point is below the deepest load line.

10 The inboard opening to any ash and waste shaft, etc., shall have a suitable cover.

10.1 If the inboard opening is located below the freeboard deck, the cover shall be watertight and, in addition, an automatically operating non-return valve shall be fitted in the well at an easily accessible position above the deepest load line.

Rule 11 External openings

1 All external openings leading to compartments assumed to be intact in the stability calculations and located below the deepest load line, shall be watertight.

2 External openings required to be watertight in accordance with Subsection 1 shall be of sufficient strength and, except for cargo hatch covers, shall have indicators on the bridge.

3 Openings in the shell plating below the deck which limit the vertical extent of the damage shall be kept permanently closed at sea. If any of these openings are to be accessible when at sea, they must be fitted with a device to prevent unauthorised opening.

4 Other closing appliances which are kept permanently closed in the sea to ensure the watertight integrity of the external openings shall bear a sign affixed to each closing appliance stating that it is to remain closed. Manholes fitted with bolted covers need not be marked in this way.

Rule 12 Construction and initial tests of watertight doors, portholes, etc.

1 On all vessels

1.1 The design, materials and construction of all watertight doors, portholes, gangways, cargo and coal doors, valves, pipes and ash and waste chutes referred to in this Order shall be of an approved type and fit for the purpose.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.2 Such valves, doors, mechanisms shall be suitably marked to ensure that they are used in the best way to provide the best safety.

1.3 The lower edge of vertical watertight doors shall not have grooves in which dirt can collect and prevent the door from closing effectively.

2 Watertight doors shall be tested with a water pressure equal to the water column to which they may be subjected in a final or intermediate stage of filling. If the test of individual doors is omitted because of risk of damage to insulation or equipment, the test of these doors may be replaced by a prototype test of each type and size of door, carried out at a water pressure at least equal to that required for the intended location. The prototype test must be carried out before the door is installed. The method and procedure of installation on board shall correspond to the prototype. After installation on board, the alignment of each door in the frame and bulkhead must be checked.

Rule 13 Structure and initial tests of watertight decks, trunks, etc.

1 Watertight decks, trunks, tunnels, duct coolers and ventilation ducts shall have the same strength as watertight bulkheads of equivalent height. The means used to make them watertight and the devices used to close the openings in them shall be of an approved type and suitable for the purpose. Watertight ventilators and trunks shall be led up to the freeboard deck as a minimum.

2 After their completion, watertight decks shall be subjected to a spray test or similar and watertight trunks, tunnels and ventilation ducts shall be subjected to a spray test.

Rule 14 Water level alarms on cargo vessels with a single hold

1 This rule applies to new and existing cargo vessels.

2 Cargo vessels having only one cargo hold below the freeboard deck which is not divided by watertight bulkheads led up to that deck shall be fitted with water level alarms.

3 Water level alarms, as required in Subsection 2, shall:

3.1 Give an audible and visual alarm on the bridge when the water level reaches a height of 0.3 m measured from the bottom of the hold, and a second alarm when the water level exceeds 15% of the average depth of the hold; and

3.2 Be fitted in the rearmost part of the hold, or in the lowest part of the hold if the bottom is not parallel with the structure waterline. Where frames or partially watertight bulkheads are fitted above the bottom of the hold, the Danish Maritime Authority may require additional water level detectors.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 15 Prevention and control of water ingress, etc.

1 Openings in the shell plating below the freeboard deck shall be kept permanently closed at sea.

2 Regardless of the requirements of Subsection 3, the Danish Maritime Authority may permit special doors to be opened if, in the opinion of the master of the vessel, this is necessary for the operation of the vessel and provided that the safety of the vessel is not thereby impaired.

3 Watertight doors fitted internally to divide large cargo holds shall be closed before the voyage commences and shall be kept closed at sea; the times of opening of these doors in port and of closing them before sailing shall be entered in the ship's log.

4 The use of access doors and hatch covers to ensure the watertight integrity of internal openings shall be authorised by the officer in charge.

Section I B Freeboard conditions and load lines

Rule 16 Freeboard conditions

1 Cargo ships covered by this section shall maintain a level of safety which satisfies the criteria of the Load Line Convention.

2 Freeboards are assigned according to the criteria of the Load Line Convention, taking into account the vessel's hull strength, stability, buoyancy and trade area.

3 The freeboard shall be determined from a table freeboard of 200 mm and corrected by the relevant parameters of the Load Line Convention. Where parameter values cannot be derived directly from the Load Line Convention, values used for vessels of 24 m in length shall be used.

4 Freeboard as determined in accordance with Subsections 2 and 3 shall not normally be less than 150 mm, except that in special circumstances and having regard to the season and duration of the voyage, a smaller freeboard may be permitted, but in no case shall it be less than 50 mm.

Rule 17 Exemptions

1 In addition to the exemptions provided for in Article 6 of the Load Line Convention, the Danish Maritime Authority may permit an exemption from the provisions of this section if, for each vessel, the allocated trade area together with any other operational limitations, would result in such protected conditions of navigation that the full application of the provisions would be unreasonable or unnecessary.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 Such deviations shall not entail any relaxation in relation to equivalent provisions for cargo vessels of less than 15 m in length.

Rule 18 Protection of the crew

1 Measures for the protection of the crew as specified in Rules 25(4), 26(2) and (3) of the Load Line Convention shall be carried out in accordance with the rules of a recognised organisation, as well as IACS interpretations and guidelines.

Rule 19 Marking

1 The deck line and load line markings shall be as specified in the Load Line Convention, but without the letters D-L. For small vessels, the load line mark may be of a smaller diameter, but not less than 200 mm in outside diameter.

2 The bow and stern shall be marked with draught marks in decimetres on both sides. The marks are placed as close as possible to the perpendicular.

Rule 20 Surveys and certificates

1 The freeboard conditions appear in connection with the surveys of cargo vessels referred to in Section 10(1)

2 The minimum freeboard shall be indicated on the national cargo vessel safety certificate referred to in Section 11.

Chapter 2

Stability and seaworthiness

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Special requirements for sand pumps

1 Sand pumps shall meet the stability criteria of the general loading conditions and also of the following special loading conditions:

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

1.1 Light ship with stores and 10% bunker.

1.2 100% bunker, no cargo.

1.3 10% bunker, water in cargo box to widest point.

1.4 10% bunker, water to top of cargo box.

1.5 10% bunker, 1/3 sand cargo, water to top of cargo box.

1.6 10% bunker, 2/3 sand cargo, water to top of cargo box.

1.7 10% bunker, cargo box filled with sand.

1.8 70% bunker, cargo box filled with sand.

1.9 In Subsections 1.3, 1.4, 1.5 and 1.6, the free surface effect of the water in the cargo box is taken into account.

2 For excavation work where, for example, mud is present, the full free surface effect of the load must be taken into account. The specific gravity of mud or the like is set at 1.5.

3 For sand pumps, the stability information shall draw the attention of the master to the fact that the sand cargo shall be drained by bottom suction when sailing in rough weather.

Rule 3 Damage control plans

1 For the guidance of the officer in charge, plans shall be kept at all times showing clearly the boundaries of the watertight compartments, the openings therein with means of closure and the position of any controls. This information shall also be included in the vessel's stability information.

2 Where watertight doors are permitted to remain open during navigation, these shall be clearly indicated in the vessel's stability information.

3 General precautions shall consist of a list of equipment, conditions and operational procedures considered by the Danish Maritime Authority to be necessary to maintain the watertight integrity of the ship during normal operation.

4 Special precautions shall consist of a list of actions (e.g., closing, securing cargo, investigating alarms, etc.) which are considered by the Danish Maritime Authority to be essential for the survival of the vessel, passengers and crew.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Chapter 3

Machinery and electrical installations

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 General

1 Propeller shaft systems and rudder systems shall be sized in accordance with the rules of a recognised organisation.

2 There must be a drainage tray around the filling pipe.

3 Filters, water separators with reserve shall be provided in the fuel oil system so that engine operation can be maintained.

4 There shall be at least 2 independently driven bilge pumps. There shall be emergency bilges directly from the engine room.

5 Emergency control instructions shall be available on the bridge and in the steering engine room.

6 There shall be at least 2 sea filters to allow for continued operation.

7 Other electrical distribution systems are accepted if they comply with the rules of a recognised organisation

8 Unattended engine rooms shall be constructed in accordance with the rules of a recognised organisation.

9 The emergency source of electrical power shall be capable of supplying the items specified in Annex 3, Rule 12(12.2) for a period of at least 12 hours. In vessels with reduced trade areas, less capacity may be accepted.

Chapter 4

Fire protection, fire detection and fire extinguishing

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issued by the Danish Maritime Authority*

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

3 The provisions of this Chapter shall not apply to tanker ships. Tanker ships shall comply with the provisions of the Order on the construction and equipment of ships, etc., implementing the International Convention for the Safety of Life at Sea (SOLAS)

4 If the design or use of a cargo vessel deviates from the principles underlying the drafting of these rules, the Danish Maritime Authority may make the issue of a trading permit conditional on the vessel complying in whole or in part with the rules applicable to cargo vessels in the Order on the construction and equipment of ships, etc, implementation of the International Convention for the Safety of Life at Sea (SOLAS), Chapter II-2.

Rule 2 Structural fire protection

1 In engine room bulkheads, decks and sides of the ship shall be fire insulated to 300 mm below the minimum draught, to the equivalent of class A-30.

1.1 In steel vessels the fire insulation shall be carried out with insulation materials documented as type approved for use in steel structures. Type approval in the form certification marked (the 'wheelmark') mounted equipment is accepted immediately.

1.2 In aluminium vessels, the fire insulation shall be carried out with insulation materials documented as type approved for use in aluminium structures. Type approval in the form certification marked (the 'wheelmark') mounted equipment is accepted immediately.

1.3 In vessels of combustible material, fire insulation shall be provided by insulation materials documented as type approved for use in structures of that material.

1.3.1 In the absence of documented insulation materials, the Danish Maritime Authority may accept that fire insulation is carried out with insulation materials documented as type approved for steel or aluminium structures respectively. In this case bulkheads, decks and sides of the ship shall be fire insulated to 300 mm below the minimum draught, to the equivalent of class A-60.

2 The number of skylights, doors, ventilators, openings in funnels for exhaust ventilation and other openings to engine rooms shall be limited to the extent compatible with the ventilation requirements and the safe operation of the ship.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2.1 Openings in engine rooms must not contain glass partitions.

2.2 Doors to engine rooms shall be self-closing class "A" doors.

3 The galley shall be enclosed with non-combustible bulkheads and ceilings corresponding to class B-15.

4 All insulation materials must be non-flammable.

5 The use of flammable materials shall be minimised in all living quarters, service rooms, control rooms and engine rooms.

6 Where cables, pipes, ducts and similar conduits pass through 'A' or 'B' class divisions, measures shall be taken to ensure that the fire resistance is not impaired.

7 Vessels regularly carrying up to 12 passengers shall be constructed of steel or equivalent.

7.1 The Danish Maritime Authority may permit the use of other suitable materials when the conditions, taking into account the particular circumstances of the individual vessel, otherwise warrant this.

8 The installation of an open sprinkler system in the living quarters may be equivalent to the requirement that the vessel be constructed of steel or equivalent. An open sprinkler system may be a manually operated sprinkler system with open nozzles permanently connected to the ship's fire main, if the capacity of the fire pumps is sufficient to supply water to both the sprinkler system and the fire hydrants simultaneously.

8.1 Conditions relating to low flame spread surfaces shall be in accordance with the Fire Test Procedures Code.

8.2 Provisions for bottom layer deck covering shall be in accordance with the Fire Test Procedures Code.

8.3 Conditions for paints, varnishes and other surface materials used on exposed interior surfaces shall be in accordance with the Fire Test Procedures Code.

9 At least 2 firefighting appliances shall be provided if the minimum crew complement is 3 or more persons.

10 There shall be at least 2 fixed fire pumps, one of which shall be independent of the engine room.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

11 If the ship is to carry dangerous goods, it shall comply with the requirements of Section G, Chapter II-2 of the Order on the construction and equipment of ships, etc., implementing the International Convention for the Safety of Life at Sea (SOLAS).

12 Installations with bottled gas are not accepted.

Chapter 5

Rescue equipment and arrangements

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2

1 Floatation suits

1.1 There must be approved floatation suits on board for everyone.

1.2 Floatation suits shall be stowed in the vicinity of the life-saving devices and, as far as possible, so that they are accessible from the open deck. Floatation suits must not be stored in compartments.

2 Lifebuoys

2.1 Cargo vessels with a length of 15 m and more shall carry 3 approved lifebuoys. One of the lifebuoys shall have an approved floating self-activating smoke flare with an electric light and shall be positioned so that it can be easily released from the bridge. The other two lifebuoys must be fitted with a line of at least 27.5 m that can float on the water. One lifebuoy with a line shall be positioned forward in the ship and the other shall be positioned as far aft as possible.

3 Life rafts

3.1 Cargo vessels with a length of 15 m and more shall carry at least 2 SOLAS-approved life rafts with a total capacity to accommodate at least 200% of all persons on board. Rafts shall, as far as possible, be placed with at least one raft with capacity to accommodate all persons on board on each side of the ship.

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*Order no. 2447 of 13 of December 2021
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4 Pyrotechnics

4.1 Cargo vessels with a length of 15 m or more shall carry at least 6 approved parachute flares emitting red light.

5 Evacuation training and drills

5.1 In cargo vessels of 15 m in length and above or with a scantling number of 100 or above, it shall be checked weekly that all life-saving and fire-fighting equipment is on board at the positions specified in the fire and safety plan. Information on weekly inspections shall be recorded in the ship's log or other appropriate management system.

6 An arrangement shall be established to ensure that persons who fall overboard can be rescued and brought back on board. This arrangement shall also be operational if the cargo vessel's duties restrict its manoeuvrability so that the cargo vessel is unable to manoeuvre to the person overboard immediately after the MOB situation is recognised.

Chapter 6

Emergency procedures, musters, and drills

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2

1 In cargo vessels of 15 metres in length and above or with a scantling number of 100 or above, it shall be checked weekly that all life-saving and fire-fighting equipment is on board at the positions specified in the fire and safety plan. Information on weekly inspections shall be recorded in the ship's log or other appropriate management system.

Chapter 7

Radio communications

Rule 1 Scope

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1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Radio equipment

1 Vessels of 15 metres in length and above or a scantling number of 100 metres and above shall be fitted with radio equipment as shown in the table below:

| Sea area | VHF-DSC | MF-DSC | HF-DSC | EPIRB Float-free | SART | Portable VHF | NAV-TEX |
|----------|---------|--------|--------|---------------------|------|-----------------|---------|
| A1 | 1 | | | 1 | 1 | 1 ¹⁾ | 1 |
| A2 | 1 | 1 | | 1 | 1 | 1 ¹⁾ | 1 |
| A3 | 1 | 1 | 1 or 1 | 1 | 1 | 1 ¹⁾ | 1 |

Required equipment

When sailing in international waters, 2 portable VHF shall be carried on board, in national waters at least 1 portable VHF.

Chapter 8

Safety of navigation

Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Navigational equipment

1 For the purposes of this Chapter, "approved equipment" means equipment which meets the performance standards established by the Organisation.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

2 All ships shall be fitted with a direction finder and means shall be fitted to correct courses and bearings to true at any time.

3 All ships with a GT over 150 shall have an approved radar reflector.

4 All ships with a GT over 300 shall be fitted with an Automatic Identification System Class A.

5 All ships shall have a bridge alarm meeting, as a minimum, the technical and operational requirements of the IMO performance standards. In ships with self-steering or route control systems, the bridge alarm shall be connected when this equipment is used. In ships without self-steering or route control systems, the bridge alarm shall be connected when the ship is out of port or protected anchorage.

6 All ships shall have a set of fixed electric emergency lights fitted for the top, side, stern lights as prescribed in the International Navigation Regulations for the type of ship concerned.

Rule 3 International signal book and IAMSAR manual

1 All ships of 15 metres in length and over shall carry the International Code of Signals, as may be amended by the Organisation.

2 All ships with a trading permit in areas beyond F3 shall carry a copy of the IMO Maritime terms.

3 All ships with a trading permit for other than F3 shall carry an updated edition of Volume III of "The International Aeronautical Maritime Search and Rescue (IAMSAR) Manual".

Rule 4 Electromagnetic compatibility

1 All electronic equipment on or near the bridge of ships shall be tested for electromagnetic compatibility, taking into account the recommendations adopted by the Organisation.

2 Electrical and electronic equipment shall be installed so that electronic interference does not prevent navigation systems from operating effectively.

3 Transportable electrical and electronic equipment shall not be used on the bridge if it may interfere with the effective operation of navigation systems and equipment.

Chapter 9

Transport of dangerous goods and dangerous cargo

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Rule 1 Scope

1 This chapter applies to new cargo vessels of length L of 15 to 24 m and having a scantling number of 100 or above.

2 Unless otherwise provided, this section applies to all ships carrying packaged dangerous goods which are subject to this Order.

3 The provisions of this Chapter shall not apply to the stores and equipment of ships.

4 The transport of packaged dangerous goods shall be carried out only in accordance with the provisions of this Chapter.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Definitions

1 For the purposes of this Chapter, unless otherwise expressly provided, the following shall apply:

1.1 IMDG Code: the International Maritime Dangerous Goods Code, adopted by the Maritime Safety Committee of the Organisation by Resolution MSC. 122(75), as may be amended by the Organisation.

2 Dangerous goods: substances, materials and articles covered by the IMDG Code.

3 Packaged form: use of the form of packaging specified in the IMDG Code.

Rule 3 Requirements for the carriage of dangerous goods

1 The carriage of packaged dangerous goods shall be in accordance with the prescribed provisions of the IMDG Code.

1.1 The latest amendment to the IMDG Code adopted by the Organisation and in force shall be used, except that the latest adopted version of the IMDG Code may be used for an implementation period of 1 year before it enters into force internationally.

1.2 Relevant extracts from the IMDG Code with the latest amendments¹⁾ As well as the guidelines established in addition to the IMDG Code with the latest amendments²⁾ For handling emissions (Emergency Schedules Guide - Ems) and first aid (Medical First Aid Guide - MFAG)) must be available on board all ships carrying packaged dangerous goods. The mentioned rules and guidelines may be available in physical or electronic format.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Rule 4 Documents

1 In all documents concerning the carriage by sea of packaged dangerous goods, the proper shipping name of the goods shall be used. Trade names alone may not be used. The correct description is given in accordance with the classification given in the IMDG Code.

2 The transport documents drawn up by the shipper shall include or be accompanied by a signed certificate or declaration to the effect that the consignment to be transported is properly packed, labelled and marked with warning labels and is suitable for transport.

3 The person(s) responsible for the packing/loading of dangerous goods in transport units³⁾ must issue a signed container/vehicle packing certificate. The certificate or declaration proves that the cargo in the unit is properly packed and secured and that all relevant transport regulations are met. The certificate or declaration may be combined with the document referred to in Subsection 2.

4 A transport unit carrying dangerous goods shall not be loaded if there is reasonable doubt that the requirements of Subsections 2 and 3 have been complied with. Loading shall also be refused if a container/vehicle package certificate for the transport unit cannot be presented.

5 A special list or manifest, conforming to the classification in accordance with the provisions of the IMDG Code, shall be prepared for each ship carrying packaged dangerous goods. The list or manifest shall contain information on the dangerous goods and their location on board. A detailed stowage plan indicating the dangerous goods on board - identified by class and location - may be used instead of such a special list or manifest. A copy of one of these documents must be made available - before departure - to the person or organisation designated by the port state authority.

6 In ships carrying packaged dangerous goods, information on the goods and the measures to be taken in the event of an accident involving the goods shall be available to the crew.

7 Reference to documents in this rule does not preclude the use of digital systems to assist with paper documentation.

Rule 5 Reporting incidents involving dangerous goods

1 When an incident involving the loss or likely loss of packaged dangerous goods overboard at sea occurs, the master or other person in charge of the ship shall report the details of such incident without delay and to the fullest extent possible to the nearest coastal State. Reporting shall be based on the guidelines and general principles adopted by the Organisation⁴⁾.

2 In the event of the abandonment of the ship referred to in Subsection 1, or in the event of a report from such a ship being incomplete or unobtainable, the shipowner shall assume to the greatest extent possible the obligations imposed on the master by this rule.

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*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

Chapter 10

Transport of dangerous cargo

Rule 1 Scope

1 This Chapter applies to carriage of cargo (except liquids in bulk, gases in bulk and those types of carriage covered by other Chapters) which, because of the special hazards they present to ships and persons on board, may require special precautions for all ships covered by these regulations and for cargo ships of less than 500 gross tonnage. However, for cargo ships of less than 500 gross tonnage, the Administration may take other effective measures to ensure the required level of safety if it considers that the voyage is taking place in such sheltered conditions that the application of one or more of the provisions of Section A or B of Chapter VII of the Order on the construction and equipment of ships, etc., would be inappropriate, implementing the International Convention for the Safety of Life at Sea (SOLAS), would be unreasonable or unnecessary.

2 Existing cargo vessels with a length of 15 to 24 m shall comply with the applicable provisions.

Rule 2 Cargo information

1 The consignor shall provide the master or its representative, in good time before loading, with the necessary information to enable procedures to be initiated for the safe stowage and carriage of cargo. Such information²⁾ shall be documented in writing in physical or electronic form and by appropriate ship documentation in good time before loading commences.

2 Cargo information must include:

2.1 For general cargo and for cargo carried in units, a general description of the cargo, the gross mass of the cargo or unit and any special characteristic of the cargo. In applying this rule, the cargo information required by CSS Code Section 1.9, as amended, shall be duly used.

2.2 In the case of bulk cargoes, information on the stowage factor of the cargo, the trim procedures, the assessment of the probability of the cargo slipping and the final angle of heel of the cargo, if applicable, and any other relevant special characteristic. In the case of a concentrate or other cargo which may change from solid to liquid form, also a certificate giving information on the moisture content of the cargo and the limit value for moisture content during carriage;

2.3 In the case of a bulk cargo not classified in accordance with the IMDG Code as defined in Chapter 9, Rule 2, but having chemical properties which may give rise to a potential hazard, information in addition to that mentioned in this section describing those chemical properties.

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*Order no. 2447 of 13 of December 2021
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3 Before loading cargo units, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass indicated in the ship's documents.

Rule 3 Oxygen analyses and gas detection equipment

1 When carrying a bulk cargo which may emit toxic or flammable gases or which may cause a reduction in the oxygen content of the cargo holds, measuring equipment shall be carried on board which is capable of measuring the concentration of gases or oxygen in the air. There shall also be detailed instructions for the use of such equipment. The measuring equipment shall be maintained and calibrated in accordance with the manufacturer's instructions and be fit for purpose.

2 The shipowner shall ensure that ship's personnel are trained in the use of such equipment.

Rule 4 Use of pesticides in ships ⁶⁾

1 Appropriate precautions must be taken when pesticides are used on ships, particularly in connection with fumigation.

Rule 5 Stowage and securing

1 Cargoes, cargo units and transport units carried on or below deck shall be stowed and secured in such a way as to prevent, during the voyage, damage to the ship or persons on board or loss of cargo overboard.

2 Cargoes, cargo units and transport units shall be packed and secured in the unit in such a way as to prevent damage or other danger to the ship or persons on board.

3 Due precautions shall be taken during the loading of heavy cargo or cargo of abnormal physical dimensions to ensure that no damage is done to the ship's structure and that adequate stability is maintained throughout the voyage.

4 Due precautions shall be taken during the loading and carriage of cargo units and transport units on ro-ro ships, in particular with regard to lashing arrangements on such ships, cargo units and transport units and with regard to the strength of lashing points and lashings.

5 Freight containers shall not be loaded to more than the maximum permissible gross weight; this is indicated on the Safety Approval Plate in accordance with the provisions of the International Convention for Safe Containers (CSC), as amended.

Translation: Only the Danish document has legal validity.

*Order no. 2447 of 13 of December 2021
issued by the Danish Maritime Authority*

¹⁾ The draft Order has been notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (codification).

¹⁾ A bridge or poop is considered closed only if there is alternative access for the crew to machinery and other workplaces inside these superstructures from any point on the upper, complete, exposed deck or higher up. Such access must always be available when openings in bulkheads are closed.

²⁾ See the definition in Section 3(15).

³⁾ See the definition in Section 3(15).

¹⁾ Waters north of 56° N in the Baltic Sea and north of the limit defined by 62° N from the west coast of Norway to 4° W, then 4° W to 60° 30' N, then 60° 30' N to 5° W, then 5° W to 60° N, then 60° W to 60° N, N to 15° W, then 15° W to 62° N, then 62° N to 27° W, then 27° W to 59° N, then 59° N west to and along the line running from 63° N, 28° W to 43° N, 48° W, then 43° N, bounded on the west by the coast of North America. Furthermore, all sea areas north of the North American and Asian continents, the Bering Sea, the Sea of Okhotsk, the Strait of Tartary during the ice season and south of 60° S.

¹⁾ Order on fixed CO₂ fire extinguishing systems, Order on the installation and testing of fire extinguishing systems with mixed atmospheric gases in engine rooms of ships, Guideline No. 9654 of 2004 on fixed aerosol fire extinguishing systems, Guidance No. 9514 of 2017 on maintenance and inspection of fixed CO₂ or Guidance on installation of open sprinkler/water mist systems in engine rooms of ships less than 24 metres.

¹⁾ Such rescue signals are described in the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) Volume III, Mobile Facilities and illustrated in the International Code of Signals, as amended in accordance with Resolution A. 80(IV).

²⁾ The international unit of measurement for barometric pressure is the Hectopascal (hPa), which is the numerical equivalent of the millibar (mbar).

¹⁾ Reference is made to the IMDG Code adopted by the Organisation by MSC resolution 122(75).

²⁾ Please refer to 1. The Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide) (MSC/Circ. 1025); and 2. The Medical First Aid and the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) (MSC/Circ. 857) published by the Organisation.

³⁾ Reference is made to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants, adopted by the Organisation by resolution A. 851(20).

⁴⁾ Reference is made to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants, adopted by the Organization by resolution A. 851(20).

⁵⁾ Please refer to MSC/Circ. 663, Form for cargo information.

⁶⁾ Reference is made to the IMO recommendation, Safe Use of Pesticides in Ships, as amended.