Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels[1]

In pursuance of section 1(2), sections 3 to 5, section 17(5), section 28 and section 32(4) in the act on safety at sea, cf. consolidated act no. 654 of 15 June 2010, and pursuant to decree no. 882 of 25 August 2008 on the entry into force for Greenland of the act on safety at sea and after consultation with the Government of Greenland and upon authorisation, the following is laid down:

Section 1. This technical regulation shall apply to small commercial vessels as defined in regulation 1 of chapter I and to companies or persons in Denmark carrying out conversions of fishing vessels.

Section 2. Detailed regulations on the construction and equipment, etc. of small commercial vessels are printed as separate parts as annexes to this technical regulation.

Subsection 2. The chapters are:

Chapter I	General provisions, dated 14 December 2010.
Chapter II	Construction, watertight integrity and equipment, dated 1 October 2006.
Chapter III	Stability and associated seaworthiness, dated 14 December 2010.
Chapter IV	Machinery and electrical installations, dated 1 December 2007.
Chapter V	Fire protection, fire detection, fire extinction and fire fighting, dated 14 December 2010.
Chapter VI	Crew protection (working environment and safety, etc.), dated 1 October 2006.
Chapter VII	Life-saving appliances and arrangements, dated 1 October 2006.
Chapter VIII	Emergency procedures, musters and drills, dated 1 October 2006.
Chapter IX	Radiocommunications, dated 1 May 2005.
Chapter X	Safety of navigation, dated 1 October 2006.
Chapter XI	Special provisions for Greenland, dated 1 October 2006.
Chapter XII	Accommodation, dated 1 October 2006.
(Chapters XIII-XX have been reserved for later)	
Chapter XXI	Prevention of pollution by oil, dated 1 October 2006.
Chapter XXII	Prevention of pollution by harmful liquid substances in bulk, dated 1 October 2006. (Reference to Notice B from the Danish Maritime Authority, chapter XXII).
Chapter XXIII	Prevention of pollution by harmful liquid substances carried by sea in packaged form, dated 1 October 2006. (Reference to Notice B from the Danish Maritime Authority, chapter XXIII).
Chapter XXIV	Treatment and storage of sewage, dated 1 October 2006.
Chapter XXV	Prevention of pollution by garbage, dated 1 October 2006.
Chapter XXVI	Prevention of air pollution from ships, dated 14 December 2010.

1) This technical regulation has been notified in draft in accordance with European Parliament and Council Directive 98/34/EC (the Information Procedure Directive), as amended by Directive 94/48/EC.

Annex 1	Contains forms of type certificate as well as checklists and daily checklists. Notice from the Danish Working Environment Authority no. 4.04.12, dated 14 December 2010.
Annex 2	Contains type-approval signs and placards, dated 1 October 2006.

Section 3. Chapters I-V and VII-X contain provisions for the construction and equipment, etc. of small commercial vessels and have been drawn up on the basis of the Nordic Boat Standard with the additions and amendments necessitated by progress and practical experience. Furthermore, the chapters contain relevant provisions from the most recent revision of FAO/ILO/IMO's "Voluntary guidelines for the design, construction and equipment of small fishing vessels".

Subsection 2. Chapter VI contains parts of Council Directive no. 93/103/EEC on minimum health and safety requirements for work on board fishing vessels. With regard to the provisions on medicine chests on small commercial vessels, reference is made to Notice A from the Danish Maritime Authority, chapters IX B and C.

Subsection 3. Chapter XII contains provisions on accommodation and drinking water plants and has been drawn up, among other things, on the basis of the ILO Accommodation of Crews Convention on Fishing Vessels.

Subsection 4. Chapters XXI, XXIV, XXV and XXVI contain provisions on measures to prevent pollution and have been drawn up on the basis of the International Convention for the Prevention of Pollution from Ships (MARPOL, Annexes I, IV, V and VI).

Subsection 5. Chapters XIII-XX are not currently in use.

Subsection 6. Chapters XXII and XXIII contain references to the provisions on measures to prevent pollution stipulated in Notice B from the Danish Maritime Authority, which apply to all vessels carrying harmful substances in liquid or packaged form. The provisions shall not apply to vessels' stores, equipment and ballast water.

Section 4. Equipment for vessels specified in the annexes to this technical regulation may be replaced by equipment carrying the conformity mark in pursuance of the technical regulation on marine equipment.[2]

Section 5. Companies or persons in Denmark carrying out conversions of Danish ships pursuant to chapter 1, regulation 5.2, shall report this to the Danish Maritime Authority.

Section 6. Contraventions of this technical regulation shall be punishable by fine or imprisonment for a period not exceeding one year.

Subsection 2. The punishment may be increased to imprisonment for a period not exceeding two years if

1) the contravention has caused or threatened to cause loss of life or damage to health,
2) bans or orders have previously been issued for the same or analogous conduct, or
3) the contravening party has achieved or sought to achieve financial gain for the benefit of himself or another party by means of the contravention.

[2] Reference is made to the most recent version of the technical regulation on marine equipment, enacting Council Directive 96/98/EC, as amended.

Subsection 3. It shall be considered a particularly aggravating circumstance if the contravention has caused or threatened to cause loss of life or damage to the health of persons under 18 years of age, cf. subsection 2(2)(i).

Subsection 4. If the proceeds of a contravention are not confiscated, particular account shall be taken when determining fines, including additional fines, of the amount of any financial gain achieved or sought to be achieved.

Subsection 5. Liability to punishment may be imposed on companies etc. (juridical persons) in accordance with the rules of chapter 5 of the penal code.

Section 7. If the contravention is covered by the decree on the entry into force of the act on safety at sea in Greenland, measures may be ordered in accordance with the penal code for Greenland.

Subsection 2. The conditions mentioned in section 6(2) and (3) shall be considered especially aggravating circumstances.

Subsection 3. If the financial benefit achieved is not confiscated, cf. section 116(1) of the penal code, special consideration shall be given to the size of the achieved or intended financial benefit when determining the size of the fine, including supplementary fine.

Subsection 4. If the contravener is a company, etc. (legal personalities), the legal personality may be liable to punishment by fine. If the contravener is the State, the Government of Greenland, a municipality, an inter-municipal enterprise covered by section 64 of the act of the Landsting (Greenland Parliament) on municipal councils and village councils, etc. or a village council, the relevant public authority shall be liable to punishment by fine.

Subsection 5. If the person in question does not live in Greenland, or if his tie to Greenland society is of such a rather loose nature that the preconditions for the application of the measures are not present, legal proceedings may be instituted in Denmark or the case may be sent for trial in Denmark.

Section 8. This technical regulation shall enter into force on 1 March 2011. However, chapter XXVI shall enter into force on 1 January 2011.

Subsection 2. The structural requirements of Notice F issued by the Danish Ships Inspection, technical regulation on the construction and equipment, etc. of small commercial vessels, as amended most recently by technical regulation F of 27 July 1995, shall continue to apply to existing ships, unless otherwise stipulated in this technical regulation.

The Danish Maritime Authority, 14 December 2010

Per Sønderstrup / Søren Enemark Jensen

Notice F from the Danish Maritime Authority
The dates of the chapters in the versions from 1 January 2001

Date of signature	**10/11-00**	**27/1-03**	**1/5-05**	**1/10-06**	**14/12-10**			
F I	1/1-01			1/10-06	14/12-10			
F II (1)	1/1-01			1/10-06				
F II (2)	1/1-01			1/10-06				
F III	1/1-01			1/10-06	14/12-10			
F IV	1/1-01			1/10-06				
F V	1/1-01			1/10-06	14/12-10			
F VI	1/1-01			1/10-06				
F VII	1/1-01			1/10-06				
F VIII	1/1-01			1/10-06				
F IX			1/5-05					
F X	1/1-01			1/10-06				
F XI		1/2-03		1/10-06				
F XII	1/1-01			1/10-06				
F XIII-XIX	Reserved for later use							
F XX (Now XX IV)	Reserved for later use							
F XXI	1/1-01							
F XXII*				1/10-06				
F XXIII**				1/10-06				
F XXIV (previous XX)	1/1-01			1/10-06				
F XXV (previous XXIV)				1/10-06				
F XXVI***			1/5-05	1/10-06	14/12-10			
Annex 1				1/10-06	14/12-10			
Annex 2				1/10-06				

* Reference to Notice B, chapter XXII

** Reference to Notice B, chapter XXIII

*** The same as in Notices B, D and E

Introduction

This order consists of a short technical regulation and a number of annexes in the form of chapters.

The technical regulation contains the statutory basis, the application, the penalty and entry into force clauses and a table of chapter contents. The chapters will be enacted by the issuance of a new technical regulation.

Unless otherwise specified in each individual chapter, existing vessels shall only comply with the structural requirements in force when the vessel was constructed. However, derogations from this may be specified in regulations issued subsequently. Thus, replaced parts should not be discarded.

Amendments have been marked by underlined text.

The following chapters have been revised in connection with this revision:

Technical regulation
A new section 5 has been introduced requiring yards and persons in Denmark to report Danish ships subject to conversions to the Danish Maritime Authority.

Chapter F I – General provisions
The new provisions on stability information and draught marks have been introduced in regulation 10 and regulation 14, respectively. Amended text on the dynamometer test has also been introduced in regulation 9.

Chapter F V – Fire protection, fire detection and fire extinction and fire fighting
New provisions have been inserted in regulation 12 on the pressure-testing of CO2 containers.

Chapter F XXVI – Prevention of air pollution from ships
The most extensive amendments in this chapter are stricter requirements on the discharge of SOx and NOx. These requirements become gradually stricter. The first new requirements for stricter SOx discharges enter into force on 1 July 2010 in the special emission control areas, while the first stricter requirements for NOx discharges will enter into force on 1 January 2011. The related IAPP certificates are also amended.

In addition, more lenient requirements have been introduced as regards the designation of the special emission control areas, which means that, in the future, more such areas are expected.

Furthermore, it should be added that the technical NOx Code (which does not form part of Notice B) has also been revised. The related EIAPP certificate has also been amended.

Annex 1
Minor adjustments have been made to the self-monitoring checklists.

General remarks

Unless provided otherwise in each individual chapter, existing vessels shall only comply with the structural requirements in force on the date of construction. Deviations from this may, however, be stipulated in regulations issued subsequently. Consequently, replaced parts should not be discarded.

Council Directive 96/98/EC of 20 December 1996 on marine equipment, as amended, has been enacted in Denmark through order no. 197 of 5 March 2010, and thereby the technical regulation shall apply to equipment required by:

- The International Convention for the Safety of Life at Sea (SOLAS 74).
- The International Load Line Convention, 1966 (ILLC 66).
- The International Regulations for Preventing Collision at Sea, 1972 (COLREG).
- The International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73/78).

Where relevant, marine equipment covered by Notice F from the Danish Maritime Authority may, however, be substituted by equipment that is EU conformity-marked (wheel-marked) under the above-mentioned Directive 96/98/EC, as amended.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter I
General provisions

Regulation 1 – Application

1 Unless expressly provided otherwise, these provisions shall apply to new vessels[1] with a length L below 15 m and a scantling number of or above 20, but below 100, with the exception of:

.1 passenger ships,

.2 ships of war and troopships,

.3 pleasure yachts,

.4 wooden ships of primitive construction (viking ships), and

.5 vessels not mechanically propelled.

2 The provisions of this chapter shall apply to existing ships to the extent that the provisions of other chapters apply to existing ships.

3 Vessels regularly engaged on voyages with up to 12 passengers as well as pilot vessels and coastal lifeboats of a size within the above limits are covered by this technical regulation, but shall, furthermore, comply with the special provisions that apply to these types of vessels.[2]

Regulation 1a – Use of recognised organisations (classification societies)

1 Where the Danish Maritime Authority has not laid down structural regulations in this technical regulation, new vessels shall be designed, constructed and maintained in accordance with the regulations of a recognised organisation.

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1 Fishing vessels with a length L of or above 15 m or a scantling number of or above 100 shall comply with the requirements of Notice E from the Danish Maritime Authority. Other vessels with a length of or above 15 m or a scantling number of or above 100 shall comply with the requirements of Notice B from the Danish Maritime Authority.

2 Cf. technical regulation no. 10 of 2 December 2003 on small vessels carrying a maximum of 12 passengers issued by the Danish Maritime Authority and technical regulation no. 2 of 10 March 2003 on the coastal rescue vessels of the Royal Danish Administration of Navigation and Hydrography.

2 Existing vessels shall be covered by the structural regulations in force at the time of construction, unless provided otherwise in this technical regulation.

3 Where this technical regulation stipulates that vessels shall comply with requirements to the satisfaction of the Danish Maritime Authority, the vessel shall in each individual case also comply with the Danish Maritime Authority's standard or interpretation of the relevant provision. If the Danish Maritime Authority has not laid down standards or interpretations of the relevant regulation, the regulations of a recognised organisation shall apply, where available.

Regulation 1b – Trading areas

1 The trading areas for vessels covered by these regulations – called F1 to F5 – shall be determined individually on the basis of the following principles.[3]

.1 Open vessels may be assigned a trading area within trading areas F1 and F2.

.2 Decked vessels may be assigned a trading area that is appropriate as to safety in consideration of the size, construction and use of the vessel.

.3 Decked vessels with a length of up to 12 m may normally be assigned a trading area within F3.

.4 Decked vessels with a length of up to 15 m may normally be assigned a trading area within F4.

.5 Decked vessels with a length[4] of or above 15 m and with a scantling number below 100 may normally be assigned a trading area within F5.

Regulation 2 – Definitions

For the purpose of this technical regulation, the following definitions shall apply:

1 "Vessel" means any object covered by chapter I, regulation 1, used as a means of transport on water. The definition shall also cover vessels that are normally designated ship, cutter, boat, dinghy or the like.

2 "Decked vessel" means a vessel fully decked or spar-decked, i.e. above the waterline at the deepest operating waterline it is provided with a complete, watertight deck with secure, weathertight means of closing for all openings.

3 "Open vessel" means a vessel that is not a decked vessel. An open vessel may be partly spar-decked.

4 "New vessel" means a vessel for which:

.1 the building or major conversion contract has been placed on or after 1 January 2001,

.2 the building or major conversion contract has been placed before 1 January 2001 and which is delivered after 1 January 2002, or

.3 if there is no building contract, any vessel that is subjected to its first survey on or after 1 January 2001 shall be regarded as a new vessel.

5 "Existing vessel" is a vessel that is not a new vessel, including

.1 vessels covered by the provisions on surveys stipulated in the order on regulations on the construction and equipment, etc. of ships of 21 May 1965, or

.2 vessels covered by the provisions on surveys stipulated in Notice F from the Danish Ship Inspection of 1 April 1984 on the construction and equipment, etc. of small commercial vessels.

6 "Vessel constructed" means a vessel for which:

.1 the building or major conversion contract has been placed before, on or after the date stipulated,

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[3] The special Greenland trading areas are stipulated in chapter XI, regulation 1.

[4] Cf. the definition in chapter I, regulation 2.16.

.2 the keel is laid or construction identifiable with a specific vessel has begun without a building contract, or

.3 assembly of that vessel has commenced comprising at least 1% of the total lightweight.

7 "Fishing vessel" is a vessel used for commercial catching of fish, whales, seals, walrus, shellfish or other living resources of the sea, including vessels that are equipped as fishing vessels and are capable of processing their own catch or whose certificate of nationality is provided with a port number under the ships' registration act.

"Beam trawler" means a fishing vessel arranged for fishing by means of a bottom trawl where the trawl is suspended in a fixed steel frame and where two beams are normally used, which are swung over the side in order to drag to two trawls.

"Mussel fishing vessel" means a special vessel used to catch mussels, oysters, cockles and the like in Danish waters and to which the Danish Directorate of Fisheries under the Danish Ministry of Food, Agriculture and Fisheries has issued a licence.

8 "Passenger ship" means a ship which carries more than 12 passengers.

9 "Pleasure yacht" means a vessel that, irrespective of the means of propulsion, is used for sport or recreational purposes and not for commercial purposes.[5] In case of doubt, the Danish Maritime Authority will decide whether a vessel may be regarded as a pleasure yacht. Hiring out without a master on board or professional training in yachting shall not be regarded as commercial purposes.

10 "Pilot vessel" means a vessel used by a pilot station to carry pilots to and from ships requiring piloting. A vessel that is only occasionally used to carry pilots to or from a ship shall not be regarded as a pilot vessel.

11 "Coastal lifeboat" means a vessel approved in accordance with the special regulations issued by the Danish Maritime Authority regarding such vessels and used by the Danish Maritime Safety Administration.[6]

12 "Tug" means a vessel designed to tow or push other vessels and equipped with hooks, winches, bollards or other similar arrangements.[7]

13 "The length (L)" shall be taken as 96 per cent of the total length on a waterline at 85 per cent of the least moulded depth measured from the keel line, or as the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that be greater. In vessels designed with a rake of keel the waterline on which this length in measured shall be parallel to the designed waterline.

14 "Length overall (Loa)" means the straight-line distance between the foremost point of the stem and the hindmost point of the stern. In these regulations, this length shall be used for fishing vessels, such as the length is evident from the vessel's tonnage certificate.

15 "Length L1" means the length measured from the foreside of the intersection of the plating with the topside of the deck at the stem to the after side of the intersection of the plating with the deck at the stern. On open vessels, the length shall be measured at the topside of the gunwale. In these regulations, this length shall be used for small commercial vessels other than fishing vessels, such as the length is evident from the vessel's tonnage certificate.[8]

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5 Cf. technical regulation no. 4 of 1 May 2004 on the construction and equipment, etc. of recreational craft issued by the Danish Maritime Authority.

6 Reference is also made to the technical regulation on the coastal lifeboats of the Danish Maritime Safety Administration.

7 Reference is also made to technical regulations on towing and anchor-handling winches as well as towing hooks.

8 Cf. Council Regulation 2930/86/EEC of 22 September 1986 on the characteristics of fishing vessels, as amended by Council Regulation 3259/94/EEC of 22 December 1994.

16 In these regulations, "length" without any other designation means the "length overall" for fishing vessels and the "length L1" for other small commercial vessels, such as the length is evident from the tonnage certificate of each individual vessel.

17 "Breadth B" means the maximum breadth of the vessel, such as it is evident from the vessel's tonnage certificate.[4) 5)]

18 "Scantling number" means the length overall multiplied by the breadth of the vessel (Loa x B) for fishing vessels. For other small commercial vessels it is the length L1 multiplied by the breadth (L1 x B).

19 "The moulded depth" is the vertical distance measured amidships from the keel line to the top of the working deck beam at side.

In vessels having rounded gunwales, the moulded depth shall be measured to the point of intersection of the moulded lines of the deck and side shell plating, the lines extending as though the gunwale were of angular design.

Where the working deck is stepped and the raised part of the deck extends over the point at which the moulded depth is to be determined, the moulded depth shall be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part.

20 "Deepest operating waterline" means the waterline related to the maximum permissible operating draught.[9]

21 "Light waterline" means the waterline of the vessel without load, persons, ice and fishing tackle, but with stores and 10% bunker.

22 "Amidships" means the mid-length of the length Loa for fishing vessels and L1 for other small commercial vessels.

23 "Midship section" means that section of the hull defined by the intersection of the moulded surface of the hull with a vertical plane perpendicular to the waterline and centreline planes passing through amidships.

24 "Keel line" is the line parallel to the slope of keel passing amidships through:

.1 the top of the keel or line of intersection of the inside of shell plating with the keel where a bar keel extends above that line of a vessel with a metal shell; or

.2 the rabbet lower line of the keel of a vessel with a shell of wood or a composite vessel; or

.3 the intersection of a fair extension of the outside of the shell contour at the bottom with the centreline of a vessel with a shell of material other than wood or metal.

25 "Baseline" is the horizontal line intersecting at amidships the keel line.

26 "Freeboard" is the vertical distance measured amidships on the shell contour from the deepest operating waterline to the upper edge of the working deck in the side.

27 "Working deck" is generally the lowest complete deck above the deepest operating waterline from which fishing is undertaken. In vessels fitted with two or more complete decks, the Danish Maritime Authority may accept a lower deck as a working deck provided that that deck is situated above the deepest operating waterline.

28 "Weather deck" is a deck exposed to the weather and the sea from above and from at least one side.

29 "Superstructure" is the decked structure on the working deck extending from side to side of the vessel or with the sides' plating not being in board of the shell plating more than 0.04 X B.

30 "Enclosed superstructure" is a superstructure with:

.1 enclosing bulkheads of efficient construction;

.2 access openings, if any, in those bulkheads fitted with permanently attached weathertight doors of a strength equivalent to the unpierced structure which can be operated from each side; and

.3 other openings in sides or ends of the superstructure fitted with efficient weathertight means of closing.

A bridge or poop shall not be regarded as enclosed unless access is provided for the crew to reach machinery and other working spaces in these superstructures from any place on the upper, complete, exposed deck or higher up by alternative means which are available at all times when bulkhead openings are closed.

31 "Superstructure deck" is that complete or partial deck forming the top of a superstructure, deckhouse or other erection situated at a height of not less than 1.8 metres above the working deck. Where this height is less than 1.8 metres, the top of such deckhouses or other erections shall be treated in the same way as the working deck.

32 "Height of a superstructure or other erection" is the least vertical distance measured at side from the top of the deck beams of a superstructure or an erection to the top of the working deck beams.

33 “Structural regulations” means regulations on the design, construction and maintenance of hull, anchor and mooring equipment, towing hooks, machinery, boilers, all other technical installations and electrical installations, including regulations on strength and material dimensions.

34 “Machinery spaces” means spaces forming part of the vessel’s construction in which combustion engines for propulsion and/or oil-fired boilers for central heating are installed, except for small oil-fired boilers of the pot furnace type and the like, or spaces where combustion engines for other purposes than propulsion are found with a total output of at least 375 kW.

35 "Weathertight" means that in any sea and weather conditions water will not penetrate into the vessel.

36 "Watertight" means capable of preventing the passage of water through the structure in any direction under a head of water for which the surrounding structure is designed.

37 "Poundboard" means a space or container for stowage of the catch or fishing tackle and may consist of fixed or portable stanchions and portable boards or side plates.

38 "Bin" means a space or container in which the catch is placed when brought on board. A bin may be a space permanently built into the hull or it may be designed as a poundboard.

39 "Concrete assessment" means that the Danish Maritime Authority has approved the relevant method, execution, design or use of the material involved at the planning stage and, if necessary, at a subsequent survey.

40 "Approved" means approved by the Danish Maritime Authority or approved in accordance with Council Directive no. 96/98/EC, as amended by Commission Directive no. 98/85/EC, Directive no. 2001/53/EC and 2002/75/EC. Equipment that has been assessed for conformity and wheel-marked in accordance with the Directive mentioned,[10] as amended, has been approved. More detailed regulations on the acquisition of type-approval, including both technical requirements and requirements for

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9 The draught at the deepest operating waterline shall not be greater than the structural draught used for dimensioning the hull. For fishing vessels, the structural draught shall in general be equal to the moulded depth since there is no requirement for a minimum freeboard on these vessels.

10 Reference is made to the latest version of the technical regulation on marine equipment implementing Council Directive no. 96/98/EC, as amended.

marking, testing procedures, etc., shall be laid down for each individual type of equipment. General regulations on this shall be published in Notices from the Danish Maritime Authority.

41 "Crew" means the master of the ship and everyone employed or active on board a vessel in connection with its operation.

42 "Passenger" means every person on board older than one year except for the master of the ship and other members of the crew.

43 "GRP" means glassfibre reinforced polyester and is the standard Danish abbreviation for glassfibre vessels.

44 "Classification society" means an organisation recognised by the Danish Maritime Authority in accordance with the provisions of Council Directive no. 94/57/EC, as amended by Commission Directive no. 97/58/EC, and Directive of the European Parliament and the Council no. 2001/105/EC, which carries out inspections and surveys of ships on behalf of the Danish Maritime Authority.

45 "Trading area" means the sea area for which the vessel has been constructed, equipped and fitted out.

46 "Trading area F1" means trade within 2 nautical miles from the nearest coast within the lines of Skaw-Vinga and west of 16 easterly longitude in the Baltic as well as along the west coast of Jutland.

47 "Trading area F2" means trade within 10 nautical miles from the nearest coast within the lines of Skaw-Vinga and west of 16 easterly longitude in the Baltic as well as along the west coast of Jutland.

48 "Trading area F3" means trade within 30 nautical miles from the nearest coast within the lines of Skaw-Vinga and west of 16 easterly longitude in the Baltic as well as along the west coast of Jutland.

49 "Trading area F4" means trade within the lines east of 6° easterly longitude in the North Sea and south of 58° northerly latitude in the Baltic.

50 "Trading area F5" means trade in the North Sea east of 4 westerly longitude, south of 62 northerly latitude and south of 56 northerly latitude in the Baltic.

Regulation 3 – Exemptions

This regulation shall apply to new and existing vessels.

1 The Danish Maritime Authority may exempt any vessel fully or in part from the provisions in these regulations if it considers the use hereof unreasonable and impractical considering the distance between the vessel's working area and its base port, its type, the weather conditions and the navigational risks, provided that the vessel complies with the safety requirements which, in the opinion of the Danish Maritime Authority, are adequate for the service for which it is intended and are such as to ensure the overall safety of the vessel.

2 It is not be possible to bring decisions made by the Danish Maritime Authority before a higher administrative authority. However, the Danish Shipping Tribunal is the appeals body when a vessel has been detained.

Regulation 4 – Equivalence and test provisions

This regulation shall apply to new and existing vessels.

1 The provisions of this technical regulation shall not preclude the use on board of other equipment, material, fittings, apparatuses, etc. or the implementation of other measures or that the vessel is designed or constructed in another way if the Danish Maritime Authority is satisfied, by trial thereof or otherwise, that any such fitting, material, appliance or apparatus or type thereof or measure or design or construction is at least as effective and represents at least the same degree of safety as that required by this technical regulation.

2 The Danish Maritime Authority shall accept tests carried out by recognised test institutes, including test institutes in other EU member States as well as in countries parties to the Agreement on the European Economic Area and in Turkey, and providing suitable and satisfactory guarantees of a technical, expert and independent nature.

Regulation 5 – Repairs, alterations and modifications

This regulation shall apply to new and existing vessels.

1 A vessel which undergoes repairs, alterations or modifications shall continue to comply with at least the requirements previously applicable to the vessel. This applies to, for example, repairs, replacements and minor improvements exclusively made due to wear and tear, corrosion, putrefaction, damages as well as general maintenance that does not change the construction or arrangement. This also applies to re-buildings the purpose of which is exclusively to increase the survivability of a vessel, for example through improvements of the stability conditions, structural fire-protection, outlook or the like.

2 Repairs, alterations and modifications of a major character[11] and outfitting related thereto shall meet the requirements for new vessels only in so far as the Danish Maritime Authority deems reasonable and practicable. However, this shall apply in full to life-saving appliances and other equipment.

3 Any alteration of a vessel's type, such as a rebuilding of a cargo vessel into a fishing vessel or passenger ship, shall mean that the entire vessel is to comply with the provisions on a new vessel of the type into which it is converted.

4 Any change of a vessel's trading area from sheltered to less sheltered waters shall mean that the entire vessel is to comply with the provisions on a new vessel in the new trading area. However, changes into a previously approved less sheltered trading area will mean that only the equipment requirements for new vessels shall be met.

Regulation 6 – Approval, surveys and self-monitoring

The provisions of this regulation shall apply to new and existing vessels.

1 The approval of drawings, surveys and inspections of vessels shall, in so far as the enforcement of the provisions of these regulations is concerned, be made by the Danish Maritime Authority. However, the Danish Maritime Authority may delegate surveys and inspections to nominated surveyors or recognised organisations.

2 It is the duty of the owner, if relevant through a yard or consultant, to report a ship for survey and to have a measurement carried out by an authorised surveyor.

3 When a nominated surveyor or recognized organization determines that the condition of a vessel or its equipment is such that the vessel is not fit to proceed to sea without danger to the vessel or persons on board, such surveyor or organization shall immediately ensure that corrective action is taken and shall immediately notify the Danish Maritime Authority. If such corrective action is not taken, the vessel's

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[11] Repairs, alterations and modifications of a major character as well as equipment related thereto shall include:

Any considerable change of a vessel's main dimensions, for example through extension, a new deck or a new head or stern.

Alterations that, to a considerable extent, change a vessel's capacity, for example in terms of catch-carrying capacity or cargo-carrying capacity.

Alterations that, to a considerable extent, increase the service life of a vessel, for example a complete renovation of an entire machinery space, passenger space on a complete deck or the entire accommodation on a cargo or fishing vessel.

trading permit shall be withdrawn and the Danish Maritime Authority shall be notified immediately. If the vessel is in the port of another Party, the appropriate authorities of the port State shall also be notified immediately.

4 Before the construction of the vessel commences, drawings and calculations or other structural basis of the approval shall be submitted to the Danish Maritime Authority in accordance with the Danish Maritime Authority's guidelines on drawing approval.

5 The drawings, calculations and other structural basis, etc. submitted shall show, in a satisfactory way, the vessel's construction, material dimensions, arrangement, cargo, freeboard, conditions of stability, propulsion machinery as well as the number of persons that the vessel is intended to carry and shall document that the vessel complies with the provisions of this technical regulation.

5.1 Every vessel shall be subjected to the surveys specified below:

.1 An initial survey before the vessel is put into service, either as a new vessel or as purchased from abroad. This initial survey shall be carried out before the trading permit prescribed in regulation 7 is issued for the first time.

Regulations 6.5.1.2-6.5.1.7 and 5.22 shall apply to new and existing Danish fishing vessels. The regulations shall not apply in Greenland.

.2 A renewal survey at intervals of no more than 60 months calculated from the vessels' initial survey after the entry into force of this regulation or the latest renewal survey, however in accordance with regulations 6.5.1.3-6.5.1.7.

.3 Vessels with scantlings of or above 20, but with a LOA below 8 metres shall have been subject to a renewal survey no later than on 1 January 2012.

.4 Vessels with a LOA of or above 8 metres, but below 9 metres shall have been subject to a renewal survey no later than on 1 January 2013.

.5 Vessels with a LOA of or above 9 metres, but below 10 metres shall have been subject to a renewal survey no later than on 1 January 2014.

.6 Vessels with a LOA of or above 10 metres, but below 13 metres shall have been subject to a renewal survey no later than on 1 January 2015.

.7 Vessels with a LOA of or above 13 metres shall have been subject to a renewal survey no later than on 1 January 2016.

.8 Additional surveys at the discretion of the Danish Maritime Authority.

5.2 The above-mentioned surveys shall be carried out as follows:

.1 The initial survey shall include a complete survey of the vessel's structure, stability, machinery, arrangements and material, including the outside of the vessel's hull and the inside and outside of the boilers and equipment in so far as the vessel is covered by the requirements of these regulations. This survey shall be such as to ensure that the arrangements, material, and scantlings of the structure, boilers, and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installations, radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications and other equipment fully comply with the requirements of these regulations. The survey shall also be such as to ensure that the workmanship of all parts of the vessel and its equipment is in all respects

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A number of minor alterations and modifications that, taken together, change the characteristics or capacity of a vessel to a considerable extent.

satisfactory and that the vessel is provided with the lights, means of making sound signals and distress signals required by the requirements of these regulations and the International Regulations for Preventing Collisions at Sea in force.

.2 The renewal survey shall include an inspection of the structure, machinery and equipment as stipulated in paragraph 5.2.1 to ensure that they comply with the requirements of these regulations, are in satisfactory condition and are fit for the service for which the vessel is intended.

.3 An additional survey, either general or partial, shall be made after major repairs, alterations and modifications as described in regulation 5.

.4 Vessels used for specific purposes or with a permit to sail in trading area F5 shall be subjected to a renewal survey at maximum intervals of 48 months calculated from the date of the latest survey.

5.3 Prescribed renewal surveys shall be carried out within a period of three months before the prescribed survey date.

6 Annual self-monitoring shall be carried out on new and existing fishing vessels in accordance with the checklist in annex 1.[12]

7 Vessels built as part of a series of vessels may be type-approved in accordance with the following:

.1 Before the construction of a new type of vessel is commenced that shall be type-approved, drawings and calculations shall be forwarded to the Danish Maritime Authority in accordance with the Danish Maritime Authority's guidance on drawing approval. The material submitted shall contain the information stipulated in paragraph 5 above.

.2 Before a serial production of a vessel is commenced, the prototype shall have been approved, which means that the Danish Maritime Authority or the recognised organization subjects it to an ongoing control during the construction on the basis of the approved drawings, including weighing of the precast GRP hulls, if relevant, and to the tests relevant for this type of vessel. If the results of the surveys and tests stipulated comply with these regulations, the vessel may be type-approved.

.3 The subsequent production of the type-approved vessel will be spot-checked by either the Danish Maritime Authority or a recognised organisation, which shall consequently have free access to the production facilities at any time.

.4 In connection with the initial survey, the manufacturer shall issue a type certificate on the authority of the Danish Maritime Authority, which shall follow the vessel. A copy shall be kept by the manufacturer. Furthermore, the manufacturer shall affix a metal sign with a text as indicated in annex 2 in a place on board the vessel indicated by the Danish Maritime Authority.

.5 The type approval of a vessel shall be valid for as long as each vessel is carefully made in accordance with the conditions stipulated. The Danish Maritime Authority or the recognised organisation that has made the type approval shall be informed about any alteration and decide whether a new approval is required. However, it shall be possible to withdraw the type approval at any time if there are grounds for this after an assessment made by the Danish Maritime Authority or the recognised organisation.

.6 The type approval of each individual type of vessel shall be published in "Notices from the Danish Maritime Authority".

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[12] Check and control forms are found as a separate annex in the appendix.

.7 Before a type-approved vessel is put into service, a final survey, as stipulated in paragraph 5.1 above, shall be made covering the parts of the vessel and its equipment that are not covered by the type-approval.

8 To ensure that the vessel continues in every respect to be fit to go to sea without danger to the vessel or those on board, the vessel and its equipment shall be maintained at all times so as to comply with the requirements of these regulations.[13]

9 On completion of a survey in accordance with these regulations, no modifications may be made without the permission of the Danish Maritime Authority or the recognised organisation to the structure, machinery, equipment or other conditions covered by the survey. However, approved fittings and equipment may be replaced by equivalent approved fittings and equipment.

10 When the vessel is involved in an accident or if a defect is detected and the accident or the defect affects the safety of the vessel or the efficiency or integrity of its life-saving appliances or other equipment, the master or owner of the ship shall as soon as possible notify the Danish Maritime Authority, the appointed surveyor or the recognised organisation responsible for the issuance of the trading permit, which party shall ensure that inspections are carried out to establish whether it is necessary to carry out a survey as required by these regulations. If the vessel is in a foreign port, the master or the owner shall also immediately notify the relevant authorities in this port of the situation.

Regulation 7 – Trading permit, survey book and notices

This regulation shall apply to new and existing vessels.

1 After an initial survey or each renewal survey, a trading permit stating the validity of the trading permit, the vessel's trading area and the maximum number of persons to be carried shall be issued. The trading permit shall be kept on board the vessel together with the tonnage certificate of the vessel.
A trading permit shall remain valid for as long as the conditions of the vessel's use and survey intervals are observed.

2 Vessels covered by these regulations shall carry a survey book and an annex file. The survey book, which is issued by the Danish Maritime Authority, shall be kept in accordance with the instructions printed in the book. A completed survey book shall be kept on board until all necessary information has been transferred from the completed to the new survey book.[14]

3 Vessels covered by these provisions shall, following a concrete assessment made by the Danish Maritime Authority, be provided with signs, notices and markings to an extent appropriate for the size and trading area of the individual vessel.

Regulation 8 – General safety

Sufficiently satisfactory measures shall have been taken to prevent accidents during the normal operation of the vessel so that persons staying or carrying out work on board or boarding or unboarding the vessel are not, insofar as possible, exposed to inadvertent risk of damage.

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13 To ensure seaworthiness, the master of the vessel should, before departure, carry out a control in accordance with the "daily checklist" in annex 1.

14 Cf. order no. 99 of 15 February 2005 on ship's logs and survey books issued by the Danish Maritime Authority. When the master uses the annex file for annexes to the survey book, such as print-outs of computer-registered inspections, tests and drills held, a reference shall be made in the survey book about the annexes inserted and removed.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter II
Construction, watertight integrity and equipment

Regulation 1 – General construction

1 Application

1.1 Unless expressly provided otherwise, this chapter shall apply to new vessels as defined in chapter I.

1.2 A vessel that is converted into another type (use), such as conversion of a cargo vessel into a fishing vessel or passenger ship, regardless of the date of construction, shall be treated as a vessel of that type constructed on the date when such conversion was commenced.

2 Design and construction

2.1 Strength and construction of hull, superstructures, deckhouses, machinery casings, companionways and any other structures and vessel's equipment shall be sufficient to withstand all foreseeable conditions of the intended service.

2.2 Vessels shall be designed, constructed and maintained in compliance with the requirements of a classification society, cf. chapter I, regulation 1a, or comply with the corresponding regulations in this set of regulations.

2.3 Vessels constructed abroad may be approved if they are provided with a certificate verifying that they have been approved and surveyed by a recognised organisation, either in accordance with this technical regulation or in accordance with equivalent rules from this organisation.[1]

2.4 The hull of wooden vessels constructed in Denmark may be constructed in accordance with the guidance on the construction of wooden vessels issued by the Danish Maritime Authority, including the Order of 8 October 1947 previously in force and issued by the Ministry of Trade and Industry. However, the propeller arrangement and rudder dimensions shall be laid down in pursuance of chapter IV, regulation 3, and chapter II, regulation 19. The other provisions of these regulations shall also apply to such vessels.

2.5 For small wooden vessels not covered by the guidance mentioned above, the traditional structure and scantling of Danish-built fishing dinghies shall be used as the basis of each individual vessel.

2.6 The draught for the scantling of hull strength, etc. shall be equivalent to the "moulded depth" as defined in chapter I, or the depth to the gunwale for open vessels.

2.7 Tanks, watertight bulkheads, watertight and weathertight hatchways and doors as well as profile rudders and propeller nozzles, etc. shall be pressure or leak tested in compliance with valid standards and practice by a recognised organisation.

2.8 Corrections and reinforcements for fishing vessels.

.1 Scantling corrections.

All the formulae for thickness and section modulus stipulated in regulation 20 shall be multiplied by a factor for field of application in accordance with the following table:

Factor for field of application for:	**Coefficients:**
Bottom and bilge	1.05
Sides and stern	1.05
Deck and forecastle deck	1.15
Superstructure	1.10
Cut stability in the core of sandwich panels	1.05

.2 Local reinforcements.

In fishing vessels with a length of or above 12 m, constructed on or after 1 January 2007, areas on deck or forecastle, loaded with fishing gear shall be reinforced by an extra thickness (laminated thickness on GRP vessels) and carlings with sufficient strength to absorb the actual load of the fishing gear. Furthermore, GRP vessels shall be reinforced by doubling plates of sufficient stiffness to distribute the effects of the fishing gear. Doubling plates shall be of laminated, waterproof veneer or metal plate primed by epoxy primer or similar before final lamination.

1) Reference is made to the provisions of technical regulation no. 5 of 9 August 2002 issued by the Danish Maritime Authority.

Areas loaded with trawling gear or similar shall be dimensioned for the actual load. Furthermore, GRP, wooden and steel vessels shall be reinforced for local wear and tear. On GRP vessels for trawling with a length of or above 12 m, constructed on or after 1 January 2007, replaceable wear plates shall be fitted in areas where trawls and trawl boards may come into contact with the GRP structure, including the freeboard, the bulwark and the gunwale. The securing of these plates may not mean that the original laminate surface is penetrated.

A required ice-reinforcement may be equivalent to local reinforcements.

Regulation 2 – Bulkheads and watertight subdivisions

1 In decked vessels, engine, cargo and accommodation spaces shall be separated by watertight bulkheads from the bottom to the deck. Steering machinery, tank arrangements and similar located in cargo or stores spaces shall also be shielded by suitable bulkheads. Wooden vessels shall be provided with similar bulkheads, which are watertight, if practicable.

2 Open vessels shall have watertight bulkheads or a machinery casing around machinery installations up to 300 mm above the deepest operating waterline, but not above the upper edge of the gunwale. The same shall apply to openings for air inlets to the engine.

3 In open vessels, it may be acceptable that bulkheads or machinery casings and any floor over the gear are made fully or partly dismountable with a view to maintaining and servicing the engine. Joints and seals at dismountable bulkheads or machinery casings and floor shall have the same strength and watertight integrity as the remaining parts hereof.

4 Where the propeller shaft, pipes, electric cables or starting levers pierce a watertight bulkhead, arrangements shall be made to ensure the watertight integrity of the bulkhead.

Regulation 3 – Ice-strengthening

1 General

1 Vessels holding a trading permit for areas where ice frequently occurs[2] shall be ice-strengthened. All new vessels constructed for or flagged-in for navigation around Greenland shall be ice-strengthened. Wooden vessels shall also be ice-sheathed.

2 Planing or semi-planing vessels and/or vessels provided with a so-called "inboard-outboard drive" instead of a traditional propeller arrangement, as well as vessels with spade rudders or semi-spade rudders shall be granted a permit to sail only in areas that are usually ice-free.

3 It is presupposed that the vessel's speed is reduced suitably when it approaches ice-covered waters. The extent and solidity of ice-strengthening on vessels intended to navigate in ice conditions at a speed exceeding 15 knots shall be considered especially, and the Danish Maritime Authority may make increased demands for the vessel, its equipment, operational conditions, trading areas, etc.

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2) Waters north of 65° 30' northerly latitude, between 28° westerly longitude and the west coast of Iceland; north of the north coast of Iceland; north of the rhomb line running from 66° northerly latitude, 15° westerly longitude to 73° 30' northerly latitude, 15° easterly longitude, north of 73° 30' northerly latitude between the degrees of longitude 15° easterly longitude and 35° easterly longitude, and east of 35° easterly longitude as well as north of 56° northerly latitude in the Baltic, as well as the area north of 43° northerly latitude, bounded to the west of the North American coast and to the east of the rhomb line running from 43° northerly latitude, 48° westerly longitude to 63° northerly latitude, 28° westerly longitude, and from there along 28° westerly longitude.

2 Purpose of the ice-strengthening

1 The purpose of the ice-strengthening in this chapter is:

.1 to prevent damage to the hull and superstructure during navigation in ice;

.2 to prevent damage to the propulsion arrangement, including propellers, propeller shafts and controls (rudders, nozzles and the like) caused by navigation in ice or drifting ice;

.3 to decrease the risk of damage to the vessel's cargo and damage to the environment caused by the occurrence of compact or drifting ice.

3 Functional requirements

1 The formulas and values given in this paragraph/regulation on hull scantlings may be replaced by more exact methods, if approved by the Danish Maritime Authority or a recognised organisation.

2 In order to achieve the purpose of the ice-strengthening as stipulated in paragraph 2 above, the following functional requirements shall be used, where relevant:

.1 It is expected that ice-strengthened vessels are capable of generating sufficient propelling power for continuous navigation through ice of a thickness that may normally be expected in the area, and

.2 The propulsion arrangement, including engine and cooling system as well as controls, shall be designed to function without being damaged during the navigation stipulated in paragraph 3.2.1 in the forward direction as well as in the reverse direction in similar ice conditions at half speed; and

.3 Propelled vessels shall have a sufficient draught for the propeller to be sufficiently covered by water without trimming the vessel in such a way that the actual waterline at the stern is below the light ice-waterline.

4 General regulatory requirements

1 The vertical ice belt area shall cover the shell from 500 mm above the deepest operating waterline to 500 mm below the lightest operating waterline for navigation in ice (ballast waterline). The main ice belt area shall extend horizontally from the stem to 5% of the length overall abaft the point where the deepest operating waterline is widest. Furthermore, the ice belt area shall cover the bottom at a distance of 30% of the Loa measured from the stern's intersection with the light ice-waterline.

2 A transom stern may not normally extend below the deepest operating waterline.

3 On vessels with two or more propellers, propeller shafts and stern tubes shall generally be enclosed in plate bosses. If separate supporting struts are necessary, their design, strength and fastening shall be considered especially.

4 The propeller shaft shall be strengthened so that its diameter is increased by at least 15% in relation to the requirements of chapter IV.

The diameter of the rudder stock shall be increased so that, in the formulas stipulated in regulation 19, it is assumed as a minimum that the rudder power is 25% greater than otherwise stipulated. Bolts in rudder couplings, rudder blades, etc. shall also be strengthened in accordance herewith.

The thickness of the rudder blade and internal blade stiffenings shall be increased by 15% on steel and aluminium vessels and by 50% on GRP vessels.

5 Ice-strengthening shall cover the following general minimum requirements, which shall be used where more comprehensive requirements are not made in connection with individual hull materials.

.1 In the ice belt area, the shell thickness shall be increased to at least:

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

where t is the laminate or the plate thickness pursuant to the construction provisions stipulated in regulations 20, 23 or 25.

.2 The keel shall be strengthened so that its strength (section modulus) is doubled in relation to the other scantling requirements stipulated.

6 The frames shall be strengthened in the ice belt area so that their bending moment is increased by 50% in relation to the other scantling requirements stipulated.

The spacing of frames shall not be greater than 300 mm. If this is the case, ice frames shall be fitted between the ordinary frames within the ice belt area. The ice frames may be stopped by an ice stringer, deck, tanktop or similar longitudinal strengthening, but need not be welded to this (may be cut off obliquely).

7 Built-in fuel tanks may not be located in the side within the ice belt area where they are especially exposed to damages during navigation in ice.

5 Steel and aluminium vessels

1 In the ice belt area, the shell thickness shall be at least:

$t_k = 6+(0.15 \times Lvl)$

or as stipulated in paragraph 4.5.1; the greatest value shall be used.

2 From 25% of the length in the loaded waterline abaft the stem to the stern, the thickness in the ice belt area may not be lower than 6 mm.

3 The stem shall be constructed around a massive profile, which shall start at least 1 m before the end of the keel and be carried at least up to 1 m above the deepest operating waterline. The stern profile (flat steel or round steel bars) shall have a sectional area of at least 1.3 x Loa (cm^2).

4 Stern plates shall have a plate thickness of at least 1.25 x the required shell thickness after the ice-strengthening. The stern structure shall be supported by brackets and/or bow knees with a mutual distance not greater than 300 mm and with a minimum thickness of 8 mm.

5 Where ice stringers in the forepart of a vessel end in the stem, a bow knee shall be fitted. In addition, a bow knee or bracket shall be fitted between the other decks and stringers with a mutual distance as stipulated in paragraph 4.

6 The distance between the main frames in the ice belt area may not exceed 500 mm, the distance between ice frames and main frames may not exceed 300 mm and the section modulus of transversal frames may not be below 15 cm^3. The section modulus of longitudinal frames may not be below 19 cm^3.

7 Flat steel for main and ice frames in the ice belt area should not be used unless special measures have been taken to prevent capsizing, rather a bulb, angle or other profile type should be used.

8 If the distance between the main frames exceeds 300 mm, ice frames shall be fitted between the main frames in the ice area. Unsupported plating in the ice belt area may not exceed 0.3 m^2 (1 x b of the area).

9 In the area from the stem to 25% of the length in the loaded waterline abaft the stem, ice frames shall be carried down to or to the immediate vicinity of the keel.

10 In the area abaft hereof to the stern ice frames shall be fitted in the ice belt area, as stipulated in paragraph 8, if the distance between the main frames is greater than 300 mm, however as a maximum to the deck at the top and to the lowest bend or marked bilge radius at the bilge plate at the bottom.

11 On vessels that have been locally enforced for trawl fishing at the stern by welded on half round bars or similar, this may replace the required ice frames.

12 Ice frames shall have a section modulus of 75% of what is required for the main frame.

13 At the front from the stem to 25% of the length from the stem, the ice frames shall end (welded on) against either the deck or a stringer. The remaining ice frames may end (cut off obliquely) at the top and bottom by a carling or stringer of the same depth as the main frames.

14 Ice stringers shall be located at the loaded waterline from the stem to the stern. The stringer shall have a minimum depth of 120 mm and a web plate thickness corresponding to the actual plate thickness. The stringer shall be fitted with a flange if bulb or angle bar is not used. The stringer may be made as an intercostal.

The ice stringer shall be connected to any web frames, bulkheads, stern and stem and be fitted with bracket connections where possible.

Where the main deck does not extend unbroken from the stern to the stem, an unbroken stringer as stipulated above shall be fitted flush with the extension of the deck if the vertical distance to the deck above (for example forecastle or poop) from the original deck line exceeds 0.8 m.

15 An external keel section shall be fitted of sufficient strength to carry the vessel during docking and drying out on uneven ground. Any necessary solid ballast weight should be integrated into the keel structure, for example by means of increased material thickness on the keel section and keel plates.

16 Where especially much wear and tear may be foreseen, such as on the keel, bottom, the stern area and at bends in the hull, aluminium vessels shall have welded on extra wearing surfaces in the form of half round or flat aluminium. As an alternative, wearing reinforcements shall be built into the hull as such on exposed places.

17 Welding connections of sections and stiffenings of the shell plating and stern and stem in the ice belt area shall be made as double, unbroken weldings.

6 Wooden vessels

1 The stern shall, across its full breadth, be fitted with a steel flat bar with an outer cross-sectional area measured in cm^2 of 0.8 x L_{oa} in m. The flat bar shall extend from the foremost point of the stern to 1 meter abaft the point of intersection of the stem and the keel. The flat bar shall be fastened to the stem with stowage bolts or ship spikes. The stem shall be reinforced by a steel sole piece by bolting on side plates, which shall also be welded to the stem bar. The scantling of the sole piece and side plates shall be dependent on the size, use, etc. of the vessel. To protect the caulking in the rabbet groove, sections of half-round steel shall be applied, or the ice-sheathing shall be carried over the rabbet.

2 As a supplement to the ordinary keel of the vessel, there shall be a wear-resistant keel that protects against wear and tear when colliding with ice or in the event of grounding. Such a wear-resistant keel shall have the same breadth as the ordinary keel, however a minimum of 80 mm. As an alternative, it may be of steel of sufficient thickness.

3 The ice-sheathing shall be fitted throughout the ice belt area as well as in a wedge from the afterside of the sole piece at the keel to the ice-sheathing band at its greatest width. The ice-sheathing shall be of plate in black or galvanised iron, aluminium or copper. Sheathing of black or galvanised plate or aluminium plate shall be securely fastened to the shell with galvanised ship spikes of a length of about 3/4 of the shell thickness. Ice-sheathing of copper plate shall be fastened with copper spikes. Ice-sheathing of aluminium or copper may not come into contact with steel or any other metal.

4 The plating of vessels navigating in trading areas with a risk of particularly strong ice flow shall be further protected by means of flat steel or plate. Such protection shall be fastened with countersunk ship spikes and be applied approximately perpendicular to the stern and be mutually connected by stitch welding in the area above and below the loaded waterline.

7 GRP vessels

1 If sandwich designs, except for decks and superstructures, are used for hulls for vessels intended for navigation in ice, the GRP of the outside shell plating shall have sufficient local strength corresponding to what is, as a minimum, required for outer laminates in a single-shell design.

2 At the stem and the keel, from 750 mm above the deepest operating waterline and continued along the keel to the heel below the propeller, a GRP wearing surface and reinforcement shall be applied of a thickness of about 10 mm and 100 mm to each side of the hull. This shall replace the stem flat bar and wear-resistant keel of steel required previously.

3 Changes in the laminate thickness shall be gradual, and in no case may the reduction of the difference in thickness take place over a length below 20 times the difference in thickness.

4 If the weatherdeck on any part of the vessel is located below the upper limit of the ice belt area, the shell plating shall be strengthened corresponding to the plating in the ice belt area.

5 Bends, projections or other irregularities from the even hull side below the waterline should not occur. In case of bends or projections of a smaller radius of filet than 200 mm, they shall be strengthened by extra laminates externally. The thickness of such extra laminates shall be 50% of the actual shell thickness. There should be a change of colour between extra laminates and original laminates to mark the wear and tear of the extra laminates.

6 In case of keel cooling, protection of outside pipes shall be established. The protection may consist of glued on blocks or by placing the pipes in a recess located in such a way that they are protected against the effects of groundings or ice floes.

7 The echo sounder transducer should be located flush with the bottom. The transducer chest shall be located embedded internally into the hull. The embedding shall be of the same strength as the hull laminate. If the transducer chest is of steel, it shall be primed by epoxy primer or similar primer before being laminated. A watertight connection (for example pipes) shall be fitted around the wire connection to the echo sounder transducer. The connection shall be carried to deck level.

Echo sounder transducers located on the outside of the hull shall be embedded on the sides and front and back edge by reinforced polyester and the embedding shall have a form so that it is capable of rejecting ice in the best possible way.

8 Rudders shall be made of steel of a steel quality corresponding as a minimum to ship-building steel grade A.

Regulation 4 – Special provisions for open vessels

1 In welled vessels, the well coaming, deck and bulkheads shall have the same strength as the hull, and the upper edge of the well coaming shall have a height at least corresponding to the height of the gunwale.

2 Threshold and coaming heights

.1 The height of the threshold to the wheelhouse or the like shall be 380 mm above floor or deck. Doors to these spaces shall open outwards.

.2 Hatches to machinery spaces and hatches and doors to decked accommodation spaces shall be designed to that they may be shut tight.

.3 In vessels of a length below 12 m, a threshold height of 200 mm may be permitted in openings to spaces from which water cannot penetrate to spaces below deck, and the door may be made as a sliding door.

.4 For openings to spaces below deck or which form part of the vessel's buoyancy volume for stability, regulation 7.1 shall also apply.

3 Air pipes shall discharge outwardly on the plating as high as possible and be protected against mechanical damage.

4 Drainage of floor on open vessels.

The floor may not be placed so high as to have an adverse influence on the stability of the vessel. If the floor is placed above the waterline on the boat in the light condition and furthermore is so tight that water may gather on the floor, the following shall apply to ensure the stability of the vessel:

.1 On both sides of the floor, there shall be drain openings for draining water to the bottom of the vessel. (See figure 1).

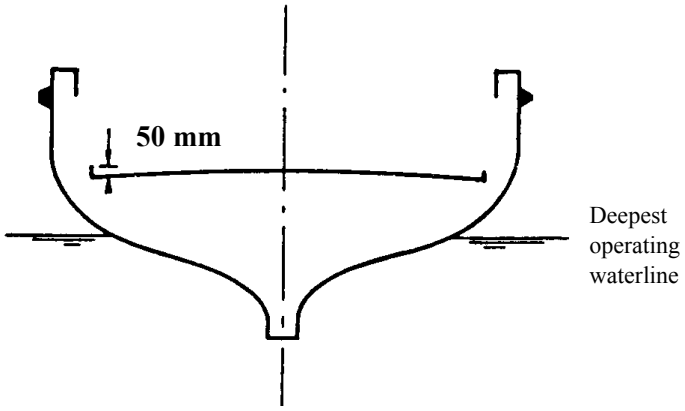
.2 The drainage area shall be at least 75% of the requirement for freeing ports for draining a deck directly overboard.

.3 Open vessels may not be fitted with freeing ports.

.4 To prevent rainwater from penetrating to the bottom of the vessel through the drains, these may be placed at a maximum of 50 mm above the floor as shown in the figure below.

.5 The intake of the bilge pump shall be easily accessible.

Figure 1. Cross-section of open vessel



Regulation 5 – Special provisions for decked fishing vessels

1 In welled vessels, the well coaming, deck and bulkheads shall have the same strength as the hull, and the well coaming shall be watertight to the deck.

2 It shall be possible to lock or secure poundboard arrangements in position when in use, and they may not prevent the discharge of shipped water. Between the bulwark and the longitudinal poundboard bulkhead at the ship's side, there shall be sufficient distance to ensure free and unrestricted flow of water to the freeing ports.

Regulation 6 – General weathertight integrity of the hull

External openings shall be capable of being closed so as to prevent water from entering the vessel. Deck openings which may be open during fishing operations shall normally be arranged near to the vessel's centreline. The Danish Maritime Authority may, according to a concrete assessment, approve different arrangements if satisfied that the safety of the vessel will not be impaired.

Regulation 7 – Weathertight doors

1 Openings in superstructures, deckhouses, companionways or the like, from weather deck to spaces below deck or to spaces forming part of the vessel's buoyancy volume for stability shall be fitted with weathertight doors that open outwards.

2 The following is required for a door to be regarded as weathertight:

.1 The door shall have the same strength as the bulkhead in which it is fitted.

.2 The door shall be fitted with gaskets that cannot be pressed out.

.3 The door shall be hinged and it shall be possible to secure it in the open position.

.4 In addition to the hinges, the door shall be fitted with at least two clamping devices, which it shall be possible to undo and tighten from both sides of the bulkhead.

3 The height above deck of sills in 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.

Regulation 8 – Weathertight hatchways on decked vessels

1 The height above deck of hatchway coamings shall be at least 380 mm on the working deck and at least 300 mm on the superstructure deck.

2 Hatchways that are opened at sea shall be hinged or fastened with chains, and it shall be possible to secure them in the open position.

3 Coamings of small hatchways (emergency exit hatchways and the like), which are not normally opened when the vessel is at sea, may be at least 230 mm on working decks and 100 mm on superstructure decks above weather decks/working decks. Where, following a concrete assessment by the Danish Maritime Authority, it is found that there is no immediate risk of water penetration, approved flush patent hatchways without coaming may be accepted. The hatchways shall be clearly marked "EMERGENCY EXIT, TO BE KEPT CLOSED AT SEA" on both sides.

4 The requirement for the height of hatchway coamings may be reduced or not apply at all to:

.1 Machinery space hatchways that are used only in connection with maintenance and repairs of machinery and other hatchways that are similarly not necessary for the general operation of the vessel.

.2 Small hatchways with an area of not more than 0.1 m^2.

It is a precondition that the hatchways are fitted with gaskets and clamping devices with short spacing and that they cannot be casually opened, and that the weathertightness is ensured extraordinarily.

5 The following is required for a hatchway to be regarded as weathertight:

.1 The hatchway shall be fitted with gaskets that cannot be pressed out.

.2 Battening down devices shall have a mutual spacing of maximum 600 mm and 300 mm from hatchway corners.

.3 The hatchway shall be fitted with at least two hinges or the like.

6 Strength calculations shall be based on hatchway covers being exposed to the weight of the load that they are intended to carry, however as a minimum 10.0 kN per square meter. In case of covers made of mild steel, the maximum stress as stated above multiplied by 4.25 may not exceed the minimum ultimate strength of the material. At this load, the deflection shall not exceed 0.0028 times the span.

7 Covers made of materials other than mild steel shall be of at least equivalent strength to those made of mild steel, and their construction shall be of sufficient stiffness ensuring weathertightness under the loads specified above.

8 It shall be possible to secure all covers in the open position, and they shall be protected against accidental closing by a self-opening device.

Regulation 9 – Machinery space openings

1 Machinery space openings shall be framed and enclosed by casings of strength equivalent to the adjacent superstructure. External access openings therein shall be fitted with doors complying with the requirements of regulation 7. Openings other than access openings shall be fitted with covers of equivalent strength to the unpierced structure, permanently attached thereto and capable of being closed weathertight.

Regulation 10 – Other deck openings and ice covers

1 Where it is essential for fishing operations, flush deck hatchways and ice covers of the screw, bayonet or equivalent type and manholes may be fitted provided these are capable of being closed watertight and such devices shall be permanently attached to the adjacent structure. Having regard to the size and disposition of the openings and the design of the closing devices, metal-to-metal closures may be fitted if the Danish Maritime Authority is satisfied, after a concrete assessment, that they are effectively weathertight and that the closing devices are secured with a chain or the like so that they may be quickly reapplied when they have been removed.

2 If the working and/or superstructure deck is penetrated by a fishing and/or ice lift, such lifts shall be lined with a sleeve through the deck to a height of at least 900 mm above the working deck and/or the superstructure deck and be enclosed with a satisfactory seal around the lift. The sleeve shall be stiffened and be of the same scantling as hatchway coamings. Lifts shall be fitted with a reasonably tight, hinged flap at the top, the underside of which shall be located at least 1200 mm above deck.

Regulation 11 – Ventilators

1 On decked vessels, the height above deck of ventilator coamings shall be at least 450 mm. They shall be designed and located so that shipped water cannot penetrate into the vessel.

2 The height above deck of machinery space ventilator coamings shall be as is reasonably practicable, however at least 760 mm on weather decks/working decks and 450 mm on superstructure decks. As to the mechanical requirements for ventilation of machinery spaces, reference is made to chapter IV, regulation 2, paragraph 2.9.

3 Ventilator openings shall be designed and located so that water cannot penetrate and shall be capable of being closed weathertight by fixed closing appliances. It shall be possible to operate the closing appliances from open deck. It shall be possible to secure closing appliances in both the open and closed positions.

4 Ventilator openings shall be designed and located at such a height that they are submerged in water only in case of a heeling of more than 30° on open vessels and more than 40° on decked vessels.

5 Coamings of ventilators shall be of equivalent strength to the adjacent structure.

Regulation 12 – Air and sounding pipes

1 Air pipes shall be of a height corresponding to the upper edge of the bulwark, however at least 450 mm above deck. Air pipes shall be placed so that they are protected against damage in connection with work on deck.

2 Air pipes shall be fitted with non-return valves, gooseneck or the like that prevent water that pours in over deck from penetrating into tanks, battery rooms and the like.

3 Air pipes shall be of a strength equivalent to the adjacent structure and fitted with appropriate protection.

4 On vessels with a length of or above 12 m, sounding devices shall be fitted that comply with the requirements of the Danish Maritime Authority for the following:

.1 bilge wells in spaces not easily accessible at any time while at sea; and

2. all tanks and cofferdams.

5 Openings for sounding pipes for fuel oil tanks may not be located in the crew accommodation and may not be capable of causing oil spillage in case the tanks are overfilled. The pipe openings shall be fitted with fixed closing devices.

Regulation 13 – Side scuttles, windows and doors

1 Windows, side scuttles and apertures as well as the glass hereof in hulls, superstructures and houses on weather decks/working decks shall be made of a suitable material of a solid design suitable for this purpose. The scantling shall be in accordance with the following table, which shall apply to windows of tempered glass, carbonate, acrylic glass and laminated glass. Those in danger of being damaged by fishing tackle or the like shall be suitably protected.

The glass thickness is given in mm with the height (h) and the breadth (b) in cm.

H cm ->	**20**			**30**			**40**			**50**			**60**			**70**		
Column →	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 location of windows and on whether the vessel is decked or open in accordance with the following guidelines:

Column 1

a) Windows in hull side from 0.5 m to the following height (measured to the lower edge) in m above the deepest operating waterline:

$$\frac{3.2x\Delta}{1000xLxB}$$

where:

Δ: fully loaded displacement in kg

L: length in m as defined in chapter I, regulation 2

B: greatest breadth of the hull in m, measured externally on the plating, but not including fenders and the like

Side scuttles, windows or light valves located as above shall be provided with deadlights.

b) Horizontal hatchways or windows that may be exposed to point loads in decks or superstructure roofs on decked vessels and located higher than

$$\frac{3.2 x \Delta}{1000 x L x B}$$

meter above the deepest operating waterline.

Equivalent hatchways or windows located lower than this will be assessed concretely by the Danish Maritime Authority.

Column 2

a) Windows in superstructures, wheelhouses, etc. on decked vessels located higher than

$$\frac{3.2 \mathrm{x} \Delta}{1000 \mathrm{xLxB}}$$

meter above the deepest operating waterline.

Column 3

a) Windows in superstructures on open vessels or partly spar-decked vessels where the window location above the deepest operating waterline is higher than the freeboard amidships for such vessels.

b) Windows in the second superstructure level on decked vessels, except on the front of the wheelhouse where column 2 shall be used.

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

3 No windows or side scuttles may be fitted in the hull side so that their lower edge is less than 500 mm above the deepest operating waterline. Side scuttles in the hull side shall be fitted with a hinged deadlight. Furthermore, for front windows in the remaining levels of the superstructure, at least two blind flanges of sufficient strength shall be fitted, however at least 5.0 mm steel plate or 7 mm aluminium plate per window, however not more than one per window. It shall be easy to place the blind flanges in front of damaged windows. All side scuttles or windows located less than 1.0 m above the deepest operating waterline shall be of a type that cannot be opened.

4 Windows or side scuttles in the hull side below the working deck or the weather deck on vessels other than fishing vessels shall be located at least 10 mm within the hull side and it may not be possible to open them. Frames on the outside of the hull side may not be more than 5 mm outside the hull side.

5 Coloured glass or panes of material that is easily scratched may not be used on the front and sides of the wheelhouse or at the control station.

6 Glass in windows, side scuttles and apertures located in the freeboard, on exposed decks and in hatchways laid flush into the deck shall be mechanically secured between two frames or between a fold and a frame. The frame may be designed as a full or a partitioned frame. Where there is a risk of the glass being pressed out of the frame, e.g. in the case of large windows, the flexural properties of the glass or the location of the window, special precautions shall be taken against this. Such precautions may, for example, consist in increasing the face of contact between the glass and the frame or in protecting the glass with bars or gratings.

7 Windows in spaces that are included in the buoyancy for stability shall always be secured in solid frames, as stipulated in paragraph 6.

8 Rubber profiles for the fitting of glass may be approved only after a concrete assessment by the Danish Maritime Authority and only for secondary spaces where water cannot penetrate into spaces below the working deck. Where rubber profiles are used, the glass shall be fitted secure against being pressed in, and the thickness of the glass in columns 1 and 2 shall be increased by 20%. If a material other than toughened glass is used, the thickness shall match the stiffness and strength of the material.

9 If windows of a greater length or breadth than given in the table are used, an equivalent strength and stiffness shall be documented.

10 Doors in the freeboard on open vessels shall be designed so that they are watertight. Doors and frames shall have at least the same strength as the hull as such. Doors in the sides, bow and stern on decked vessels shall not be permitted below the working deck.

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

12 For doors with the lower edge of the opening lower than 500 mm above the deepest operating waterline, solid gaskets are required as well as battening down devices with a mutual spacing of not more than 300 mm. It may not be possible for large amounts of water to penetrate through doors located higher than 500 mm above the deepest operating waterline. Such doors shall be fitted with satisfactory closing and battening down devices.

13 Doors that may be folded down shall be provided with stopping devices in the lowest position.

Regulation 14 – Inlets and discharges (hull penetrations)

1 Inlets and discharges carried 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 stipulated in regulation 7 shall be fitted with accessible devices for preventing ingress of water into the vessel. Normally, each opening shall have an automatic non-return valve fitted with a secure closing device operable from an accessible position. Such valves shall, however, not be required if the Danish Maritime Authority considers it unlikely that ingress of water through the opening will lead to dangerous flooding and that the thickness of the pipe system is sufficient. The operation of the valve shall be fitted with an indicator for the open and closed position.

2 Hull penetrations with openings less than 100 mm above the deepest operating waterline or below the floor on open vessels shall be fitted with means of closing (see figure 2).

3 .1 Valves on hull penetrations shall be suitable for use on vessels. They shall be made of steel, bronze or of another approved tough material and shall be fitted so that they are easily accessible under all conditions (cf. also chapter IV/10).

.2 Valves located in holds or below the floor shall have the manoeuvring device extended to above the floor or deck.

.3 Valves with a thread in the cover or top part shall be secured against the cover or top part coming loose when the valve is opened or closed. The valve shall be provided with an indicator showing whether the valve is open or closed.

4 Discharges in the hull above the light waterline and less than 350 mm above the deepest operating waterline as well as systems with an open outlet inboard shall be fitted with a non-return valve preventing penetration of water if the line is at any point lower than 350 mm above the deepest operating waterline (see figures 2 and 3).

5 Pipe systems connected to penetrations in the shell shall be fitted so that water cannot penetrate into the vessel though the valves are open.

6 Pipe systems with hose connections shall be fitted with double, corrosion-resistant hose clips at both ends. Hose connections to penetrations may not be located lower than 350 mm above the deepest operating waterline, and the hoses shall be of the reinforced type.

7 Penetrations may not be located in sandwich laminates without this having been made massive around the penetration.

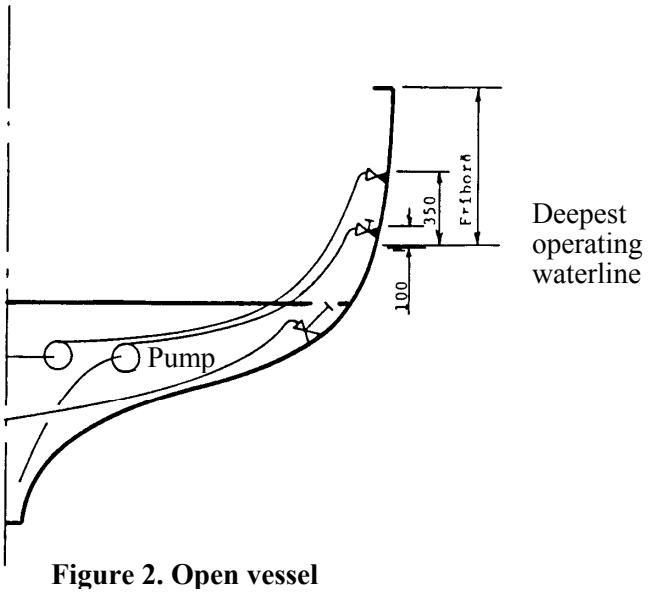


Figure 2. Open vessel

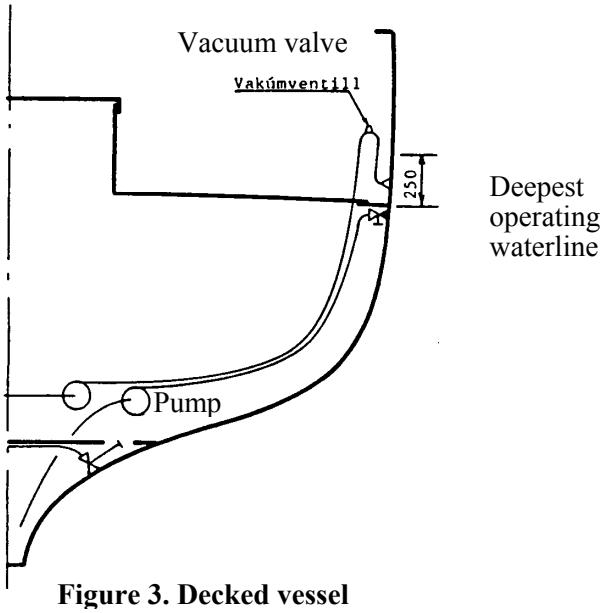


Figure 3. Decked vessel

Cross-section showing pipeline discharge

Regulation 15 – Freeing ports in decked vessels

1 On open deck with solid bulwark, a sufficient number of freeing ports shall be located on each side.

2 Freeing ports shall be so distributed along the length of the deck as to ensure that their location is mostly concentrated in areas where most water gathers on deck due to sheer, probable trim, etc. Freeing ports shall be so distributed along the length of bulwarks as to ensure that the deck is freed of water most rapidly and effectively. Lower edges of freeing ports shall be as near the deck as practicable.

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

.1 $A = K \times l$

Where: K = 0.07 for vessels with a length of 15 m

K = 0.05 for vessels with a length of 12 m or less.

As regards intermediate values of K, they shall be found through interpolation.

(l need not be calculated as greater than 70% of the vessel's length).

.2 If the bulwark has an average height greater than 1200 mm, the required area shall be increased by 0.004 m^2 per metre length of the well for each 100 mm height difference.

.3 Where the bulwark has an average height of less than 900 mm, the required area may be reduced by 0.004 m^2 per metre length of the well for each 100 m height difference.

4 Unless the Danish Maritime Authority approves it, the smallest freeing port area for each well on the superstructure deck may not be smaller than half the area (A) as stipulated in paragraph 3.

5 The freeing port area calculated according to paragraph 3 shall be increased where the Danish Maritime Authority considers, after a concrete assessment, that the vessel's sheer is not sufficient to ensure that the deck is rapidly and effectively freed of water.

6 In vessels fitted with wells with their own drain, the requirement for the freeing port area may be reduced, but not by more than 10% of the required freeing port area.

7 It shall not be possible to batten down clearing ports, but they may be fitted with external top-hinged flaps and internal gratings. Such arrangements may, however, not lead to a considerable reduction of the effective freeing port area. Any hatchways or external rubber flaps in freeing ports shall be fastened with hinges in the upper edge. The hatchways shall fit freely so that they cannot get stuck. The hinges shall be made of materials that are not susceptible to corrosion. There may not be any arrangements for the locking of freeing port hatchways.

8 Large freeing port openings shall be fitted with bars with a maximum mutual distance of 380 mm, but a maximum of 230 mm below the lowest bar.

9 Poundboards and means for stowage of the fishing gear shall be arranged so that the effectiveness of freeing ports will not be impaired.

10 In vessels holding a trading permit for areas with a risk of icing, as mentioned in chapter III, regulation 8, flaps and other protection of freeing ports shall be easy to remove to limit icing.

Regulation 16 – Anchor and mooring equipment

1

.1 All vessels shall be equipped with anchor equipment, bollards, cleats or fastening fittings so that the vessel can quickly and safely anchor, moor, tow or be towed in proper fashion.

.2 The requirements for anchors, chains and moorings are stipulated in the following table.

.3 The anchor equipment stipulated in the table is based on bottom conditions with normal holding characteristics.

2 Mooring fittings, bollards and hawseholes.

It shall be possible to properly secure anchor ropes or chains in the foremost end of the vessel. If necessary, hawseholes, rollers, guard plates or the like shall be fitted where moorings, anchor ropes or chains cross the bulwark, deck or gunwale.

3 All vessels shall have at least one bollard, fitting or cleat forward and two aft. Where two bollards or fittings are installed, they shall be placed as far into the side as possible.

4 One bollard or fitting in the bow and one in the stern shall be placed so that towing is possible. If a towing fitting in the stern is easily accessible, it may also be approved as a mooring fitting on open vessels without a foredeck.

5 Mooring fittings and their fastening shall be solidly constructed and fitted and shall be designed for a direct horizontal tensile stress "P" in the longitudinal direction corresponding to the following:

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

where:

P: tensile stress (N)

Δ: weight displacement at full loading (kg)

L: length as defined in chapter I, regulation 2 in m.

6 The area where bollards, fittings, cleats or hawseholes are fitted shall be given adequate reinforcements. Bolts, nuts and other mounting parts shall be made of materials that are resistant to corrosion and shall be secured against coming loose.

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

8 The anchor weight stipulated in the table is based on traditional anchor types. If the anchor is of a special type with a high holding capacity, the anchor weight may be reduced by up to 25%.

9 Vessels with a particularly large superstructure or rigging shall be provided with heavier anchor gear. The anchor weight and length and ultimate stress of anchor ropes shall be increased by up to 20% in relation to that stipulated in the table.

10 In vessels holding a trading permit for trading areas F4 or F5, the anchor weight and the length and ultimate stress of anchor ropes or chains and chain foregangers shall be increased by 20% in relation to that stipulated in the following table.

11 In vessels holding a trading permit for Greenland, the anchor weight and the length and ultimate stress of anchor ropes or chains shall be increased by 30%. If anchor ropes are used, the length of the chain foreganger shall also be increased by 100% in relation to that stipulated in the following table.

12 Anchor cable and moorings

The vessel shall be equipped with at least one anchor cable or chain and three moorings of a length and an ultimate stress as stipulated in the table.

13 Chain foregangers

If anchor cables are used, a chain foreganger shall be inserted between the anchor and the anchor cable with a length and dimension as stipulated in the table.

14 Trawl wire

A trawl wire may be used as an anchor wire if this wire has a tensile strength at least similar to that stipulated in the table for anchor cables. It is acceptable that the trawl wire is led through a gallows

block. There shall be a chain foreganger between the anchor and the wire with a diameter as stipulated in the table and with a length of at least 12.5 m.

15 Anchor chain

The chain dimensions stipulated in the chart shall apply to a short-link chain. The chain shall be designed in accordance with a recognised standard.[3]

Hull length less than (m) →	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total anchor weight (kg)	5	6	9	12	16	21	26	32	39	47	54	62	70	88
Largest anchor minimum weight (kg)	3	4	6	8	11	14	17	21	26	31	36	43	53	63
Anchor cable length (m)	15	17	20	24	28	32	36	40	44	48	54	62	71	80
Anchor cable ultimate stress (kN)	8	11	15	19	23	28	32	36	41	45	49	53	70	76
Chain foreganger length (m)	1.2	2	3	4	5	6	7	8	8	9	10	11	13	13
Chain foreganger dimension (mm)	8	8	8	8	8	8	10	10	10	12.5	12.5	12.5	13	13
Mooring length (m)	5	7	9	11	13	15	17	19	21	23	26	28	30	32
Mooring ultimate stress (kN)	5	7	9	11	13	15	17	19	21	23	26	28	30	32

Table 1. Vessels with a length below 16 m.

Regulation 17 – Working deck below an enclosed superstructure on fishing vessels

1 Vessels with an enclosed shelter above the working deck that has no freeing ports, but ports or hatchways that it is necessary to have open at sea in connection with the operation of the vessel shall be provided with an effective drainage system with an adequate drainage capacity to remove wash water and fish waste.

2 All necessary openings for fishing operations shall be provided with means of closing that one person can operate quickly and effectively.

3 If the catch is brought to such decks for handling or processing, it shall be placed in a watertight poundboard. Such poundboards shall be provided with an effective drainage system. After a concrete assessment by the Danish Maritime Authority, there shall be sufficient protection against inadvertent water penetration onto the working deck.

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

5 The free height at work stations and the ventilation system shall be as stipulated in chapter VI.

6 Side hatchways and aft hatchways in enclosed working spaces on the working deck that must be kept open during fishing shall be restricted in size and shall normally have a height above deck of sills of not less than 1000 mm.

7 The means of closing for such hatchways shall have at least the same strength as the superstructure in which they are located and it shall at all times be possible for one person to close them quickly without using any tools.

3) Reference is made to DS/EN 24 565, which contains DS/ISO 4565 Anchor chains for pleasure yachts and small vessels.

8 Side doors/hatchways that can be closed from the wheelhouse shall be provided with an acoustic and visual alarm at the work station giving a warning when closing begins.

9 Side and aft hatchways shall be provided with conspicuous signs warning that the hatchways shall be kept closed when they are not in use during fishing as well as when there is a danger of water filling the working deck.

10 On the working deck in enclosed working spaces with side hatchway(s), it may, in addition to the pumps stipulated in paragraph 13, be permissible to have drainage flaps in suction wells for direct drainage overboard. Such drainage flaps may not be used in vessels that are to sail in areas as stipulated in chapter III, regulation 8.1, where there is a risk of icing. The drainage flaps shall be designed and installed as shown in the diagram below, and the following conditions shall be met:

.1 Drainage flaps shall be recessed in the hull.

.2 Drainage flaps shall, when closed, be watertight from the outside, and they shall be easily accessible for cleaning and inspection.

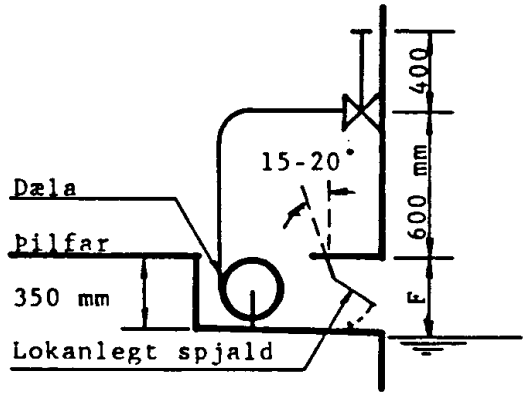
.3 It shall also be possible to close drainage flaps manually from a point at least 1 m above deck.

.4 Openings for drainage flaps may not exceed 0.06 m^2.

.5 The drainage flaps shall be located at least 500 mm above the deepest operating waterline. Drainage flaps may not be permitted in enclosed superstructures included as weathertight in the stability calculations.

.6 Drainage flap hinges shall be made of materials that do not corrode.

Figure 4.



11 Waste chutes in decked superstructures or fully enclosed working spaces on working decks shall be installed and designed so that they are easy to inspect. The inside openings of the chute in spaces on the working deck shall be located as high as possible considering the trim and deepest operating waterline, however at least 600 mm above the deepest operating waterline. The inside opening shall be fitted with a weathertight filling hatchway with packings and clampings. The chute and the hatchway shall have at least the same thickness of material as the shell plating or bulwark of which it forms a part, however at least 8 mm. All chutes and hatchways shall be approved by the Danish Maritime Authority, which may make further requirements on the basis of the concrete design. Normally, each individual discharge opening shall have an automatic non-return flap or non-return valve fitted with a secure closing arrangement operable from an accessible position. However, such flaps/valves shall not be required if the Danish Maritime Authority deems it improbable that ingress of water through the

opening would lead to dangerous filling and that the thickness of the pipe system is sufficient. The operation of the flap shall be fitted with an indicator of the open or closed position.

12 Any structure that may prevent a quick and effective drainage of decks on decked vessels shall not be permitted. Deckhouses with side walls against the side, separate bulkheads/shielding in the side for protection against the weather during operation or similar structures on deck shall be permitted only under special circumstances and after a concrete assessment by the Danish Maritime Authority. In such shieldings, freeing ports in accordance with regulation 15 shall not be regarded as providing effective drainage. A bulwark with a height of more than 1.20 m shall be regarded as such a shielding.

13 There shall be good overboard drainage from bin arrangements on deck.

Regulation 18 – Draught marks

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

Regulation 19 – Rudders[4]

1 Rudders, rudder stocks, rudder bearings, heels, rudders and rudder couplings, etc. shall have scantlings either in accordance with the rules of a classification society[5] or in accordance with the provisions below.

2 Rudders with fittings, rudder stocks, couplings, etc. shall have the necessary strength. The required stiffeners and reinforcements shall be made where there are penetrations and fittings.

3 Rudders shall be properly protected against being lifted up. Bolts in rudder couplings etc. shall be secured so that the bolts cannot work loose in operation and as a result of vibrations, etc.

4 If the total vertical load of the rudder cannot be absorbed in the heel seat, the rudder shall be provided with a suitable rudder bearing capable of absorbing the vertical forces.

5 The stuffing box of the rudder stock shall in general be located at least 350 mm above the deepest waterline. The height of the stern seat or the heel seat shall be at least 20% greater than the diameter of the rudder stock or the rudder pintle. In cases where the distance between the rudder bearing and the quadrant exceeds six times the diameter of the rudder stock, a top bearing (support bearing) shall be installed.

6 The following symbols shall be used for the forces of the steering system:

K: steering force in N

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

A: rudder area in m^2

V: maximum speed of the vessel in knots

Sa: length of the steering arm in mm

Sb: distance in mm from the centre of pressure, Tc, to the closest rudder bearing above.

Sv: 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 the centre of pressure 40% abaft the foreside of the rudder. Profile rudders have the centre of pressure 30% abaft the foreside of the rudder.

U: maximum engine power in kW

M: momentum in Nmm

dv: solid rudder stock diameter in mm

---

4 Steering gear is found in chapter IV.

5 Cf. chapter I, regulation 1a.

$\sigma_{0.2}$: yield stress in N/mm^2

7 The steering force in vessels with rudders is:

$$K = \frac{P \text{ x } Sv}{Sa} \qquad N$$

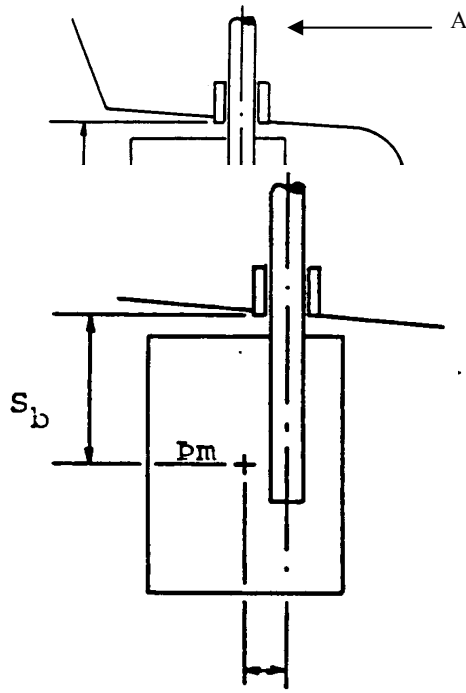
8 Rudder stocks

If the rudder has a heel with a lower heel seat and a rudder heel with at least the same stiffness across as the rudder stock, the momentum is calculated in the following way:

$$M = 1.15 \text{ x } (0.25 \text{ x } P \text{ x } Sb + 0.5 \text{ x } P \text{ x } \sqrt{Sb + 2 \text{ x } Sv^2}) \qquad Nmm$$

Diagram of balance rudder with heel seat

9 Rudder stocks for spade rudders shall be calculated for a combined torsional and bending momentum:



$$M = 1.15 \text{ x } (0.5 \text{ x } P \text{ x } Sb + 0.5 \text{ x } P \text{ x } \sqrt{Sb^2 + 2 \text{ x } Sv^2}) \qquad Nmm$$

Diagram of spade rudder

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

$$dv = 2.2 \text{ x } \sqrt[3]{\frac{M}{\sigma_{0.2}}} \qquad mm$$

11 Rudder stocks of tubing shall be dimensioned according to the following formula:

$$dv = \sqrt[3]{\frac{d1^4 - d2^4}{d1}} \qquad mm$$

where:

dv: diameter of a solid rudder stock

d1: outside diameter in mm of the tube

d2: inside diameter in mm of the tube

12 The bearings of the rudder stock and its fastenings shall be dimensioned for a force corresponding to the rudder force P.
The length/height of the bearings shall be made in accordance with paragraph 5, however at least = dv.
The rudder pintle shall at least have a diameter d = (5 + 0.6 x dv) mm.
For spade rudders, an upper bearing shall normally be placed at a distance of at least Sb above the lower bearing.

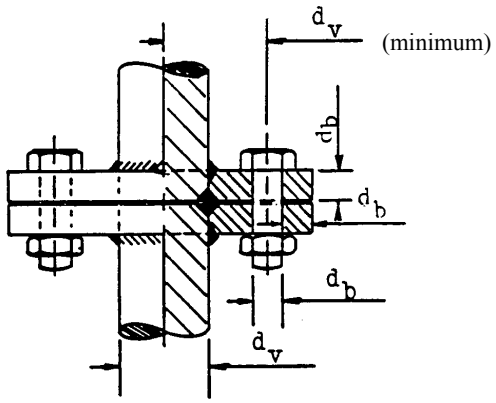
13 The rudder bearing shall be placed at a height of at least 350 mm above the deepest operating waterline and be fitted with a seal ring. In cases where this is not practicable, a grease-filled stuffing box shall be arranged.

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

$$db = \frac{0.65 \text{ x } dv}{\sqrt{n}} \qquad \text{mm}$$

where
dv: the diameter in mm of the rudder stock
n: number of bolts, however at least four

Diagram of rudder coupling



15 The pitch circle radius of the coupling bolts shall not be less than the diameter of the rudder stock. The thickness of the coupling flange and the width of the flange outside the boltholes shall not be less than db. The coupling bolts shall be made as fitted bolts and the bolts shall be secured so that they cannot work loose in operation. Self-locking nuts shall not be accepted for this purpose.

16 Rudders of steel, aluminium and glassfibre reinforced polyester shall have a continuous rudder stock from the rudder coupling down to the rudder pintle.

17 The diameter of the rudder stock shall not be less than the diameter of the rudder pintle pursuant to paragraph 12. On spade rudders, the diameter shall, however, be reduced linearly down from the rudder coupling.

18 Steel and aluminium rudders that have been made as either plate rudders or profile rudders shall have horizontal stiffeners across the rudder stock. Top and bottom stiffeners and additional horizontal stiffeners with a maximum spacing of 600 mm. The thickness of the stiffeners shall not be less than the plate thickness for profile rudders pursuant to paragraph 20.

19 Plate rudders shall have a thickness of at least:
te = 3 + 0.125 dv mm

where dv: diameter of rudder stock pursuant to paragraph 10.

20 Plates in profile rudders (double-plate rudders) as well as horizontal stiffeners shall have a thickness of at least:

td = k x te mm

k = 0.46 for steel or aluminium

k = 0.33 for stainless steel

te: thickness of plate rudder pursuant to paragraph 19.

21 Rudders of glassfibre reinforced polyester shall mainly be profile rudders and have steel stiffeners welded to the rudder stock with a maximum spacing of 200 mm. The thickness of the steel stiffeners shall be at least equal to the thickness of plate rudders pursuant to paragraph 32, the breadth at least ten times the thickness, and the length not less than 75% of the distance from the rudder stock to the afterside or foreside of the rudder. The Danish Maritime Authority may approve single-plate GRP rudders if it can be proven that they have the same strength and thickness as single-plate rudders made in accordance with paragraphs 23-24.

22 Rudders of glassfibre reinforced polyester that are laminated in two parts shall be filled with reinforced polyester or similar material, and the parts shall be glued together effectively on the flanges at the edges. The thickness of the side parts shall not be less than the thickness of the plate in profile rudders of steel or aluminium pursuant to paragraph 20.

23 Wooden rudders shall be of oak and be secured to the rudder stock and the rudder pintle with steel forks of a thickness corresponding at least to 0.8 x the thickness of plate rudders pursuant to paragraph 19. The steel forks shall be welded continuously to the rudder stock and the rudder pintle and shall be bolted to the rudder with at least three bolts at the top and two bolts at the bottom. The bolts shall have a diameter as that of bolts in rudder couplings pursuant to paragraph 14.

24 Oak rudders shall have a thickness of at least:

tt = 7.3 x te mm

te: thickness of plate rudders pursuant to paragraph 19.

Regulation 20 – Simplified strength requirements for GRP vessels

1 General

.1 GRP vessels may be constructed in accordance with the provisions of this regulation provided that:

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

.1.2 The structure is made as single-laminate.

.1.3 Reinforcements, bulkheads and other strength elements are accessible for inspection.

.1.4 It is possible to carry out thickness measurements on the bottom, side and deck of the hull.

.2 If the conditions above are not complied with, vessels shall be constructed in accordance with the rules of a recognised organisation.

2 Materials

.1 During the construction, it shall be documented that raw materials have been used that are in accordance with the requirements of Nordic Boat Standard, Materials and Components, chapters MK2 and MK3, or a similar recognised standard.

.2 It shall be documented that the properties of the finished laminate satisfy the requirements of Nordic Boat Standard, Materials and Components, chapter MK2.

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

3 Casting spaces shall comply with the provisions of regulation 21.

4 Workmanship

.1 The laminating shall be technically correct with good workmanship. The laminate shall be well hardened and shall not be discoloured.

.2 Laminate which will be exposed to water shall be protected by gel or topcoat.

5 Scantlings

.1 In the table below, values for B and Loa are inserted in m, but without units. The minimum dimensions shall be in accordance with the following tables:

Area	**Extension (mm)**	**Dimension (mm)**
Keel and stern laminate	80 x B from the centre line	Tk = 7.0 + 1.3 x Loa
Bottom plating laminate	Up to the full deepest operating waterline	Tb = 6.0 + 0.7 x Loa
Bilge	100 mm on each side	Tc = 6.0 + 0.8 x Loa
Laminate in side plating, superstructures, structural and tank bulkheads and deckhouses	Above the deepest operating waterline	Td = 3.0 + 0.6 x Loa
Laminate in decks	Along the entire extension	Ts = 6.0 + 0.8 x Loa

.2 Maximum frame spacing and minimum bending resistance for stiffeners. Frame spacing and minimum section modulus shall be in accordance with the following table:

Frame in	Max. frame spacing s in mm	Section modulus in cm3
Bottom	S = 5.4 x Loa + 400	Wb = 0.006 x Loa x s x 12 x 10-6
Side	S = 16 x Loa + 400	Ws = 0.0038 x Loa x s x 12 x 10-6
Deck	S = 26 x Loa + 300	Wd = 0.87 x (0.01 + 0.002 x Loa) x s x 12 x 10-6

where

l: length of frame/beam in mm

s: frame spacing in mm

.3 Floor timbers shall be installed with a maximum mutual spacing of 1.0 m, and they shall have a height of at least hb (mm) above the keel:

$$hb = \frac{B}{3} \text{ x } 100 \text{ x s}, \qquad \text{mm}$$

however, at least 100 mm

where

S: distance between floor timbers in m

.4 Bulkheads shall have the strength required to withstand the water pressure that may arise if one of the delimited spaces is filled with water. If plywood is used, it shall be of waterproof marine

grade and at least have a thickness as stipulated below, and shall be laminated on both sides with at least two times 450 g/m^2 glassfibre mats.

Thickness of at least: t = (2 x Loa – 2) mm

but minimum 12 mm

.5 Bulkheads made of other materials shall be dimensioned to a corresponding strength.

Where the sides in the non-supported part of the bulkhead exceed 1000 mm, stiffeners shall usually be fitted with a section modulus of at least:

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

where

s: stiffener spacing in m

l: length in m of the non-supported stiffener.

6 Engine seatings

Engine seatings shall be properly dimensioned so that they can absorb the tensile and compressive forces of the propeller. The longitudinal girders of the engine seating shall have at least the same strength as the floor timbers and a sufficient length in front of and abaft the engine. The girders shall be terminated against the transversal floor timber, bulkhead or similar reinforcement. The seating shall have a strong transversal stiffening with a smooth transition to the hull.

GRP engine seatings shall be provided with steel inlays at the bed bolts.

7 Sandwich laminate

.1 Only materials that have been approved for this purpose by a recognised organisation may be used as core material. Plywood shall be of marine grade pursuant to B.S.1088-1966, B.S.4079-1966 or an equivalent standard. Homogenous wood may not be laminated.

.2 Foam cores shall be made of PVC foam or equivalent. Polyurethane foam may not be used. Foam cores with open cells in the surface shall normally have polyester added before they are laid against wet laminate. The wet laminate shall be reinforced with at least 450 g/m^2 on plane surfaces and 900 g/m^2 on curved surfaces.

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

.4 The thickness of the outer laminate in the keel, stem, bottom and side shall normally not be less than 65% of the requirement for laminate thickness in single-plane structures.

.5 In decks, including deckhouses, the outer laminate shall be at least:

ty = 2.0 + 0.1 x Loa mm.

8 Inspection

.1 The requirements of the above tables, documentation in the form of diagrams and calculations as well as the execution of the work shall be inspected for each vessel at the final survey.

Regulation 21 – Construction of GRP vessels

1 General

.1 The following provisions shall apply to vessels of glassfibre reinforced plastic that are inspected individually during construction.

.2 It is presupposed that the manufacturer follows the instructions given by the manufacturers of the raw materials for use of the different products that are used for the construction of vessels of glassfibre reinforced polyester.

.3 GRP vessels shall be constructed in a workshop approved either by a recognised organisation or by the Danish Maritime Authority.

2 Casting spaces

.1 Casting spaces shall be draught-free so that an even temperature may be maintained during the casting process.[6]

.2 The air temperature in the casting space may not be below 18°C, and the temperature during the casting process may not vary by more than 6°C. The relative atmospheric humidity may not exceed 80% and may not be below 40%. It shall be possible to keep the atmospheric humidity independent of the outside humidity and temperature.

.3 The casting space shall be insulated or built so that the inside temperature is not affected significantly by the outside temperature or by the sun.

.4 Windows exposed to direct sunlight shall be painted or screened.

.5 Casting spaces shall be dust and watertight.

.6 Casting spaces shall be clean and free of dust.

.7 Casting spaces shall be well lit and arranged so that light reaches the casting moulds that are being used.

3 Materials

.1 It shall be documented that gel coats, polyester, glassfibre reinforcements, cores, binders and top coats are approved for the given use.

.2 Polyester materials may not be stored for too long so that their properties are affected.

.3 Polyester may only be mixed with additives that are required for necessary thixotropy.

.4 A hardener and an accelerator system suitable for the given polyester, the casting times and the given temperatures shall be used.

.5 Plywood that is cast in shall be of a water-resistant type.

4 Laminate construction

.1 All laminates shall have an even layer of gel coat on the outside or an equivalent surface protection shall be applied after casting.

.2 Normally, at least one layer of powder-based mat of isophthalic acid polyester shall be on top of the gel coat below the waterline.

.3 Where orthophthalic acid polyester is used in the hull or other structures constantly exposed to water, the laminate shall have at least two extra layers of surface protection applied on top of the gel coat.

.4 Emulsion-based mat may not be used with isophthalic acid polyester.

.5 On top of the gel coat, there shall normally be a light mat of maximum 450 g/m^2 on surfaces with sharp curves and maximum 600 g/m^2 on plane surfaces.

.6 The laminate reinforcement shall have been laid in an approved order.

.7 In the keel and in suction wells, the inside of the laminate shall have a top coat applied where it may be assumed that water may be collected.

.8 Where the laminate does not have a top coat or similar, the last layer of polyester shall contain wax so that the air-hardening is satisfactory.

5 Manual application

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[6] Temperatures and relative humidity shall be registered regularly, recorded and kept for at least five years. The recording shall take place by means of at least one thermohydrographer for each 1500 m^2 where laminating work is carried out. It shall be located in as neutral a position as possible in the space.

.1 Two layers of reinforcement material shall overlap by at least 50 mm.

.2 Polyester shall be applied evenly for every reinforcement layer. For at least every second reinforcement layer, the laminate shall be rolled so that the polyester is evenly distributed and the laminate is as free of pores as possible.

.3 All fibres shall be well dampened, but there may not be surplus polyester on the surface.

.4 The time that passes between each reinforcement layer shall be adapted to the hardening process that is taking place. No further lamination may take place on a previous layer that generates exothermic temperatures during hardening. Neither may so much time pass between two layers of a laminate that the previous layer hardens. In such cases, the requirements for secondary lamination shall be complied with.

.5 When rolling over sharp edges, corners, etc., it shall be ensured that the amount of reinforcement and the thickness do not become less than required.

6 Spray lamination

.1 Spray lamination may not be used for hulls, decks, bulkheads or other strength elements without special permission from the Danish Maritime Authority.

.2 When glass and polyester are sprayed, the equipment shall be set to the glass percentage that the lamination requires.

.3 The glass cutter of the spraying equipment shall be set for a fibre length of at least 20 mm.

.4 The spraying equipment shall be adjusted so that it provides an even distribution of glass and polyester.

.5 The spraying operator shall distribute the material evenly over the lamination surface. If necessary, spray up roving with colour filaments may be required to check the evenness.

.6 It shall be ensured that the working position is such that no part of the laminate is left in the shadow of the sprayer.

.7 Closest to the gel coat the laminate thickness after the first rolling may not exceed 1.5 mm.

.8 Subsequent rollings shall be carried out so that there is not more than 2.5 mm thickness increase between each rolling.

.9 There shall be at least one layer of woven roving in a spray up laminate in the hull.

7 Sandwiches in mould

.1 The type and weight per m^3 of the core material shall be in accordance with approved specifications.

.2 Core material with open pores in the surface shall have polyester applied so that the pores are filled before the core material is laid against another laminate.

.3 Contoured core material that is laid down in a wet laminate shall have sufficient polyester added so that the excess comes up between the opening in the core material.

.4 When core material is laid in wet laminate, it shall be at least 450 g/m^2 on plane surfaces and 900 g/m^2 on curved surfaces.

.5 Core material of stiff foam or plywood shall, if necessary, be weighted down so that it is fully pushed into the polyester during the hardening process.

.6 All gaps in the core material shall be filled before further lamination.

.7 The wet laminate that the core material has been laid into shall be slightly hardened before further lamination may take place on the core.

8 Sandwiches without mould

.1 When cores are constructed, all butts in the core shall be glued using a filler material or the like.

.2 The core material may not be bended so much that the properties of the core are affected.

.3 The surface of the core shall be ground for all irregularities, especially at the butt seams.

.4 The core shall be primed or filled before further lamination may take place.

.5 Mat reinforcement shall always be laid against cores.

9 Secondary laminations

.1 If further lamination is to be carried out on a laminate that has hardened for more than 48 hours, the laminate shall be ground so that the glassfibres are released on the surface.

.2 If there is wax on the surface on which further lamination is to be carried out, the laminate shall always be cleaned unless it is so wet that the wax will come to the surface in the next lamination.

.3 Top coats shall always be ground away before further lamination.

10 Stiffeners

.1 Stiffeners shall be fastened to the laminate with a breadth of at least 20 times the casting thickness.

.2 Stiffeners shall have at least the same casting breadth at the ends.

.3 If stiffeners end at an un-stiffened plate section, the casting laminate shall also be laid in continuation of the stiffener.

11 Hardening

.1 The gel coat may not have hardened for more than 24 hours before further lamination.

.2 Laminate may not be loaded or worked on during the hardening process, except for the trimming of edges.

.3 Hardening may not be carried out at so high temperatures that the laminates discolour.

.4 Hardening shall take place at the temperature and over the time required by the polyester system.

12 Cast laminate

.1 When a structure has been cast, the laminate thickness shall be checked if necessary in relation to the nominal, approved thickness.

.2 The thickness may be measured inclusive of the gel coat and the top coat, but, in this case, it shall be assumed that the thickness measured is 0.6 and 1.0 mm respectively thicker than the measured value of the laminate.

.3 The nominal thickness of the laminate is regarded as being met if the mean value of 20 measuring points on the same laminate is higher than required and if no single value is lower than 85% of the nominal thickness requirement.

.4 The coefficient of variation VL of a laminate with the same reinforcing shall normally be less than 0.14.

$$\text{VL} \quad \max = \frac{S}{t}$$

where

$$S = \sqrt{\frac{\sum (ti - to)^2}{n - 1}}$$

where

ti: single measuring values

to: mean value

t: nominal thickness requirement
n: number of individually measured thicknesses

.5 If spray up lamination is used, thickness measurements shall be made.

.6 It shall be documented that the reinforcement materials and the polyester used provide the mechanical properties that have formed the basis of the approval with the envisaged glass percentage.

.7 The glass percentage of the base laminate shall be calculated on the basis of the given reinforcement weight and the given average thickness.

.8 Repairs of damaged GRP vessels shall be carried out in approved workshops in accordance with the Guidance on Repairs issued by the Danish Maritime Authority.

Regulation 22 – Type-approval of GRP vessels, semi-manufactures and GRP vessels constructed abroad

1 General

.1 Commercial vessels covered by these regulations and constructed by glassfibre reinforced polyester, GRP, may be type-approved.

.2 Such a type-approval covers the design of the vessel's hull and deck with associated bulkheads, floors, frames, beds and other necessary stiffeners as well as any superstructures, deck houses and hatchways, etc.

.3 The approval of the first example of each type, the prototype-approval, shall, however, cover the completely finished vessel, which shall satisfy the provisions of these regulations in all details.

2 Approval of drawings and control, cf. chapter I, regulation 6.

3 Prototype approvals, cf. chapter I, regulation 6.

4 Approval of GRP semi-manufactures

.1 Vessels that are not finished at the shipyard or that are finished by the manufacturer in variations departing from the vessel already type-approved may, if requested, receive a "hull approval" in accordance with basically the same guidelines as above.

.2 In this connection, semi-manufactures shall mean a ready-produced hull that has been properly stiffened and fitted with the necessary frames, beds and similar reinforcements so that the strength of the vessel shall not depend on further lamination work.

5 Marking

.1 Vessels that have been "hull approved" shall, before they leave the workshop as semi-manufactures, be provided with a metal plate by the manufacturer as stipulated in Annex 2 and a certificate verifying that the hull design complies with the requirements of the "hull approval".

6 Final fitting

.1 If, in connection with the finishing of the "hull", lamination work is carried out on, for example, bulkheads or other important structural elements, it shall be carried out at an approved workshop.

7 GRP vessels constructed abroad

.1 If the production is carried out abroad, the hull design, etc. of the vessel may be approved by the national Administration or by an organisation recognised by the Danish Maritime Authority, which shall, in verification, mark each vessel with a plate and issue a certificate that shall be carried on board.

.2 The Danish Maritime Authority's accept of local approvals as stipulated in paragraph 1 presupposes that the hull has scantlings as a commercial vessel.

8 Surveys, etc.

.1 Surveys, etc. of each vessel shall be carried out in pursuance of the provisions of the Danish Maritime Authority, cf. chapter I, regulation 6. Vessels imported as semi-manufactures shall, as well as comply with the requirements of paragraph 7, comply with the requirements of the Danish Maritime Authority for inspection of the vessel during the remainder of the construction phase.

Regulation 23 – Simplified structural requirements for steel vessels

1 General

.1 Steel vessels may be constructed in accordance with the provisions of this regulation provided that:

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

.1.2 Bulkheads, frames, floors and other structural elements are accessible for inspection, and thickness measurements may be carried out on the hull bottom, side and deck.

.2 If the conditions mentioned above are not satisfied, the vessels shall be constructed in accordance with the rules of a recognised organisation.

2 Approval of drawings, cf. chapter I, regulation 6.

3 Materials

.1 At the construction, it shall be documented that materials of a ship quality have been used with class or factory certificate and with the following minimum properties:

.1.1 Yield point 240 N/mm^2

.1.2 Ultimate stress 410 N/mm^2

.1.3 Elongation after fracture 22%.

4 Execution

.1 The adjustment of materials, welding and detailing shall normally be carried out in accordance with regulation 24.

5 Scantling

.1 The minimum dimensions shall be pursuant to the following table, and interpolation shall be used for vessels with a length between 8.0 m and 15.0 m as defined in chapter I, regulation 2.15 (the regulatory length). If this exceeds 15 m, the column for L = 15.0 m is also used.

.2 Scantling table for steel vessels

Designation	**Length <=8.0 m**	**Length = 15.0 m**	**Remarks**
Frame spacing	Max. 500 mm	Max. 500 mm	
Bar keel	Cross-sectional area 15 cm^2	Cross-sectional area 20 cm^2	If bar keel omitted Keel-plate = 1.5 x floor thickness Total breadth = 30 x length
Centre keel	Cross-sectional area 15 cm^2 Min. thickness = 5 mm	Cross-sectional area 20 cm^2 Min. thickness = 6 mm	Only required if bar keel is omitted
Floor	Height 200 mm Thickness = 4.5 mm	Height 250 mm Thickness = 6 mm	Required for every 3rd frame. On the others, bracket floors may be used
Flange on top of floor	50 x 5 mm	50 x 6 mm	May be omitted if concrete is cast to the top of floors
Keelson	UNP 100 or equivalent Area 13.3 cm^2	UNP 120 or equivalent Area 17 cm^2	Required only if centre keel is omitted
Frames	75 x 6 mm W = 12 cm^3	90 x 7 mm W = 18 cm^3	Max. span 2.5 m
Bottom plates	4.5 mm	7.0 mm	Increase for keel and stern plates + 1.0 mm (breadth 500-600 mm)
Shell plating	4.5 mm	6.0 mm	Increase for keel and stern plates + 1.0 mm (breadth 500-600 mm)
Bulkheads	4.5 mm	6.0 mm	
Bulkhead stiffeners	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
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
Bulwark and gunwale	4.0 mm	5.0 mm	Stiffeners 50 x 6 mm Max. spacing 500 mm
Superstructure and deckhouses	4.0 mm	5.0 mm	Stiffeners 50 x 6 mm Max. spacing 500 mm
Deck beams in superstructure	75 x 6 mm Wmin = 10 cm^3	75 x 6 mm Wmin = 10 cm^3	Max. spacing 500 mm Max. spacing 2.5 m
Brackets and end connections	Brackets 1.5 x profile depth t = 6 mm	Bracket depth = 1.5 x profile depth t = profile thickness	If no brackets, profiles shall be welded at the ends to adjacent profiles

.3 Remarks

.3.1 The span has been calculated from supporting point to supporting point or to the middle of brackets.

.3.2 W = Section modulus for profiles, including a plate area of 25 x the plate thickness.

.3.3 If other spacing for frames/beams/stiffeners is used, compensation may be made directly proportionally.

.3.4 If other spans for frames/beams/stiffeners are used, compensation shall be made using the ratios between the spans raised to the second power.

.3.5 If other profile types are used, they shall have at least the same section modulus as that which is to be replaced.

.3.6 Where beams are supported by beam deck girders, they shall be dimensioned for carrying the weight of the load that the deck area supports. The load on the working deck is the weight of the load that it has been designed to carry, however minimum 8.0 kN/m^2. On superstructure decks, minimum 4.0 kN/m^2. The calculation shall be made in accordance with the rules of a recognised organisation.

.3.7 In sea water tanks, ballast tanks, RSW and CSW tanks, a corrosion addition of at least 1.5 mm shall be added to the material thicknesses. Where such tanks are protected by an effective coating, the corrosion addition may be reduced or left out.

.3.8 Transversal main frames shall terminate at the bottom against the floor timber or tanktop and at the top against the deck beam or deck with bracket or welded connection corresponding to the frame profile.

.3.9 Longitudinal main frames shall terminate at the web frame, bulkhead, stern or stem by a welded connection to the bracket with a sufficient displacement area.

.3.10 Engine and gear seatings shall be properly dimensioned so that they can absorb the tensile and compressive forces of the propeller and in accordance with the engine manufacturer's recommendation. The longitudinal girders of the engine seating shall have at least the same strength as the floor timbers and a sufficient length in front of and abaft the engine. The girders shall terminate against the transversal floor timber, bulkhead or similar reinforcement. The seating shall have strong transversal stiffening with a smooth transition to the hull. The top flanges of the engine seating shall be made of strong profiles compared to the diameter of the seat bolts and the manufacturer's instructions. The seatings shall be well reinforced by brackets and tripping brackets.

6 Inspection

.1 The requirements of the above table as well as the material, documentation and the execution of the work shall be inspected for each individual vessel during the final survey.

.2 Welding inspection by means of x-rays or similar shall be carried out if it is regarded as necessary in accordance with the Guidance on Inspection of Welding Work.

Regulation 24 – Construction of steel vessels

1 General

.1 The following provisions shall apply to steel vessels that are inspected individually during their construction.

2 Materials

.1 Documentation shall be available in the form of classification society or manufacturers' certificates verifying that plates and profiles are of the types and grades approved for the given construction number. Filler materials and gas mixtures shall comply with recognised standards (for example those of a recognised organisation).

.2 The materials shall be dry and free of corrosion.

.3 Each plate shall be of an average thickness corresponding at least to the nominal thickness of the plate.

3 Adjustment of materials

.1 The structure and welded joints of the material shall be such that there is good accessibility for welding work.

.2 The adjustment of plates and profiles shall be so accurate that the welded joints have the correct dimension in relation to the thickness of the material.

.3 Plate cutting shall be executed accurately so that good welded joints may be achieved. If necessary, edges shall be ground smooth.

4 Welding

.1 All welding shall be carried out professionally correct. Any defect or substandard work shall be remedied before the material is covered with paint or similar.

.2 The welding of the hull shall be carried out under supervision and subsequently be checked by an approved welder.

.3 When welding is carried out in cold or damp weather, the steel shall be preheated before welding. Such preheating shall be carried out at temperatures of or below -5° C. There shall not be any water in or close to the welded joint during welding.

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

.5 Fillet welding shall always be double continuous welding on the following:

.5.1 Seatings, ends and brackets for stiffeners.

.5.2 "a" measurements may not be less than stipulated in the following table:

Plate thickness t	A measurement in mm
Below 4.0	2.5
4.0-6.5	3.0
6.5-8.0	3.5

5 Welding of various structures.

.1 When the various structures are being welded, the following types of welding shall be used:

Hull component	Type of welding
Beam brackets and other supports	Continuous double fillet welding
Shell plating, decks, bulkheads and other plate butts	Burnt through butt welding
Floors and bulkheads	Continuous double fillet welding
Keel and stem	Continuous double fillet welding
Seatings for machinery and equipment	Continuous double fillet welding
Tank boundaries	Continuous double fillet welding
Deck and superstructure	Continuous double fillet welding
Keelson, frames, beams, bulkhead stiffeners	Intermittent double fillet welding, however not in water tanks

.2 Double intermittent welding may be used in other places.

t mm	1 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

t: plate thickness

l: weld length (double fillet weld)

e: spacing between welds

.3 Single-sided intermittent welding (Z-welding) may be used when fastening stiffeners instead of double intermittent welding when the same amount of welding is applied. At ends, however, 150 mm double welding.

.4 Fillet welds other than mentioned in paragraph 4.5 shall normally have an "a" measurement of at least 3.5 mm.

6 Executing details

.1 There shall be continuity in stiffeners. Bracket plates shall be used where necessary to achieve a sufficient fastening area.

7 Stiffeners crossing watertight partitions:

.1 If welds and joints at continuous elements passing watertight partitions have not been carried out correctly, there is a great risk of leaks. To ensure the watertightness at continuous stiffeners that have been chain or Z-welded, the weld shall be closed with a notch in the stiffener or with a short fully burnt through weld on both sides of the watertight partition (bulkhead, deck, floors).

8 Welding of plate collars:

.1 Tank decks (e.g. deep tanks, dry tanks, heeling and trimming tanks):

.2 Collars shall be welded from both sides. If there is insufficient space to weld from the back, the collar shall be sharpened against the profile and plating.

.3 Strength decks: Where frames penetrate structural decks, the collars shall be welded from both sides. Other decks: Collars shall only be welded from above. If web frames penetrate decks, the collars shall be welded from both sides.

.4 Bulkheads: Watertight bulkheads (including watertight floors): All plate collars shall be welded from both sides. Where bulkheads provide support for beams (bulkheads replace beam bearers or web frames), the collars shall be welded from both sides.

.5 Light bulkheads, including superstructures and deckhouses: The collars shall be welded only from the fitting side. Where web frames and girders penetrate bulkheads, the plate collars shall be welded from both sides. (In this case, the bulkheads replace tripping brackets).

.6 Stiffeners shall be welded to supporting girders, also where stiffeners are continuous.

Regulation 25 – Simplified structural requirements for aluminium vessels

1 General

.1 Aluminium vessels may be constructed in accordance with the provisions of this regulation provided that:

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

.1.2 Bulkheads, frames, floors and other structural elements shall be accessible for inspection, and it shall be possible to make thickness measurements on the hull's bottom, sides and deck.

.2 If the stipulated conditions are not satisfied, the vessel shall be constructed in accordance with the rules of one of the recognised organisations.

2 Drawing approval

.1 If the vessel is constructed as unclassed, drawings and calculations shall, before the construction of the vessel is begun, be submitted for the approval of the Danish Maritime Authority in accordance with the Guidance on Approval of Drawings issued by the Danish Maritime Authority, cf. chapter I, regulation 6.

3 Materials

.1 At the construction, it shall be documented that materials of seawater-resistant aluminium have been used with a classification society or manufacturer's certificate and with the following minimum properties:

σ 0.2 = 170 N/mm2

Where materials with another σ 0.2 is used, corrections shall be made (multiplication by) $\sqrt{\frac{170}{}}$ by the factors:

$f_1 = \sqrt{\frac{170}{\sigma 0.2} V170 / \sigma 0.2}$ for plates, and

Fw = V170/σ0.2 for section modulus W of profiles.

4 Execution

.1 The production facilities as well as the adjusting of materials, welding, riveting, gluing and detailing shall normally comply with the provisions of regulation 26.

5 Scantling

.1 The minimum dimensions shall comply with the following table, and interpolation shall be used for vessels of a length between 8.0 m and 15.0 m as defined in chapter I, regulation 2.15 (the regulatory length). If it exceeds 15 m, the column for L = 15.0 m shall also be used.

Scantling table for aluminium vessels

Designation	**Length <=8.0 m**	**Length = 15.0 m**	**Remarks**
Frame spacing	Max. 300 m	Max. 300 m	
Bar keel	Cross-sectional area 18 cm^2 Min. thickness = 16 mm	Cross-sectional area 24 cm^2 Min. thickness = 20 mm	If bar keel is omitted Keel plate = 1.5 x floor thickness Total breadth = 30 x length, mm
Centre keel	Cross-sectional area 18 cm^2 Min. thickness = 6 mm	Cross-sectional area 24 cm^2 Min. thickness = 8 mm	Only required if bar keel is omitted
Floors	Height 200 mm Thickness = 5.0 mm	Height 250 mm Thickness = 6.0 mm	Only required for every third frame. Bracket floors on other frames
Flange on top of floors	50 x 5 mm	50 x 6 mm	May be omitted if concrete is cast to the top of floors
Keelson	UNP 100 or equivalent Area 13.3 cm^2	UNP 120 or equivalent Area 17.0 cm^2	Only required if centre keel is omitted
Frames	90 x 8 mm W = 21 cm^3	100 x 8 mm W = 27 cm^3	Max. span 2.50 m
Bottom plates	4.5 mm	7.0 mm	Increase for keel and stem plates + 1.0 mm (breadth 500-600 mm)
Shell plates	4.5 mm	6.0 mm	Increase for stem plates + 1 mm (breadth 500-600 mm)
Bulkheads	4.5 mm	6.0 mm	
Bulkhead stiffeners	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
Decks	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 gun-wale	4.0 mm	6.0 mm	Supports, max. spacing 600 mm
Superstructure and deckhouses	4.0 mm	5.5 mm	Stiffeners 50 x 6 mm Max. spacing 300 mm
Deck beam in 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
Brackets and end connections	Brackets 1.5 x profile depth t = 6 mm	Brackets 1.5 x profile depth t = profile thickness	If there are no brackets, profiles shall be welded at the ends to the adjacent profiles in full circumference

.2 Remarks

.2.1 The span has been calculated from supporting point to supporting point or to the middle of brackets.

.2.2 W = section modulus for profiles, including a plate area of 25 x the plate thickness.

.2.3 If other frames/beams/stiffeners are used, compensation shall be made in direct proportion between the given spacing and the spacing used.

.2.4 If other spans of frames/beams/stiffeners are used, compensation shall be made using the ratios between the given maximum span and that used raised to the second power.

.2.5 If other profile types are used, they shall have at least the same section modulus as that which is to be replaced.

.2.6 Where beams are supported by beam girders, they shall be dimensioned for carrying the weight of the load that the deck area supports. The load on the working deck is the weight of the load and the equipment that it has been designed to carry, however minimum 8.0 kN/m^2 and on superstructure decks, minimum 4.0 kN/m^2. The calculation shall be made in accordance with the rules of a recognised organisation.

.2.7 Transversal main frames shall terminate at the bottom against the floor timber or tanktop and at the top against the deck beam or deck with bracket or welded connection corresponding to the frame profile.

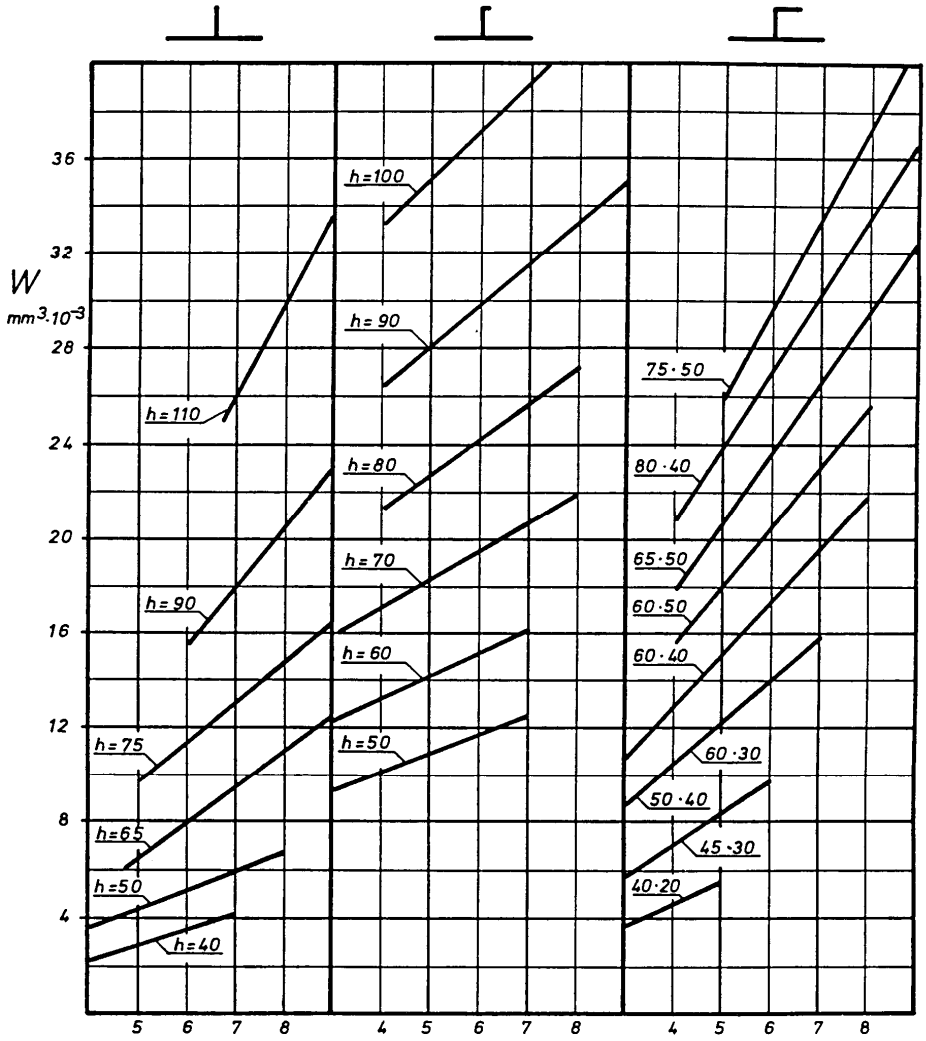
.2.8 Longitudinal main frames shall terminate at the web frame, bulkhead, stern or stem by a welded connection to the bracket with a sufficient displacement area.

.2.9 Engine and gear seatings shall be properly dimensioned so that they can absorb the tensile and compressive forces of the propeller and in accordance with the engine manufacturer's recommendation. The longitudinal girders of the engine seating shall have at least the same strength as the floor timbers and a sufficient length in front of and abaft the engine. The girders shall terminate against the transversal floor timber, bulkhead or similar reinforcement. The seating shall have strong transversal stiffening with a smooth transition to the hull. The top flanges of the engine seating shall be made of strong profiles compared to the diameter of the seat bolts and the manufacturer's instructions. The seatings shall be well reinforced by brackets and tripping brackets.

6 Inspection

.1 The requirements of the above table as well as material documentation and the execution of the work shall be inspected for each individual vessel at the final inspection.

.2 Welding inspection shall be made by means of x-rays or similar if it is regarded as necessary pursuant to the Guidance on Inspection of Welding Work.



h = height in mm t = thickness in mm

Diagram showing section modulus for profiles, including plate section with a thickness of 4-9 mm

Regulation 26 – Building of aluminium vessels

1 The following provisions shall apply to aluminium vessels that are surveyed individually during construction.

2 Storage of materials

.1 Plates, profiles and other aluminium materials shall be stored horizontally so that the materials are not damaged or deformed.

.2 Welding equipment and electrodes, filler material, etc. shall be stored in a dry and clean place.

.3 Aluminium materials may not be stored together with other metallic materials.

3 Production facilities

.1 Aluminium shall be worked on and welded in a dry place, under cover and sheltered from weather and wind.

.2 The workplace shall be clean and free of work on other metallic materials.

.3 If temperatures below 0° C may occur, it shall be possible to seal and heat the production facility.

4 Materials

.1 Documentation shall be available in the form of classification society or manufacturers' certificates verifying that plates and profiles are of the types and grades approved for the given construction number. Filler materials and gas mixtures shall comply with recognised standards (e.g. those of a recognised organisation).

.2 The materials used shall be straight and undamaged and shall have specified and approved dimensions.

.3 Plates and profiles to be used for the hull and superstructures shall be seawater-resistant, rolled, drawn or extruded products, which shall normally observe the following restrictions as to material composition:

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

.4 Examples of materials that comply with these requirements:

Alloy no.	5052	5083	5086	5154	5454
Type des-ignation	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 Forming of materials

.1 Hardened aluminium materials shall normally not be formed by applying heat, and cold-forming may be used only in case of low stress properties. Aluminium materials shall normally be straight or be formed by rolling.

.2 Plates shall normally be bent by rolling. Bending through 90° may not be carried out unless the radius of curvature, R, is at least:

R = Fxt

where

F: bending factor pursuant to the following table

t: material thickness

State: State variables pursuant to applied standard, e.g. DIN 17007.

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

.3 Materials shall be cut so that the edges are straight and without scars or burrs.

6 Welding

.1 Aluminium may not be welded at temperatures below +5° C.

.2 Hull and deck may be welded only by welders with a certificate to work with the materials and the equipment used.

.3 Normally, welding electrodes/wires of AlMg4.5Mn or AlMg5 shall be used unless it is documented that other materials provide better results.

.4 All welding shall be fully burnt through and have a fine surface without any pores or edge scars.

.5 All plates and fastenings of watertight bulkheads and engine seatings shall be continuously welded.

.6 If intermittent welding is used, the weld lengths shall at least be equal to the length of the gaps and they shall always be continuous at the ends.

.7 The guidelines for welded joints stipulated in regulation 24 shall also apply to aluminium vessels.

.8 The welding shall be pursuant to the previously approved scantling.

.9 The welding on representative parts of the hull shall be inspected by means of penetrating liquids or an equivalent method. Surface cracks may not occur.

7 Riveting

.1 Riveting may be used on decks and superstructures, but not in hull plating.

.2 Pop riveting may not be used on loaded structures unless it has been tested and approved beforehand.

.3 Normally, rivets shall be of a diameter of at least twice the plate thickness, and they shall have a mutual spacing of a maximum of 12 times the plate thickness. The distance to the plate edge shall be at least six times the plate thickness.

8 Gluing

.1 Gluing may be used only if a static and dynamic test has been carried out beforehand with the given type of glue connection, and if its use has been approved.

.2 Only glue types with documented good long-term durability properties under the effects of a damp environment within the given temperature ranges may be used.

.3 An approved procedure for the gluing process shall be available.

9 Other connections

.1 Connections between aluminium and other materials, with the exception of acid-proof, stainless steel, shall be insulated completely from one another by means of, for example, neoprene packing and plastic bushings.

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Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter III
Stability and associated seaworthiness

Unless expressly provided otherwise, this chapter shall apply to new vessels and existing mussel fishing vessels as defined in chapter I, regulation 2.

Regulation 1 – General

1 Vessels shall be so designed and constructed that the requirements of this chapter will be satisfied in the operating conditions referred to in regulation 7. Calculations of the righting lever curves shall be to the satisfaction of the Danish Maritime Authority.[1]

Regulation 2 – Stability criteria

1 The following minimum stability criteria shall be met unless the Danish Maritime Authority is satisfied that operating experience[2] justifies departures therefrom:

.1 The area under the righting lever curve (GZ curve) shall not be less than 0.055 m-rad up to 30° angle of heel and not less than 0.09 m-rad up to 40° or the angle of flooding Θ_f if this angle is less than 40°. Additionally, the area under the righting lever 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 m-rad. Θ_f is the angle of heel at which openings in the hull, superstructure or deckhouses which cannot rapidly be closed weathertight commence to immerse. In applying this

1 Cf. the latest guidance from the Danish Maritime Authority on the approval of stability.

2 The Danish Maritime Authority regards the stability criteria for offshore supply vessels of regulations 4.5.6.2.1 to 4.5.6.2.4 of the "Code on Intact Stability", IMO Resolution A.749(18), as amended by Resolution MSC.75(69), as equivalent to regulations 2.1.1-2.1.3.

criterion, small openings through which progressive flooding cannot take place need not be considered as open.

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

.3 The maximum righting lever GZ_{max} shall occur at an angle of heel preferably exceeding 30° but not less than 25°.

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

2 Where arrangements other than bilge keels are provided to limit the angles of roll, the Danish Maritime Authority shall be satisfied that the stability criteria required by regulation 2.1 are maintained in all operating conditions.

3 Where ballast is provided to ensure compliance with the stability criteria of regulation 2.1, its nature and arrangements shall be to the satisfaction of the Danish Maritime Authority. In vessels constructed on or after 1 January 2007, this ballast shall be solid. Solid ballast shall be made of solid matter and be securely fastened in the vessel. The Danish Maritime Authority may accept water ballast if it is carried in tanks especially designed for this purpose. If water ballast is used as solid ballast to ensure compliance with regulation 2.1, particulars hereof shall be given in the stability information. Solid ballast may not be removed from the vessel or moved about without the approval of the Danish Maritime Authority.

Regulation 3 – Flooding of fish-holds

1 The angle of heel at which progressive flooding of fish-holds could occur through hatches which remain open during fishing operations and which cannot rapidly be closed shall be at least 20° unless the stability criteria of regulation 2.1 can be satisfied with the respective fish-holds partially or completely flooded.

Regulation 4 – Particular working methods

1 Vessels engaged in particular working methods where additional external forces are imposed on the vessel during working operations shall meet the stability criteria of regulation 2.1 increased, if necessary, to the satisfaction of the Danish Maritime Authority.

2 Vessels on which loading and unloading gear has been installed may not heel more than 10° under the maximum work load and in the relevant operating conditions when the gear is in the least favourable position.

3 Beam trawlers with a maximum bollard pull of L^2 x 0.015 tons or more where the bollard pull is measured directly by physical testing at full main engine power shall comply with the following additional requirements:

.1 The requirements of regulation 2.1.1 for the area under the righting lever curve GZ shall be increased by 20%.

.2 The requirement of regulation 2.1.2 for the righting lever GZ shall be increased by 20%.

.3 The requirement of regulation 2.1.4 for the metacentric height GM shall be increased to 500 mm.

4 Decked fishing vessels shall have a righting lever GZ that is positive up to a heel of 65° when all means of closing are assumed closed. Existing mussel fishing vessels shall not meet this requirement.

5 Tugs with a propulsion power of more than 150 kW designed to tow other vessels and equipped with hooks, winches, bollards or equivalent arrangements shall, under towing conditions, have an area

between the righting lever curve (the GZ curve) and the heeling lever curve of at least 0.001 m-rad up to an angle of heel of 40°. The heeling lever shall be calculated in accordance with the following formula:

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

k: Heeling lever in m

C: *F*our times *l/L*, but max. 1.0

L: Length of the tug between the perpendiculars in m

l: Horizontal distance between the point of action and the aft perpendicular in m

T: Static bollard pull of the tug in kN

h: Point of action's height above the waterline in m

Θ: Angle of heel of the tug

r: Distance in m from the centre line of the tug to the hook's point of action when the pull is transversal

d: Mean draught of the tug in m

Δ: Weight displacement of the tug in tons

6 New and existing vessels fishing with an arrangement that will, in one turn, automatically move the gear's point of attack to the side whereto the vessel turns or involves a risk hereof if the gear gets snagged shall comply with the following requirements:

.1 It shall be possible to release the gear quickly from the control station.

.2 The point of attack of the gear shall be in as low a position as possible and never higher than the gunwale (maximum 1 m above deck). As an equivalence, existing vessels may instead comply with the additional stability requirements of regulations 4.3.1 to 4.3.3 in all relevant operating conditions.

7 Mussel fishing vessels shall be fitted with an arrangement that will automatically release the gear when taking in the catch if the heel exceeds the critical angle of heel. The critical angle of heel shall be evident from the vessel's stability information and determined for the actual operating condition where the lever for the maximum righting moment GZ_{max} occurs at the lowest angle of heel. The critical angle of heel is 7 lower than this angle of heel.

Regulations 5 and 6 – Not currently in use

Regulation 7 – Operating conditions

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

Fishing vessels:

.1 Lightship condition.

.2 Departure for the fishing grounds with full fuel, stores, ice, fishing gear, etc.

.3 Departure from the fishing ground with full catch.

.4 Arrival at home port with full catch and 10% stores, fuel, etc.

.5 Arrival at home port with 10% stores, fuel, etc. without catch.

Cargo vessels:

.6 Departure without cargo, but with persons and full stores, fuel, etc.

.7 Arrival without catch, but with persons and 10% stores, fuel, etc.

.8 Departure with full cargo, persons and full stores, fuel, etc.

.9 Arrival with full cargo, persons and 10% stores, fuel, etc.

2 In addition to the specific operating conditions given in regulation 7.1 the Danish Maritime Authority shall also be satisfied that the stability criteria given in regulation 2 are met in all other actual operating conditions, including those which produce the lowest values of the stability parameters contained in these criteria. The Danish Maritime Authority shall also be satisfied that those special conditions associated with a change in the vessel's mode or areas of operation which effect the stability requirements of this chapter are taken into account.

3 Concerning the operating conditions referred to in paragraph 7.1, the calculations shall include the following:

.1 Allowance for the weight of the wet fishing nets and tackle, etc. on the deck.

.2 Allowance for ice accretion, if anticipated, in accordance with the provisions of regulation 8.

.3 Homogeneous distribution of the catch and the cargo, unless this is inconsistent with practice.

.4 Catch and cargo on deck, if anticipated, in operating conditions referred to in regulations 7.1.2, 7.1.3, 7.1.7 and 7.1.8 and in regulation 7.2

.5 Water ballast if carried either in tanks which are especially provided for this purpose or in other tanks also equipped for carrying water ballast.

.6 Allowance for the free surface effect of liquids and, if applicable, catch carried.

Regulation 8 – Ice accretion

1 For vessels operating in areas[3] where ice accretion is likely to occur the following allowance shall be made in the stability calculations:

.1 30 kg/m^2 on exposed weather decks and gangways. For vessels operating in the area north of 63° N and between 28° W and 11° W, the ice allowance shall be increased to 40 kg/m^2.

.2 7.5 kg/m^2 for projected lateral area of each side of the vessel above the water plane. For vessels operating in the area north of 63° N and between 28° W and 11° W, the ice allowance shall be increased to 10 kg/m^2.

.3 The projected lateral area of discontinuous surfaces of rail, spars (except masts) and rigging of vessels having no sails and the projected lateral area of other small objects shall be computed by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.

2 Vessels operating in areas where ice accretion is known to occur shall be:

.1 Designed to minimize the accretion of ice.

.2 Equipped with such means for removing ice as the Danish Maritime Authority may require.[4]

Regulation 9 – Inclining test

1 Every vessel shall undergo an inclining test[5] upon its completion and the actual displacement and position of the centre of gravity shall be determined for the light ship condition.

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3 Waters north of 56° N in the Baltic as well as north of the boundary determined by 62° N from the west coast of Norway to 4° W, then 4° W to 60°30' N to 5° W, then 5° W to 60° N, then 60° N to 15° W to 62°N, then 62° N to 27° W, then 27° W to 59° N, then 59° N westwards and along the line running from 63° N, 28° W to 43° N, 48° W, then 43° N, bounded to the west by the North American coast. Furthermore, all waters north of the North American and the Asian continents, the Bering Sea, the Sea of Okhotsk, the Tartary Strait in the ice season as well as south of 60° S.

4 The Danish Maritime Authority requires that suitable wooden mallets be available on board for removal of ice in a number corresponding to the crew of the vessel.

2 Where alterations are made to a vessel affecting its light ship condition and the position of the centre of gravity, the vessel shall, if the Danish Maritime Authority considers this necessary, be re-inclined and the stability information revised.

3 The Danish Maritime Authority may allow the inclining test of an individual vessel to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Danish Maritime Authority that reliable stability information for the exempted vessel can be obtained from such basic data.

4 The inclining test and the determination of the condition required under regulation 9.1 shall be carried out at least once every ten years.

5 The Danish Maritime Authority may, when adequate offsets of the hull are not available, in general allow the inclining test of open vessels to be dispensed with provided that results from a so-called dynamometer test[6] are available and it is shown to the satisfaction of the Danish Maritime Authority that reliable stability information for the exempted vessel can be obtained from these results and that the stability criteria are met under the worst actual operating conditions.

Regulation 10 – Stability information

1 Stability information shall be supplied in Danish to enable the master to assess with ease and certainty the stability of the vessel under various operating conditions. Such information shall include specific instructions to the master warning him of those operating conditions which could adversely affect either the stability or the trim of the vessel. The stability information shall be submitted to the Danish Maritime Authority for approval.[7]

2 For new and existing fishing vessels covered by regulation 14, the stability information shall furthermore contain a diagram clearly showing the correct location of the marks indicating the operating waterline corresponding to the maximum permissible operating draught.

3 The approved stability information shall be kept on board, readily accessible at all times and inspected at the surveys of the vessel to ensure that it has been approved for the actual operating conditions.

4 Where alterations are made to a vessel affecting its stability, revised stability calculations shall be prepared and submitted to the Danish Maritime Authority for approval.[8] If the Danish Maritime Authority decides that the stability information must be revised, the new information shall be supplied to the master and the superseded information removed.

Regulation 11 – Portable fish-hold divisions

1 The catch shall be properly secured against shifting which could cause dangerous trim or heel of the vessel. The scantlings of portable fish-hold divisions, if fitted, shall comply with the requirements of the Danish Maritime Authority.[9] Furthermore, large fish containers shall be securely fastened.

Regulation 12 – Bow height

1 The bow height shall be sufficient, in accordance with the requirements of the Danish Maritime Authority,[10] to prevent the excessive shipping of water and shall be determined taking account of the

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5 Cf. the latest guidance from the Danish Maritime Authority on the approval of stability.

6 Cf. the latest guidance from the Danish Maritime Authority on the approval of stability.

7 Cf. the latest guidance from the Danish Maritime Authority on the approval of stability.

8 Cf. the latest guidance of the Danish Maritime Authority on the approval of stability.

9 IMO Resolution A.168(ES.IV), as amended by resolution A.268(VIII).

seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation.

Regulation 13 – Maximum permissible operating draught

1 A maximum permissible operating draught shall be approved by the Danish Maritime Authority and shall be such that, in the associated operating condition, the stability criteria of this chapter and the requirements of chapters II and VI as appropriate are satisfied. The maximum permissible operating draught shall be given on the trading permit.

Regulation 14 – Marking of the maximum permissible operating draught

1 This regulation shall apply to new and existing fishing vessels subject to an initial survey on or after 1 March 2011 as well as to fishing vessels whose main dimensions are altered or whose lightweight or gross tonnage is increased by more than 10%. The regulation shall not apply to Greenland vessels.

2 On each side of the ship, a mark shall be placed indicating the operating waterline corresponding to the maximum permissible operating draught.

3 Each mark shall consist of a horizontal line 300 mm in length and 25 mm in breadth which is marked amidships so that its lower edge is in line with the maximum operating waterline.

4 The marks shall be plainly visible and painted in white or yellow on a dark ground or in black on a light ground. They shall be welded, scribed or in any other way permanently affixed to the ship's sides.

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

10 The bow height measured in meters shall be at least 0.017 times the length of the vessel + 0.7 m. The length has been defined in chapter I, regulation 2.

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Chapter IV
Machinery and electrical installations

Unless expressly provided otherwise, this chapter shall apply to all new vessels as defined in chapter I.

Part A – General

Regulation 1 – General

1.1 Machinery and electrical installations shall be constructed and installed in accordance with sound workmanship and, if relevant, comply with rules laid down by a recognised organisation or equivalent, cf. regulation FI/1a. Machinery and equipment shall be protected, installed and maintained so that any danger to the vessel and those on board is reduced to a minimum. Special attention shall be paid to moving parts, hot surfaces and other dangers.

1.2 Machinery spaces shall be arranged so that safe and free access is provided to all machinery and associated control equipment as well as to other parts that may require operation. Such spaces shall be sufficiently ventilated.

1.3 Means shall be provided for starting the machinery from the stationary position without any outside help.

1.4 Fuel oil with a flash point below 60 C may not normally be used.

1.5 Plastic pipes may not be used for any purpose in machinery spaces where damage to them in case of fire would present a safety risk.

Part B – Machinery installations

Regulation 2 – Propulsion machinery

Vessels with a length L below 12 m as well as open vessels.

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

Decked vessels with a length L of or above 12 m.

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

All vessels.

2.3 The propulsion engine shall be fitted with an identification plate stating the manufacturer, type designation, effect and manufacturer's production number.

2.4 Propulsion machinery shall be installed in a separate machinery space or engine box separated from other spaces in the vessel by means of watertight bulkheads.

2.5 In machinery spaces, windows or any other kind of apertures may not be fitted in the side of the ship, in machinery casings or in decks.

2.6 All gears, propeller shafts and couplings for the transmittance of power to machinery of considerable importance to the vessel's propulsion, safety and other operation or to the safety of those on board shall be designed and constructed so that they are capable of resisting the highest workloads that they may be exposed to under all operating conditions. Proper consideration shall be paid to the engine type by which it is driven or forms a part.

2.7 At engine powers of 375 kW or more, there shall be at least one spare cooling water pump, which is driven separately. In the case of freshwater cooling systems, spare pumps may be omitted if there is a separate connection to the saltwater system with the possibility of circulating the fresh cooling water.

2.8 It shall be possible to operate the propulsion machinery from the wheelhouse, from which it shall also be possible to monitor the following control instruments:

.1 the number of revolutions of the propulsion machinery
.2 the lubricating oil pressure of the propulsion machinery
.3 the lubricating oil pressure and, where applicable, hydraulic oil pressure of the gear
.4 the cooling water temperature
.5 cooling water failure in exhaust systems
.6 controls for battery charging.

The control instruments shall be marked with areas indicating abnormal operating conditions and be provided with adjustable lighting. Alarms shall be established for the above functions with the exception of the number of revolutions of the propulsion machinery.

2.9 The ventilation system for the machinery space shall consist of at least two ventilation ducts, appropriately placed and with a dimension ensuring sufficient air supply and a suitable temperature throughout the machinery space. The height above deck of ventilator coamings shall be as great as is reasonably practicable, but at least 760 mm on weather decks and working decks and 450 mm on superstructure decks. At least one of the ventilation ducts shall, at a suitable point, be led to the bottom of the machinery space.

.1 in the case of natural ventilation, the ducts shall be as short as possible and shall not have any unnecessary bends.

.2 if the total cross-sectional area of both the intake and outlet ducts is at least 7 cm^2/kW, the air supply to the engine space shall be considered satisfactory. If the engine manufacturer prescribes a greater cross-sectional area in the ducts, such specifications shall, however, be observed.

.3 in the case of mechanical ventilation, the ventilator shall have the necessary capacity pursuant to the engine manufacturer's required amount of air, and the air supply duct shall have a cross-sectional area sufficiently great to ensure that the air speed does not exceed 6 m/sec.

.4 it shall be possible to shut off the ventilators from an easily accessible place outside the machinery space.

2.10 All combustion engines shall be designed so that they may be reliably started.

.2 If a crank is used to start the engine, it shall be self-releasing or designed in another reliable manner.

.3 Where compressed air is used to start the engine, there shall be two mutually independent compressed air pumps, one of which may be a manual pump. All compressors shall be fitted with a safety valve. The suction of the compressor shall be arranged so that the intake of oil-contaminated air is restricted.

.4 If the direction of propulsion is changed by reversing the engine, there shall be power for at least 12 starts of each propulsion engine without supplying additional power.

.5 If the engine is not reversible, i.e. where reverse or reversible propeller blades are used, the total power for compressed air starting need only be sufficient for six starts.

.6 If the engine is started solely by means of electrical power, there shall be at least two mutually independent accumulator batteries that may be connected to both the starting and the charging arrangement via switches (changeable cables are not permitted).

.7 It shall be possible to fully charge all starting batteries in six hours. If a starting battery is used for other purposes, the battery capacity shall be increased accordingly, and the main circuit of the starter system shall be kept completely separate from other circuits.

.8 In case of electrical starts, each of the two individually independent batteries shall have sufficient capacity for six starts.

.9 The battery capacity shall be doubled in vessels allocated to trading areas around Greenland.

2.11 Engine suspensions shall be made in accordance with the instructions of the engine supplier. Where flexible suspensions are used for propulsion machinery, the elastic part of the propeller shaft shall be longer than 40 x the shaft diameter if a flexible shaft coupling is omitted. Elastic couplings shall be designed so that emergency operation is possible.

2.12 Unclassed propeller shaft systems shall be dimensioned in accordance with the instructions of the engine supplier, but the shaft diameter shall be at least:

$$Dp = \sqrt[3]{\frac{p}{r}} \text{ x } k$$

where:

Dp: shaft diameter in mm

p: maximum power of the machinery in kW

r output speed of the propeller per second

k = 30 steel
k = 23 AISI 316 austenitic stainless steel
k = 22 AISI 431 martensitic stainless steel
k = 18 nickel-copper alloy K 500
k = 21 AISI 429

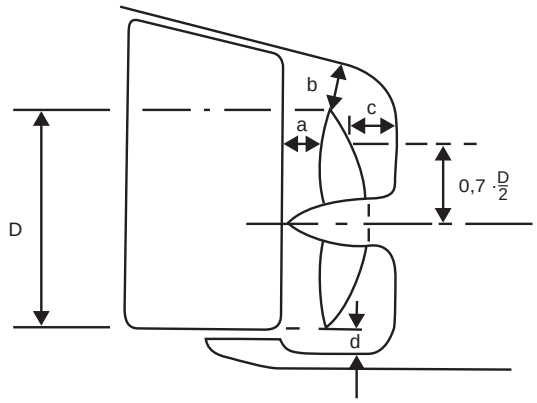
Propeller shaft materials shall have an ultimate stress of at least 440 N/mm^2.

If a material with a greater ultimate stress (σ) than 440 N/mm^2 is used, the diameter may be corrected by the following factor:

$$f = \sqrt[3]{\frac{600}{\sigma + 160}}$$

In the case of hollow shafts where the hole diameter exceeds 0.4 x the outside diameter, the shaft diameter shall be increased so that the momentum of resistance is not less than for solid shafts.

2.13 The distance between the tip of the propeller and the water surface may not be less than 10% of the propeller diameter in any condition. In vessels with double propeller arrangements, the distance between the propeller shafts shall be at least 1.5 times the propeller diameter. The distance from the propeller to the surrounding structures shall be at least as given in the diagram.



Rudder and stern

where

a = 0.10 x D
b = 0.10 x D
c = 0.15 x D (also applies to the distance to shaft brackets)
d = 0.03 x D

At propeller speeds of or above 1,000 revolutions per minute, "b" shall be at least 0.20 x D. At speeds between 600 and 1,000 revolutions per minute, interpolation is carried out between 0.10 x D and 0.20 x D. At propeller speeds below 600 revolutions per minute, a reduction of "b" may be permitted, but never to less than 0.05 x D.

The wall thickness of shaft bearings shall be at least:

$$t = \frac{Dp + 230\,mm}{32}$$

and the length shall be at least 3 x Dp for stern tube bearings and 2 x Dp for other bearings.

At the shell plating of the vessel, the shaft bearing shall have a momentum of resistance of at least:

$$W = \frac{1 \text{ x } Dp}{112 + \sigma} \text{ cm}^3$$

Where l: length of shaft bearing in mm.

æ = tensile strength in Newton/mm^2

At the propeller shaft, the momentum of resistance of the shaft bearing shall be at least 0.6 x W cm^3.

2.14 In installations where the propeller revolutions per minute at the maximum continuous output of the engine are 600 or more, the following provisions shall be complied with:

.1 the distance between the shaft bearings may not be greater than stipulated in the following chart.

.2 the propeller shall be statically balanced in accordance with the requirement in ISO Recommendation R 484 for class 'S'.

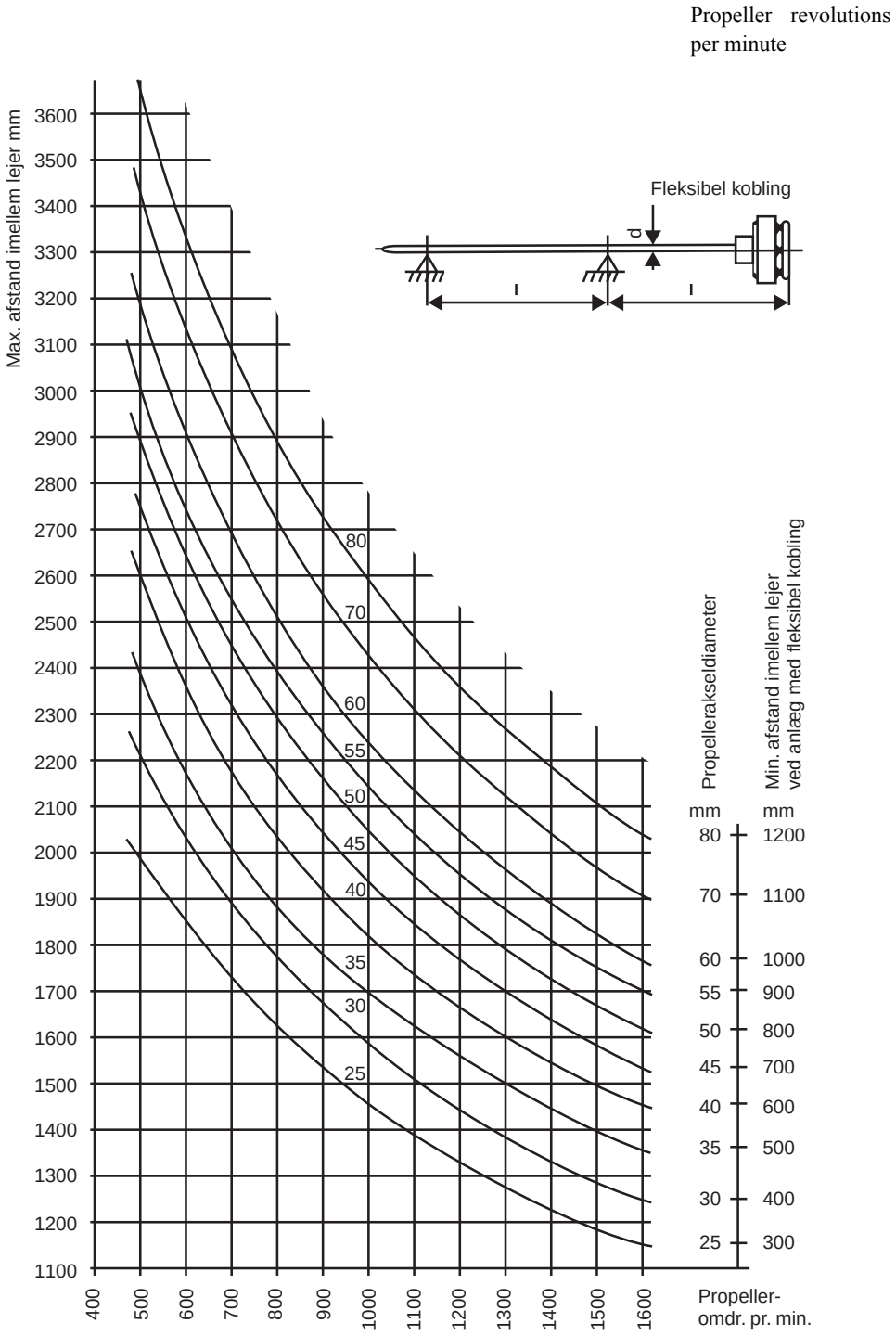
.3 where the propeller revolutions per minute are 1,000 or more, the propeller shall, furthermore, be dynamically balanced, and the sum of the loads acting immediately on each side of the propeller shall not exceed 'g' for class 'S' in the mentioned ISO recommendation. However, the Danish Maritime Authority will accept other methods that can prove that the dynamic balance is satisfactory.

.4 In special cases, such as lightweight structures, long shaft systems, special propeller designs, especially designed stern, the Danish Maritime Authority shall require that torsional vibration calculations be carried out on the engine and/or gear as well as a bending vibration calculation on the propeller shaft.

2.15 All moving parts, including couplings and connections of propeller shafts, shall be shielded in a safeguarding way, including below the floor plates. Flywheels shall be shielded and protected against hurling bilge water into the room.

2.16 Any floor-plates in engine spaces shall be made of steel or light-alloy metal with a non-slip surface and shall be fixed and secured.

2.17 Surfaces with a temperature above 65 °C shall be insulated or shielded. Pipes and hoses for pressurised oil shall be shielded from the hot parts of the engine and from the electrical installation.



Regulation 3 – Reverse capability

The vessel shall have sufficient reverse capability to ensure the necessary manoeuvrability in all normal conditions.

Regulation 4 – Air receivers

4.1 Means shall be provided for preventing overpressure in any part of compressed air systems and anywhere where water jackets, air compressors and coolers may be exposed to dangerous overpressure because air leaks into them from parts under atmospheric pressure. Suitable means for reducing the pressure shall be available.

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

4.3 All discharge pipes from starting air compressors shall be carried directly to the starting air receivers and all starting pipes from starting air receivers to main or auxiliary machinery shall be completely separate from the discharge pipe system of the compressor.

4.4 Measures shall be taken to prevent the penetration of oil into the compressed air systems to a minimum and to empty these systems.

4.5 Compressed air shall be contained in one or more air receivers designed for the purpose. These shall be made of seamless steel pipes or of boiler sheet iron (certified plate) and assembled by welding. Such containers shall, in respect of design, structure and scantlings, comply with recognised rules, but the thickness of material shall be at least 5 mm.

4.6 On each receiver, the working pressure, test pressure, the name of the manufacturer or supplier, the year of construction of the receiver as well as its serial number shall be given in a durable way so that the identity of the container may be confirmed.

4.7 The receivers shall be permanently installed and accessible for external inspection throughout. As a main rule, they shall be fitted with a closing valve, bottom drain cock or valve, pressure gauge, safety valve, frangible disc or fuse plug as well as the necessary cleaning holes.

4.8 Safety valves shall be of a sufficient size to prevent the stipulated working pressure of the container from being exceeded and may under no circumstances have a diameter of less than 10 mm. The safety valve may be fitted on the inlet pipe of the container or on the compressor and may be common for several receivers with the same pressure. All receivers the connections of which with the safety valve may be disconnected by means of intermediate shut-off devices shall be fitted with a frangible disc or a fuse plug that is activated before the test pressure of the receiver is activated and melts at a temperature of not more than 100°C.

4.9 If the Danish Maritime Authority finds that the quantity of air in the air receivers in relation to the size of the space would present a special risk in case of fire, the frangible discs, fuse plugs and safety valves fitted on the receivers shall be connected to adequately dimensioned blow-off pipes that are led to the open deck.

4.10 It shall be possible to drain water and oil from the lowest point in the receiver.

4.11 The working pressure shall be indicated on the pressure gauge by a red line. The scale of the pressure gauge shall be able to show at least 125% of the working pressure.

4.12 Receivers with an inside diameter above 150 mm shall be fitted with cleaning holes of a size such that cleaning and internal inspection may be carried out in a reliable way. Such cleaning holes may under no circumstances have a diameter below 75 mm. Containers with a length of or above 2.5 m shall have a cleaning hole in each end or be fitted with a manhole.

4.13 Inspection and pressure testing of pressure vessels.

.1 new pressure vessels for storing atmospheric air or other gases under pressure shall be pressure tested.

.2 pressure vessels that are not accessible for a reliable internal inspection shall undergo periodic pressure tests every five years. The equipment for producing, transferring and storing compressed air shall also be pressure tested if the inspection reveals that it is in such a condition that continued use could present a danger.

.3 the test pressure shall be 1.3 times the working pressure at both the first and subsequent pressure tests.

.4 a certificate from a company or person authorised by the Danish Maritime Authority shall be available verifying that the above pressure tests or inspections have been carried out with a satisfactory result.

4.14 Pressure air pipes shall be made of steel or copper piping.

4.15 Shut-off valves on pressure air pipes from receivers to the starting valves of reversible engines shall be easily accessible.

4.16 The Danish Maritime Authority may, following a concrete assessment, permit short hose connections made of an approved material.

Regulation 5 – Measures for fuel oil, lubricating oil and other flammable oils

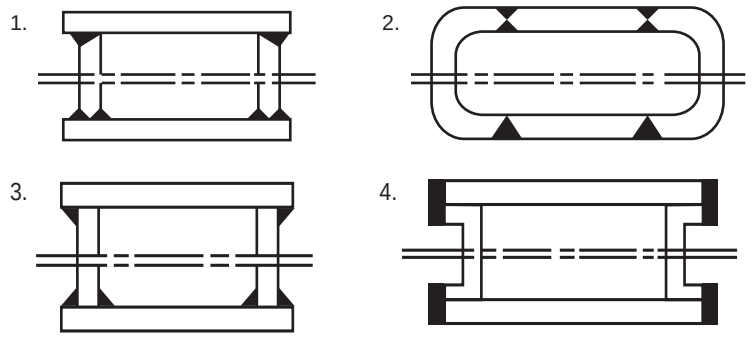
5.1 Fuel oil tanks shall be fitted with the necessary baffle plates and internal stiffeners. Tanks of or above 50 l shall, furthermore, be fitted with the necessary cleaning holes with a minimum diameter of 150 mm. Tanks of or above 1,500 l shall be fitted with manholes. It is recommended that the tanks are made tall and narrow to avoid excessive free surfaces and to prevent the oil from escaping from the suction pipe of the tank when the vessel rolls at sea.

5.2 New fuel oil tanks shall be pressure tested to at least the pressure to which they are exposed when in use, but at least 0.25 bar.

5.3 Free-standing fuel oil tanks made of steel, stainless steel or aluminium as well as built-in GRP tanks shall, where structural considerations do not require greater thickness, in respect of dimensions and materials at least be in accordance with the values in the following table:

Size	Loose tanks			Tank top and tank side of built-in tanks
	Documented steel 37-2	Documented stainless steel SIS 2353. AISI 316 L	Seawater-resistant aluminium	Glassfibre reinforced polyester GRP
0-49 l	1.5 mm	0.8 mm	4 mm	4 mm
50-99 l	3 mm	0.8 mm	4 mm	4 mm
100-199 l	3 mm	1.0 mm	4 mm	4 mm
200-999 l	5 mm	3 mm	6 mm	5 mm
1,000 and more	5 mm	4 mm	7 mm	5 mm

5.4 Free-standing fuel oil tanks made of steel, stainless steel and aluminium shall be fully welded structures. Edge welding shall not be accepted. For example as shown in the following diagrams where examples 1 and 2 may be permitted, while 3 may not be used and 4 may only be used under the conditions given.



May not be used	May not be used in tanks of stainless steel, aluminium and steel tanks of or above 50 l

5.5 Aluminium fuel oil tanks shall be made of seawater-resistant material with a certificate from a recognised organisation or of an equivalent quality. Aluminium tanks shall be installed outside machinery spaces and spaces used for storing paint or equivalent stores. However, tanks forming part of the double-bottom of the vessel may be installed in the machinery space. If aluminium tanks are placed up against spaces with heat-generating installations, the divisional bulkhead shall be fire-insulated, as stipulated in chapter V, regulation 2.4

5.6 Filling pipes and air pipes on fuel oil tanks shall be of suitably large dimensions, they shall lead to the weather deck and shall be installed and designed so that water cannot enter the tanks. Air pipes to fuel oil tanks shall exit above the superstructure on decked vessels. Filling pipes shall end tight to the deck and be installed so that any oil spill during filling cannot enter the internal of the vessel. Filling pipes and air pipes shall have the same diameter. On tanks above 200 l, the internal diameter shall be at least 38 mm. Internal pipelines between fuel oil tanks may be permitted.

5.7 It shall be possible to sound all tanks. The feeding pipe may also be used as a sounding pipe. A butt plate shall be fitted beneath the sounding pipe. Air pipes, sounding pipes and filling pipes shall be marked at the outlet on deck.

5.8 Sounding arrangements connected to the tank beneath its top shall be fitted with a self-closing valve made of steel or of another approved material. Only standpipes with flat glass may be used.

5.9 Cocks and valves fitted on fuel oil tanks shall be made of steel or another approved material. Cocks and valves shall be provided with accessible operating keys or cranks.

5.10 Oil pipelines from fuel oil tanks that may allow oil to escape in case of damage shall be provided with a cock or a valve fitted directly on the tank, which may, in case of fire, be shut-off from an easily accessible place above deck. Remote shut-off by cables with internal plastic coating shall not be permitted.

5.11 Fuel oil pipelines shall be made of either steel or copper piping. Joints shall be made as welded joints, flange joints or with suitable fittings accepted by the Danish Maritime Authority or with hard-soldering. Pipes with a diameter of or above 50 mm may not be joined by means of threaded fittings or threaded flanges.

5.12 Short, approved hose connections may be used if they are securely fitted on long connecting pieces fastened with two stainless clamps at each end or fastened with screw-joints built into the hose. One clamp may, however, be accepted if the pipe connecting piece is provided with a collar. Hose connections shall be installed so that they are visible along their entire length.

5.13 Filters, water separators and the like that are not cleaned while the engine is running shall be provided with a by-pass facility. Filter arrangements shall be designed so that they are not sucked empty if the shut-off devices on the fuel oil tank are closed.

5.14 Fuel oil gauges and the like, which have been inserted in the system, shall be fitted with a by-pass facility.

5.15 Parts of gauging equipment, filters and separators may be made of aluminium provided that this is with thick material and has a melting point of not less than 400 °C.

5.16 Electrical equipment fitted on the fuel oil system, which may in case of leakage, at penetrations or at other points come into contact with the fuel oil, shall be of an explosion-proof design.

5.17 Fuel oil pipes shall be laid or shielded so that any leak may not cause oil to drip on hot parts.

Regulation 6 – Bilge pumping and ballast arrangements and water level alarms

6.1 It shall be possible to pump from the watertight spaces of the vessel by means of a hand-driven bilge pump permanently fitted on deck. For small watertight spaces, a drain to an adjoining watertight space may be permitted if the drain is fitted with a closable non-return valve.

6.2 A hand-driven bilge pump may be used to empty two adjoining spaces by means of a two-way cock operated from the deck or wheelhouse.

6.3 All suction pipes shall be made of steel, copper or approved flexible hose. Suction pipes shall be provided with strainers, which may, however, be omitted if diaphragm pumps are used that can be opened and closed quickly. Flexible hoses may not be used in connection with combined bilge pumping and washing system.

6.4 The pumps shall be resistant to mechanical damage, and valves, diaphragms, etc. may not be made of natural rubber when pumps empty from machinery spaces or other spaces containing oily bilge water.

6.5 The capacity of hand-driven bilge pumps shall in general not be less than stipulated in the following table:

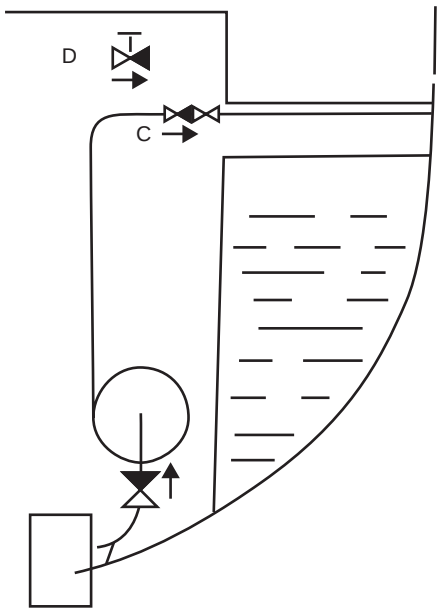
Length in meters	Litres per stroke frequency	
	Diaphragm pump	Piston pump
-7.99	0.5	0.7
8.00-9.99	0.7	1.0
10.00-	0.9	1.25

6.6 Vessels with a length L of or above 12 m shall, in addition to the hand-driven bilge arrangements, have a mechanically driven bilge pump with a capacity of not less than 10 m^3/hour. The pump shall be able to pump directly from the machinery space via a separate suction pipe or via a valve box fitted with non-return valves.

6.7 Machinery spaces in new and existing vessels shall be fitted with an alarm that sounds when the water level in the space is above normal. The alarm unit shall be located at the wheelhouse, and the signal shall be observable both visually and acoustically.

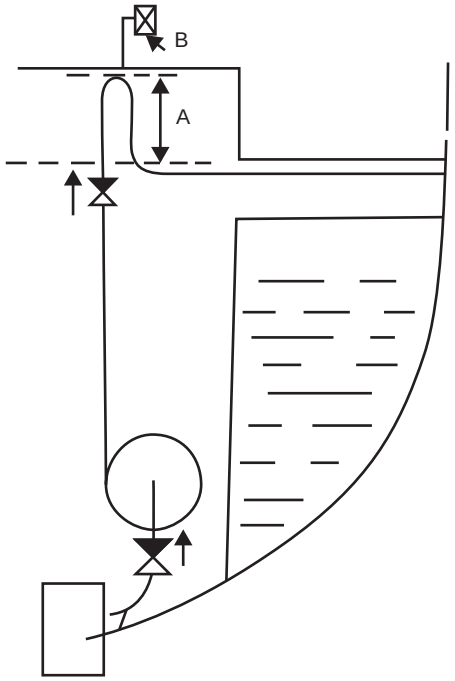
6.8 Combined bilge pumping/washing systems shall be arranged so that bilge water cannot be discharged into the washing system due to misoperation. Precautions shall be taken against water entering into the vessel via the bilge pumping system or combined bilge pumping/washing system, cf. the following simplified diagrams.

Simplified diagrams for bilge pumping and washing systems



Alternative I

1. If the shut-off device "C" is fitted directly on the shell plating, there shall be unrestricted access to operate and maintain the valve.
2. Closable non-return valve "D" may be equivalent to non-return valve and closable valve "C".
3. If the shut-off device is not fitted directly on the shell plating, but as shown in the diagram, the pipe between the shell plating and the valve(s) shall have a strong wall thickness.



Alternative II

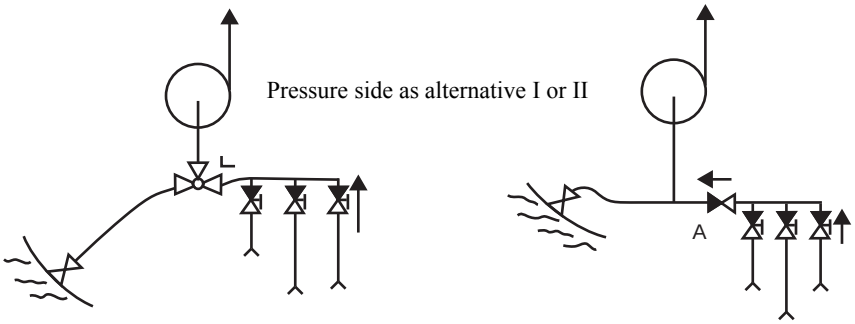
1. Distance "A" at least 0.5 m.
2. A vacuum breaker system shall be arranged as shown with a vacuum breaker valve "B".
3. The pipe between the loop and shell plating shall have a strong wall thickness.

Combined bilge pumping and washing system.

.1 all suction pipes shall be fitted with non-return valves.

.2 non-return valve "A" shall be fitted unless a three-way cock is fitted.

.3 in case of bilge pumping systems, all suction pipes shall also be fitted with non-return valves.



Bilge pumping from enclosed working decks

6.9.1 Where the working deck in spar-decked working spaces with side hatches is lowest, there shall in each space bounded by bulkheads be at least one bilge well in each side of the deck in the side. Where the breadth of the working space is below ½ x B over the entire length of the space, it may be acceptable with only one bilge well in one side of the deck. The volume of each bilge well shall at least be the greatest of:

a) $V = 0.5 \times A \times 1 \times b$,

where

V: volume in dm^3

A: area of outside side hatch in m^2

1: length of working space in m

B: breadth of working space in m

b) Minimum $V = 60\ dm^3$

6.9.2 The depth of bilge wells may not be below 350 mm.

6.9.3 Bilge pumping from working decks in spar-decked working spaces with side hatches shall be by means of a separate pump in each bilge well.

6.9.4 The pumps shall be of a type that works when submerged and capable of operating in the "dry" condition. They shall be self-priming and shall have an individual, automatic stop and start function.

6.9.5 The bilge well and pump shall be located and designed so that clogging by seaweed, fish waste and the like is avoided on the suction side of the pump in the best possible way. In addition, the pump shall be capable of pumping fish waste overboard together with the water.

6.9.6 The bilge pump capacity Q in m^3/h in each bilge pump shall not be smaller than the greatest of the calculated value of a) or b):

a) $Q = 3 \times B \times A$,

where

Q: capacity in m^3/h

A: Total area in m^2 of ports and hatches that may be open during fishing operations or the hauling in of the catch or fishing gear.

B: Vessel's breadth in m;

or

b) Q = 1.5 x maximum washing capacity in the working space plus total water capacity used during fish processing on deck.

6.9.7 Outlets overboard from pumps shall be located at least 600 mm above the working deck. For ships built after 1 January 2007, this shall however be at least 1300 mm. They shall have a closeable flap valve operable from an easily accessible place at least 1 m above the working deck.

6.9.8 Outlet pipes from pumps shall have a diameter and a material thickness equivalent to the capacity of the pump. The material thickness shall be at least 5 mm.

6.9.9 A water level alarm sounding in the wheelhouse shall be fitted on the working deck in each bilge well and at least one in each side of the working deck. The alarm shall be activated when a bilge well is full.

6.9.10 Bilge pumping from enclosed working spaces on the working deck shall be by a separate pump in bilge wells and outlets as stipulated in paragraphs 1-9.

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

The bilge pumping capacity from each bilge well shall in both cases be at least 1.5 x maximum washing capacity on the working deck plus the total water capacity used during fish processing on deck.

Drainage flaps, as stipulated in chapter II, regulation 17, paragraph 10, shall not be permitted in enclosed spaces forming part of the stability calculations.

6.9.11 If RSW tanks or CSW tanks with cooled down seawater or similar tank systems are used, such tanks shall be fitted with a separate, fixed arrangement for the filling and emptying of seawater,

6.9.12 If such tanks are also used for the carriage of dry cargoes, they shall be fitted with a bilge pumping system and with suitable means for preventing ingress of water from the bilge pumping system into the tank.

Water level alarms on fishing vessels

6.10 Existing fishing vessels covered by this technical regulation and with a trading area outside F1 and F2 shall, in addition to other required water level alarms, be fitted with an alarm that is activated when the water level in the forepart of the vessel is greater than 50 cm above the upper edge of the keel. The alarm shall be located so that it is activated at lower water levels.

.1 In fishing vessels constructed on or after 1 January 2007, a water level alarm shall be installed in all large, enclosed spaces below deck. The alarm shall sound when the water level exceeds the normal level. Alarms shall not be required in tanks where fish is carried in bulk. The Danish Maritime Authority shall decide in each individual case in connection with the drawing approval of a new built or flagged-in fishing vessel in what spaces below deck water level alarms shall be installed.

.2 The alarm call unit shall be fitted both at the control station and in the crew accommodation and it shall be possible to observe the signal both visually and acoustically. The alarm sounding device may be provided with a delay of no more than 30 seconds.

Regulation 7 – Exhaust system

7.1 All engines shall have a separate exhaust system, which shall be led as directly as possible to the open air.

7.2 The pipework shall be made of solid steel pipes laid so that expansion may occur without harmful tensions occurring and without the pipe being damaged by vibrations.

7.3 At flange joints, only gaskets designed for exhaust pipes may be used. Exhaust pipes placed where material is normally stowed shall be provided with shields ensuring 10 cm free air around the pipe.

7.4 The penetration for the exhaust pipe shall be made in a reliable way so that the surrounding materials cannot be heated up and ignite.

7.5 The insulation around the exhaust pipe shall not be oil-absorbing.

7.6 The exhaust system of the engine shall be made of steel pipes or of another approved material. If water-cooled hoses are used in the exhaust system (wet exhaust system), an alarm shall be fitted for failure of the water-cooling. Exhaust systems consisting of uncooled hoses may not be used.

7.7 The exhaust system shall be made so that the engine cannot fill with water.

7.8 If the exhaust outlet is less than 350 mm above the deepest operating waterline, the pipe shall be provided with an easily accessible shut-off valve fitted directly on the shell plating of the vessel.

Regulation 8 – Steering gear

8.1 The steering gear as well as rudder and rudder stock shall be of sufficient strength and capable of steering the vessel at maximum speed. The design and installation shall be such that it is not damaged in case of full astern or when manoeuvring during fishing operations. The steering gear and wheel shall comply with the provisions of a recognised standard.[1]

8.2 The steering gear shall be protected so that it does not come into contact with cargo or other fixed, moving or hot parts on the vessel or the like that may lock or hamper steering.

8.3 In case of wheel steering, the arrangement shall be designed so that a full swing from one side to the other is achieved at at least two and at most five turns of the wheel, while at the same time the rudder swing is not suddenly changed if the wheel is released during navigation.

8.4 The arrangement shall be provided with suitable rudder stops restricting the rudder swing to about 35° to each side.

8.5 It shall be possible to use emergency steering on all rudder shafts with remote control.

8.6 All penetrations of the engine well, such as holes for steering cables, shall be sealed effectively with sleeves or the like.

8.7 Hydraulic hoses and pipes shall be protected against coming into contact with hot parts, shall be protected against mechanical wear and tear and shall be fastened with a spacing of about 300 mm.

8.8 Oil filling devices and vents shall be easily accessible.

8.9 An emergency steering position below deck shall be accepted if a suitable system for communicating with the navigation bridge has been installed. On vessels with two propellers, emergency steering shall not be required if it is established by a manoeuvring test that the vessel may manoeuvre safely by means of the propellers.

8.10 On vessels where the main steering arrangement consists of two mutually independent systems one of which is not dependent on the power supply of the vessel and where flexible hoses are not used in the hydraulic system, emergency steering shall not be required.

8.11 Where the main steering unit is mechanically operated, an emergency steering device shall be fitted. In case of remote control, means shall be available for easy and quick connection to the rudder stock so that safe emergency steering is acquired when the vessel navigates at, at least, its navigable speed.

8.12 Where another steering device than a rudder is installed, its design and operation shall ensure that the manoeuvrability stipulated in regulation 3 is complied with.

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[1]) Reference is made to DS/EN 28 847, Wheel Steering System for Pleasure Yachts and Small Vessels.

8.13 Steering gear (machinery) that is remote-controlled shall be fitted with a rudder angle indicator at the conning position. The rudder angle indicator shall be independent of the control system for the steering gear.

Regulation 9 – Cooling system for storing the catch

9.1 Cooling systems shall be designed, constructed, tested and installed in due consideration of the system's safety as well as the liberation of refrigerants stored in quantities or concentrations harmful to human health or to the environment and shall be to the satisfaction of the competent authority.

9.2 Refrigerants used in cooling systems shall be to the satisfaction of the Danish Maritime Authority. Methyl chloride or CFC the ozone-depleting potential of which is greater than 5% of CFC-11 may not be used as refrigerants.

9.3 Cooling systems shall be suitably protected against vibrations, shock, expansion, contractions and the like and shall be fitted with an automatic safety control device capable of preventing dangerous temperature and pressure increases.

9.4 Cooling systems using poisonous or flammable refrigerants shall be fitted with outlet devices led to a place where the refrigerant will not present any danger to the vessel or those on board.

9.5 Any space containing cooling machinery, including condensers and gas tanks, using poisonous refrigerants shall be separated from any adjoining space by gastight bulkheads. Any space containing cooling machinery, including condensers and gas tanks, shall be fitted with a system for detecting leakages, which shall have an indicator outside the space close to the entrance and shall be fitted with an independent ventilation system.

9.6 Spaces containing condensers, gas tanks and cooling machinery using poisonous refrigerants, such as ammoniac, shall be fitted with a water sprinkler system.

9.7 When such fitting is not practicable due to the vessel's size, the cooling system may be installed in the machinery space provided that the quantity of the refrigerant used cannot present a risk to persons in the machinery space if the entire quantity of refrigerant escapes and provided that an alarm is installed warning about any dangerous accumulation of vapours if a leakage occurs in the space.

9.8 In spaces for cooling machinery and in refrigerating spaces, alarms shall be found for the wheelhouse or control stations or for evacuation exits to prevent persons from being confined. It shall be possible to open at least one of the exits from such places from the inside. If practicable, exits from spaces containing cooling machinery using poisonous or flammable refrigerants may not lead directly to any accommodation space.

9.9 If a refrigerant that is harmful to persons is used in a cooling system, at least two sets of breathing apparatuses shall be available, one of which shall be located in a place that will most likely not become inaccessible in case the refrigerant escapes. Breathing apparatuses acquired as part of the vessel's fire-fighting equipment shall be considered to meet this or parts of this requirement provided that the location of the apparatuses complies with both purposes. If automatic breathing equipment is used, spare containers shall be available.

9.10 Sufficient guidance about the safe operation of as well as emergency procedures for the cooling system shall be given in the form of suitable placards on board the vessel.

Regulation 10 – Cooling water system and sea connections

1 In case of seawater cooling, the cooling water pump shall be able to suck from at least two mutually independent sea connections.

2 All pipes with a connection to the sea below the deepest operating waterline as well as pipes to outboard coolers shall be made of steel, copper or another approved material and shall be provided with easily accessible shut-off devices fitted directly on the side of the vessel. Any flexible hose connections shall be as short as possible, be visible in their entire length and be of an approved type. Sea connections shall be made of steel, bronze or another approved, tough material.[2]

3 Sea connections shall be provided with a fixed operating key or handwheel. The connections shall be accessible (possibly carried up through the floor) and fitted with an indicator showing the open/closed positions.

4 If seawater is used for direct cooling of combustion engines, a filter shall be fitted on the inlet side of the cooling water pipe that may be cleaned without using any tools. The filter box shall be made of steel, bronze or another approved, tough material. A closable non-return valve shall be fitted on the internal side of the shell plating where the cooling water outlet is led overboard. Such a valve may be omitted if the outlet pipe has been led in a loop of at least 0.35 m above the deepest operating waterline.

Part C – Electrical installations

Regulation 11 – Electrical main source of energy

Vessels with a length L below 12 m and open vessels

11.1 At least two electrical main sources of energy shall be available consisting of a generator that may be driven by the propulsion engine and an accumulator batter. The generator shall, during the operation of the vessel, continuously be capable of supplying energy to the electrical installations required by these regulations. The accumulator battery shall be capable of supplying energy to the installations important to the propulsion and safety of the vessel for at least eight hours.

Accumulator batteries shall be located in as high and appropriate a position as possible in a dry place with suitable ventilation.

Accumulator batteries shall be installed in accordance with the regulations issued by the Danish Maritime Authority in force at any time.[3]

Decked vessels with a length L of or above 12 m, constructed on or after 1 January 2007:

11.2 If electrical energy is the only means of ensuring the operation of the auxiliary systems that are of importance to the propulsion and safety of the vessel, an electrical main source of energy consisting of two generator sets shall be available, one of which is capable of being driven by the propulsion engine.

Regulation 12 – Electrical emergency source of energy

This regulation shall apply to decked vessels with a length L of or above 12 m, constructed on or after 1 January 2007.

12.1 An electrical emergency source of energy shall be available above the deepest operating waterline outside the machinery space, arranged so that its functions are secured in case of fire, admission of water or other causes for failure of the electrical main installation system. The electrical emergency source of energy shall be arranged so that it is ensured that it will function in case of fire or other causes of defects in the most important electrical installations.

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2 Cf. regulation II/14 on hull penetrations.

3 Guidances no. 6 and 7 of 28 August 1995 issued by the Danish Maritime Authority.

12.2 The electrical emergency source of energy, which may be either a generator or an accumulator battery, shall in due consideration of the starter circuit and momentary nature of certain loads be capable of supplying at the same time for a period of at least three hours:

.1 The following radio equipment simultaneously:

.1 VHF-DSC as well as one of the installations below if the vessel has a trading area outside side sea area A1:

.2 MF-DSC, or

.3 MF-HF-DSC, or

.4 Inmarsat-C.

.2 internal communications equipment, the fire-detection systems and signals required in an emergency; and

.3 the vessel's lights if they are solely electrical as well as the emergency lights:

.1 at boat launching places on deck and on the outside;

.2 in all corridors, stairways and exits;

.3 in spaces containing machinery or emergency sources of energy;

.4 at control stations; and

.5 in spaces for treating and processing fish.

12.3 The arrangements in connection with the electrical emergency source of energy shall comply with the following:

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

.2 If the electrical emergency source of energy is an accumulator battery, it shall be capable of covering the emergency load without being recharged, while it retains the battery voltage during the entire service period within plus or minus 12% of its nominal voltage. In case of failure of the main emergency source of energy, this accumulator battery shall be automatically connected to the emergency switchboard and instantly service at least the systems mentioned in paragraph 12.2. The emergency switchboard shall be provided with an assisting exchange system making it possible to connect the battery manually in case of failure of the automatic connection system.

12.4 The emergency switchboard shall be installed as close as practicable to the emergency source of energy and shall be fitted in accordance with paragraph 12.1. If the emergency source of energy is a generator, the emergency switchboard shall be located in the same place unless operation of the emergency switchboard would thus be impaired.

12.5 Any accumulator battery shall be located in an effectively ventilated space, which may not be the same space as the one containing the emergency switchboard. In normal operation, the emergency switchboard shall be supplied from the main switchboard through a feeder protected at the main switchboard against overloading and short-circuit. The emergency switchboard shall be arranged such that, in case of failure of the main source of energy, the emergency supply will automatically be connected. If the system is intended for feedback, the feeder shall also be protected at the emergency switchboard at least against short-circuit.

12.6 The emergency generator and its driving engine as well as any accumulator battery shall be arranged so that it is ensured that they can function at the full, calculated power when the vessel is in the upright

position and when it rolls up to an angle of 22 1/2 each way and, at the same time, moves up to 10 at the bow or stern or is in any combination of angles within these limits.

12.7 Battery charging indicators shall be located in a suitable place on the main switchboard or in the wheelhouse to indicate the conditions of the batteries constituting the emergency source of energy as well as of any batteries that may be required to start an emergency generator. An indicator shall be provided in a suitable place on the main switchboard or in the wheelhouse to show when the battery constituting the emergency source of power is discharged.

12.8 The electrical emergency source of energy and the automatic starter equipment shall be designed and arranged in such a way that it is possible for the crew to carry out satisfactory testing while the vessel is in operation.

Regulation 13 – Measures against shock, fire risk and other electrical elements of danger

13.1 Electrical installations shall be arranged so that passengers, the crew and the vessel will be protected from electrical elements of danger.

13.2 Wire systems and electrical equipment shall be installed so that interference with radio operations is avoided or reduced.

13.3 In vessels constructed on or after 1 January 2007, all electrical wires shall be of a fire-retardant type and be installed so that their original fire-retardant characteristics are not reduced. In new and existing vessels, wire of a fire-retardant type shall be used when electrical components are replaced and installed.

The Danish Maritime Authority may permit the use of special wire types that do not comply with the above requirements when it is necessary for certain purposes, such as radio frequency wire, cf. also regulation F IV/14.7.

13.4 Where wires are not metal-shielded or armoured and there may be a risk of fire in case of an electrical defect, special measures shall be taken to the satisfaction of the Danish Maritime Authority.

13.5 Electrical wires shall be made of weather-resistant materials. Electrical equipment exposed to the effects of the weather, shall be protected against humidity and corrosion as well as mechanical overload.

13.6 Lighting fittings shall be arranged so that the wires are not exposed to harmful temperature increases as well as to strong heating of surrounding material.

13.7 In spaces where easily ignitable mixtures may generate and in spaces primarily intended for accumulator batteries, electrical equipment may not be installed unless the Danish Maritime Authority finds that it has been established that it is:

.1 essential for operational purposes;

.2 of a type that cannot ignite the mixture in question;

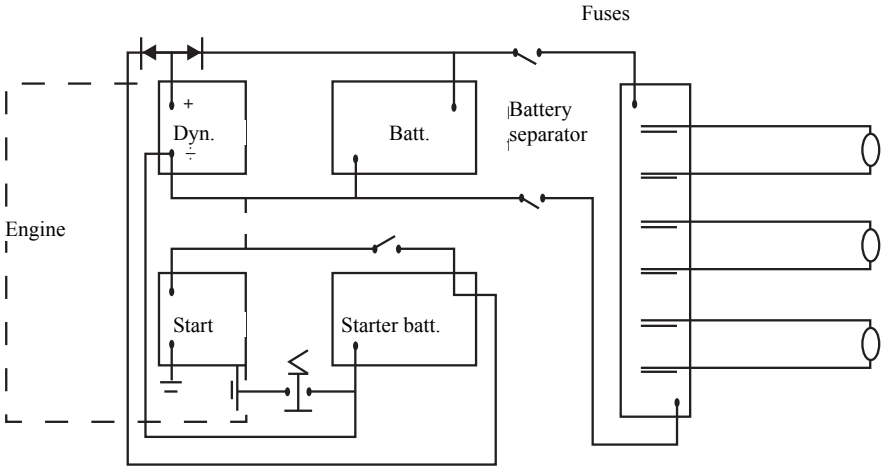
.3 suitable for the space in question, and

.4 duly approved for safe use under the relevant conditions in terms of the dust, vapours and gases that are likely to occur.

13.8 Where there is a potential risk of explosion in or close to a space, all electrical equipment and fittings installed in such spaces shall be either explosion-proof or safe to the satisfaction of the competent authority.

Regulation 14 – Electrical systems

1 The electrical system shall be made as a two-wire insulated system. Hull, machinery/engine parts and the like shall not be used as return. For propulsion engines with an output below 100 kW, relays are permitted so that the engine is used as a conductor during starting in accordance with the following simplified diagram.



.1.2 Only systems and installations for cathodic protection of the hull of the vessel are exempted from the provision of paragraph 1.

14.2 Main and emergency switchboards shall be arranged so that safe access is provided to apparatuses and equipment. The sides and back and, where necessary, the front of the switchboards shall be suitably protected. Insulating mats shall be provided at the front and back.

14.3 Pipe lines carrying liquids may not be installed over or close to switchboards or other electrical equipment. Where such arrangements are unavoidable, measures shall be taken to prevent leakages from harming the electrical equipment.

14.4 Main and emergency switchboards shall be fitted with voltmeters and ammeters for all the generators as well as with earth lamps.

14.5 Distribution boards shall be made of flameproof material. The distribution board may not be located in the bottom of the vessel or in connection with spaces where gas cylinders are installed.

14.6 The cross-section of wires in the permanent installation shall be such that the voltage drop in the individual cable does not exceed 6%, however the cross-section shall be at least 1.5 mm^2.

14.7 All insulated wires shall be multi-threaded and made of copper and in accordance with IEC standards or of a type approved by a recognised organisation.

14.8 Cables and wires shall be laid so that they are not exposed to greater influence of mechanically and/or environmentally wearing down than absolutely necessary. Where necessary, the cables shall be protected against such influences.

14.9 Penetrations of cables on deck or watertight bulkheads shall be watertight, i.e. corresponding to IP 67.

14.10 Through-going screws or bolts may not be used to mount electrical equipment on the outer hull and watertight bulkheads. Fittings causing galvanic corrosion may not be used for such mounting either.

14.11 The supply cable between accumulator batteries and the distribution board shall be secured as close as possible to the accumulator.

14.12 The equipment in various spaces shall as a minimum satisfy the requirements of the following table.

SPACE	Nature of space	Execution in casing	Desks, boards, switching regulation equipment,	Generators	Engines	Transformers, converters, rectifiers	Light fittings	Heating equipment	Galley equipment	Installation equipment
Dry spaces not representing fire or explosion hazard	Risk of accidental contact with danger of personal injury	IP20	X	-	X	X	X	X	X	X
Dry control rooms			X	-	X	X	X	X	X	X
Enclosed navigation bridge			X	-	X	X	X	X	X	X
Control rooms	Risk of dripping water and/or minor mechanical influence	IP22	X	-	X	X	X	X	X	X
Engine spaces above floors			X	X	X	X	X	X	X	IP44
Steering gear rooms			X	X	X	X	X	X	-	IP44
Refrigerating machinery rooms			X	-	X	X	X	X	-	IP44
Cargo, provision rooms			X	-	X	X	X	X	-	IP44
Pantry			X	-	X	X	X	X	-	X
Damp spaces (bathrooms)	Increased risk of water and/or mechanical influence	IP34	-	-	-	-	X	IP44	-	IP55
Machinery spaces below floors			-	IP44	IP44	-	X	IP44	-	IP55
Pump rooms	Great risk of water and/or mechanical influence	IP44	X	-	X	X	IP34	X	-	IP55
Cold stores			-	-	X	-	IP34	X	-	IP55
Galley, washrooms			X	-	X	x	IP34	X	x	X
Shaft and pipe tunnel and equipment below floors	Great risk of spray water and serious mechanical influence	IP55	X	-	X	X	X	X	-	IP56
Plant on open deck	Risk of splash water	IP56	X	-	X	-	IP55	X	-	X

X = unless provided otherwise, the execution shall be made with the given cladding degree.

- = installation cannot be permitted.

14.13 Where another electrical current than supply at low voltages is the only means of retaining the auxiliary functions that may be required for the vessel's propulsion and safety, the main switchboard shall be designed so that it is possible to make a selective disconnection of less important loads to reduce the risk of overload and too early starting of the emergency source of power.

14.14 The distributing panel shall be divided into groups, and in vessels constructed on or after 1 January 2007 such groups shall be provided with two-poled switches and fuses for each out-going circuit, while the remaining sub-circuits may be fitted with one-poled switches. Switches and fuses shall be

designed in accordance with the maximum load and heat generated of the circuit. The dimensioning shall be made in accordance with the following table.

.14.1 Each separate circuit shall be protected against short circuit as well as against overload in accordance with table 14.2.

.14.2 Table for the loading and protection of wire when the ambient temperature is 15°C lower than the temperature class of the wires.

Conductor cross-section	Continuous load	Maximum fuse for overload protection	Maximum fuse for short-circuit protection (at continuous minimum main cross-section)
mm^2	A	A	A
1.5	9	10	20
2.5	12	16	35
4	16	20	35
6	21	25	63
10	28	35	100
16	37	50	160
25	49	63	200
35	60	80	315
50	76	100	400

.14.3 Safety fuses of the neozed type as well as fuses in accordance with DIN 72581 Part 3 with rated current in accordance with the column "Maximum fuse for short-circuit protection" comply with the requirement for short-circuit protection. Pinol fuses and fuses with automatic reconnection shall not be used.

14.15 The capacity of each circuit shall be indicated. And the nominal overload protection shall be clearly indicated on switchboards and, where relevant, on distribution boxes.

14.16 An effective means of recharging accumulator batteries shall be provided by means of a generator that is driven either by the propulsion engine or by an auxiliary engine. Systems for recharging accumulator batteries shall be fitted with protection against transient tension as well as excess and return current.

An arrangement for continuous recharging of accumulator batteries when main or auxiliary engines are operating shall be provided. This arrangement shall consist of a charging switchboard fitted with voltmeter and ammeter for each system. The arrangement shall make it possible to switch between recharging and discharging of the battery groups by means of an arrangement with change-over switches. Where possible, the change-over switch should be of a type that will automatically ensure that, when one group of batteries in a system is chosen for discharging, the other group in the system will automatically be placed for recharging.

14.17 Accumulator battery groups shall be fitted with switches located in an easily accessible place. In vessels constructed on or after 1 January 2007 switches shall be two-poled and spark-free.

14.18 Wires between a battery group and an insulating switch and between the switch and a starting engine shall be as short as possible and shall be double insulated.

14.19 Where the main source of energy is an alternating current system, alternating current generators shall be fitted with a device for automatic regulation of the voltage.

14.20 The Danish Maritime Authority may approve parallel operation of alternating current generators. Devices for synchronization and load distribution shall be installed. The system shall also be fitted with protection against return effects.

14.21 Board sections in switchboards supplied directly from a separate alternating current generator shall be fitted with ammeter, frequency meter as well as a voltmeter installed so that it is possible to measure the voltage in all phases.

14.22 In the wheelhouse, a visual and acoustic alarm shall be installed for the vessel's navigation lights. The alarm shall sound if one or more of the lights are inadvertently switched off. The power supply shall be executed with fuses and a multiple pole switch for every light.

14.23 Where electrical engines are installed in connection with deck machinery, the control lever shall automatically return to the stop position when released. Emergency stops shall also be installed at the work place. The mechanical part of deck machinery shall be fitted with a suitable, fail-safe braking system.

14.24 All electrical engines shall be fitted with a starting/stopping device located in such a way that the person operating the engine can easily operate it.

14.25 Electrically driven ventilators as well as electrically driven pumps for carrying fuel oil shall be fitted with a remote-control located outside the machinery space concerned so that it is possible to stop the ventilators and the pumps in case of fire in the space in which they are located.

14.26 In case of connections from ashore to the electrical system of the vessel at voltages greater than 50 volts, such connections shall be electrically separate from the electrical system of the vessel.

14.27 A suitably strong rubber cable shall be used as a shore connection cable. The connection shall be fitted at a practical place protected against the weather. In case of polyphase shore connections the connection arrangement shall be fitted with means for controlling the voltage and the phase sequence. It shall be ensured that it is not possible to connect the distribution system of the vessel to the vessel's power source and the external power source at the same time. At the apparatus for the connection to land, the kind of current and voltage that may be fed to the installation shall be specified.

14.28 At any new installation and after major repairs, insulation measurements shall be carried out by an authorised company.

Regulation 15 – Earth connections

15.1 In consideration of the design and working voltage of the system, the Danish Maritime Authority may require the installation of a system with an earth indicator light or devices for indicating earth defects.

15.2 Unprotected metal parts on electrical machinery or apparatuses that need not be live but that easily become so due to defects shall be connected to the vessel's hull or to an earth plate of copper fitted on the vessel's hull with an area of at least 0.2 m^2 unless such machinery or apparatuses:

.1 are supplied with a voltage of no more than 50 V direct current or 50 V effective voltage between conductors; autotransformers may not be used to acquire this voltage; or

.2 are supplied with a voltage of no more than 250 V over safety insulating transformers only servicing one item; or

.3 have been designed in accordance with the principle on double insulation.

15.3 On hulls of electrically insulated material, there shall be an earth plate of copper of at least 0.2 m^2 in a place where it will constantly be below water in all conditions of heel. In the hull the earth plate should be connected to a copper band of at least 64 mm^2.

15.4 Radars, radios and other navigational equipment that is required to be earth connected shall have separate earth connection and the connection shall be as short as possible.

15.5 Where a flexible, non-conducting connection is located between the output shaft and propeller shaft of the gear, the connection shall be made by means of a piece of merged copper conductor.

Regulation 16 – Lighting systems

16.1 Lighting for machinery spaces, control stations and work places shall be supplied from at least two separate groups and shall be arranged so that failure in one of the groups will not black out the space.

16.2 Lighting for spaces that are not normally manned, such as cargo spaces and storerooms, shall be operable from a point outside the spaces in question.

Regulation 17 – Lightning conductors

17.1 Lightning conductors shall be fitted on all wooden masts. They shall be made of unbroken copper wire with a cross-section of not less than 75 mm^2 and be fitted to a copper nail with a diameter of 12 mm, projecting at least 150 mm above the top of the mast.

17.2 In connection with metal hulls the lower end of the lightning conductor shall have earthing to the hull.

17.3 In connection with wooden hulls or hulls made of other non-metallic materials, the lower end of the lightning conductor shall be connected to the earth plate. All sharp bends shall be avoided and only bolted down or riveted joints shall be used.

Part D – Periodically unattended machinery spaces

Part D of Notice E from the Danish Maritime Authority, chapter IV, may be used as guidance, especially as regards fire-protection, fire-detection, protection against filling and general alarm systems.

Part E – Other electrical installations

Regulation 18 – Hydraulic systems

18.1 Hydraulically driven systems and the belonging pipe systems and equipment shall be designed and constructed so that they are suitable for the function for which they are intended. They shall be fitted and protected in such a way that they present least possible danger to persons on board and take the necessary precautions against moving parts, hot surfaces and other elements of danger. The choice of components and the design of the system shall take account of what the installation will be exposed to. Short-term pressure variations may not exceed the maximum nominal value of the components. The entire installation shall be made so that noise and vibrations from the system are not transferred to the ship structure (structural noise).

18.2 Where steel pipes are used as pressure pipes, they shall be made of seamless pipes. Electric-resistance welded pipes may be used only in specific cases after special permission from the Danish Maritime Authority. The steel pipes shall satisfy the relevant recognised pipe standard taking into account the maximum pressure of the system. If flexible hoses are used, they shall be of a suitable, recognised, approved type, e.g. SAE/ISO, and shall be fitted without twists and bendings. Hose couplings shall be of a suitable and recognised, approved type.

18.3 Joints of pipes or joints between pipes and fittings/equipment shall be made using bolted flange joints, by welding or by means of flange fittings or another type of cutter fitting with O-gasket. Flange joints and fittings shall be able to stand the working pressure. Pipes in hydraulic systems shall be treated in

accordance with D.V.S. no. 08004 and D.V.S. no. 08005. If they have been welded or hot-bent, they shall be cleaned with acid to metallic purity. Pipes on the discharge side of pumps shall be protected against overpressure greater than the calculated working pressure. When safety valves on the discharge side of the pump are used for such protection against overpressure, the design shall be such that the discharge side of the valve is led back to the suction side of the pump or another suitable place, usually a tank. The safety valves shall open if the working pressure increases by more than 10%. Pipes placed on the low pressure side of a pressure reducing valve shall be protected against overpressure by means of safety valves or the like when these pipes and the components connected to them are not designed for the pressure on the high pressure side of the pressure reducing valve. The flow capacity of the safety valves shall be such that the pressure in the pipes does not at any time exceed the working pressure by more than 10%. Engines shall be protected by means of shock valves as close to the engine as practicable.

18.4 Pressure testing shall be carried out before a system/components are put into operation in the presence of the approving authority.

.1 Pressure pipelines as well as various fittings shall be pressure tested at a minimum of 1.5 x the working pressure.

.2 Cylinders shall be pressure tested at a pressure Pe as a function of the working pressure P.

Pe = 1.5 where $P < 40$ bar

Pe = 1.4 P + 4 where $P \geq 40$ bar

The test pressure may not be below 4 bar.

18.5 The system pressure for winches, net drums, etc. may not, without special permission from the Danish Maritime Authority, exceed 250 bar at the pump.

18.6 Taking into account the maximum permissible noise level on the vessel, the flow speed in the pressure line of a hydraulic system may not exceed 3 m/sec. on the working deck and enclosed working decks and 4 m/sec. in other places, however a flow speed of up to 5 m/sec. may be permitted in systems such as bow propellers and mooring winches used for short periods of time. For the same reasons, the flow speed in suction pipes may not exceed 0.8 m/sec.

18.7 Pipe diagrams and calculations shall be submitted to the approving authority showing that the above-mentioned provisions have been followed.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter V
Fire protection, fire detection and fire extinction

Regulation 1 – Application

1 Unless otherwise provided in each individual regulation or paragraph, this chapter shall apply to new vessels as defined in chapter I, however regulation 12(2) in this chapter shall also apply to existing vessels.

Regulation 2 – Definitions

1 "Accommodation spaces" are all spaces used for the accommodation of persons, including corridors and sanitary spaces.

2 "Service spaces" are those spaces used for galleys or pantries containing cooking appliances, lockers and store-rooms.

3 "Control stations" are those spaces in which the vessel's radio equipment, main navigation equipment, emergency source of power or central installations for fire-detection or fire control equipment is centralized.

4 "Machinery spaces" are those spaces forming part of the structure of the vessel containing internal combustion engines for propulsion and/or oil-fired boilers for central heating, except for small oil-

fired boilers of the pot furnace type and the like, or spaces where combustion engines for other purposes than propulsion are found with a total output of at least 375 kW.

5 "Machinery casings" are spaces where the sides and the top are exposed to the weather and where internal combustion engines and/or oil-fired boilers for central heating are installed.

6 "Class A subdivisions", “Class B subdivisions” and “Class B-15 subdivisions” as defined in Notices B or E from the Danish Maritime Authority.

7 “Class F subdivisions” as defined in Notice E from the Danish Maritime Authority, chapter V, regulation 2.

8 "Non-combustible material" is a material that can neither burn nor release flammable vapours in such quantities that it may ignite by itself when heated to about 750 C, which is to be determined in accordance with the IMO “Fire Test Procedures Code”.

Regulation 3 – General construction and fire-integrity

1 The fire integrity of bulkheads and decks in machinery spaces, including doors and hatchways, as well as the sides and the top of machinery casings shall be class B-15.

2 In aluminium vessels and vessels made of combustible material, the fire integrity of any bulkheads, decks and ship's sides in the machinery space shall be class F or B-15 up to 300 mm below the lowest draught. Alternatively, a finishing layer of approved polyester or topcoat with fire-retardant properties or a protective layer of an approved fire-retardant paint or protection by non-combustible materials may be accepted on vessels with a length L below 12 m. Polyurethane foam may not be used on board for insulation or parts of GRP structures.

3 In general, fire insulation shall be applied to the internal side of the machinery space, but in steel vessels the application is free.

4 Oil and bilge tanks of aluminium installed in the machinery space or the sides of which adjoin the machinery space shall be insulated to class B-15 or expanding fire insulating paint with an equivalent insulating value shall be applied. Tank sides against the hull need not be insulated.

5 Oil and bilge tanks of GRP may be installed in machinery spaces or machinery casings only if they form part of the structure of the vessel, the tank top is below the light waterline, and the fire integrity of the free sides against the machinery space or machinery casing is class B-15.

6 The fire integrity of GRP oil and bilge tanks installed outside machinery spaces shall be as stipulated in paragraph 5 if the location close to the galley, oil-fired furnaces, radiators or the like means that they may be exposed to the same external heat influence as if they had been installed in a machinery space.

7 The surface of insulating materials on the internal bulkheads in machinery spaces and machinery casings and in spaces into which oil products may penetrate shall be impervious to oil and oil vapours.

8 The fire integrity of pipe, cable and hose penetrations to or from machinery spaces and machinery casings shall be equivalent to that of the penetrated bulkhead/deck/sides.

9 Materials that are easily destroyed by the effect of heat may not be used in connection with sea connections located below the deepest operating waterline of the vessel.

10 All insulating material in accommodation spaces, including the wheelhouse, shall be non-combustible. In spaces used for storing or processing fish, flammable insulation shall be protected by close-fitting, non-combustible covering.

Regulation 4 – Additional requirements for structural fire-protection

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007.

1 If steel decks or steel bulkheads in accommodation spaces form the top or side of a fuel oil tank, they shall be covered in a non-combustible material with a 40 mm thickness. Manholes or other openings for fuel oil tanks may not be located in accommodation spaces.

2 External bulkheads, decks and ship's sides bounding accommodation spaces shall be insulated by at least 50 mm approved, non-combustible insulating material. In steel vessels bulkheads between accommodation spaces and machinery spaces or cargo spaces shall be of steel or similar, insulated by a non-combustible material with a thickness of at least 40 mm and a density of 110 kg/m^3 or above. In wooden vessels they may be constructed of two layers of wood with two layers of filt or similar in between or by 60 mm wood with covering of insulation plates or – as an alternative – be constructed for class "B-15" standard.

3 All unprotected surfaces in corridors or stairways as well as surfaces of bulkheads and ceiling linings in all accommodation, service and control spaces and exposed surfaces in enclosed or inaccessible spaces (behind bulkheads, ceiling lining, panels and linings) in accommodation, service and control spaces shall have low flame-spread properties.

4 All unprotected surfaces in glass-fibre reinforced plastic structures in accommodation spaces, service spaces, control stations and machinery spaces with similar fire risk shall have a finishing layer of approved polyester with fire-retardant properties or be covered by approved fire-retardant paint or be protected by non-combustible materials.

5 If there is a door between accommodation spaces and machinery spaces, it shall be a self-closing door made of steel or similar. Where only electrical cooking appliances are used in the galley, the galley and the mess may be considered a joint space subdivided into two suitable sections.

6 The lower layer of deck covering in accommodation, service and control spaces shall be of an approved material that does not easily ignite or give rise to risk of poisoning or explosion at high temperatures.

7 In accommodation, service and control spaces, pipes led through class "A" or "B" subdivisions shall be of an approved material in consideration of the temperatures such subdivisions shall be capable of resisting. If the Danish Maritime Authority permits that oil and flammable liquids are conveyed through accommodation and service spaces, the pipes conveying the oil or flammable liquids shall be of an approved material in consideration of the fire risk.

8 Materials such as plastic or the like that is easily disintegrated due to heat may not be used for overboard scuppers, sanitary drains and other outlets close to the waterline where failure of the material in case of fire could create a risk of water filling.

Regulation 5 – Ventilation systems

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007, however paragraphs 4-6 shall apply to all new vessels.

1 Means shall be provided for stopping mechanical ventilators and closing the main openings for the ventilation system from a place outside the spaces serviced.

2 Ventilation openings in and under doors in bulkheads for corridors may be permitted; except from doors to stairways. The openings may only be fitted in the lower half of a door, and the total net area

of the opening or openings may not exceed 0.05 m^2. An opening cut in a door shall be fitted with a grid of non-combustible material.

3 Ventilation ducts for machinery spaces or galleys may not normally be led through accommodation, service or control spaces. The Danish Maritime Authority may, however, permit such an arrangement if the ducts are made of steel or similar material and are installed so that the fire-integrity of the subdivisions is retained.

4 Ventilation ducts for accommodation, service or control spaces may not normally be led through machinery spaces or through galleys. However, the Danish Maritime Authority may permit such an arrangement on the condition that the ducts are made of steel or similar material and are installed so that the fire-integrity of the subdivisions is retained.

5 Storerooms containing considerable quantities of very combustible products shall be fitted with ventilation systems separated from other ventilation systems. Ventilation shall be provided both at the top of and at the bottom of the space and the inlets and outlets of the ventilators shall be located in secure areas. Suitable wire netting for stopping sparkles shall be fitted above the inlet and outlet of the ventilation openings.

6 Ventilation systems servicing machinery spaces shall be independent from systems servicing other spaces.

Regulation 6 – Heating installations

1 All heating installations shall be properly made. Special consideration shall be paid to personal safety as well as safety in connection with fire prevention.

2 Electrical radiators shall be located and designed so that the risk of fire is reduced to a minimum. Electrical heaters shall be type-approved for fixed mounting and shall, furthermore, be encapsulated in perforated steel plating designed so that fallen items will automatically slide out of the heating zone.

3 Heaters and other similar arrangements shall be fixed, and sufficient protection and insulation against fire under and around such arrangements and their smoke pipes shall be provided. Smoke pipes from heaters burning solid fuel shall be located and designed so that the risk of them being blocked by combustible substances is reduced to a minimum, and they shall have accessible means for cleaning. Dampers for reducing draught in smoke pipes shall, when in the closed position, still leave a sufficient area open. Spaces in which heaters are installed shall be fitted with ventilators with sufficient area to provide the heater with the necessary inlet of combustion air.

Regulation 7 – Cooker installations

1 The provisions of technical regulation no. 3 of 2 April 2003 issued by the Danish Maritime Authority on F-gas installations and cookers using spirits or kerosene in vessels shall also apply to all vessels covered by these regulations.

2 Except for cookers and water heaters, apparatuses using open gas flames shall not be permitted. Spaces containing such cookers or water heaters shall be provided with suitable ventilation for removing vapours and any gas leakages to a safe place.

3 If galleys or pantries with cooking/roasting installations are arranged with open gas flame or other sources of heat with a total effect of or above 5 kW, all surfaces facing the source of heat shall be covered in stainless steel or similar non-combustible material to a distance of at least 750 mm from the source of heat.

Regulation 8 – Miscellaneous

1 All waste containers, except for those used in connection with the processing of fish, shall be made of non-combustible material without any openings in the sides or the bottom.

2 Machinery driving fuel oil transfer pumps, fuel oil pumps and other similar fuel pumps shall be remote controlled so that, in case of fire in the space in which they are located, it shall be possible to stop them from outside the space in question.

3 Drip pans shall be provided where necessary to prevent oil from leaking into the bilges.

4 On vessels with a length of or above 12 m constructed on or after 1 January 2005, paint, varnish and other materials used on unprotected internal surfaces may not be capable of generating too large quantities of smoke or poisonous gases or vapours.

Regulation 9 – Storage of gas cylinders and hazardous materials

1 Cylinders for compressed, liquid or dissolved gases shall be carefully secured and clearly marked using the prescribed identity colours with a clear, easily read identification of the name and chemical formula of the contents, which shall be attached to the cylinder in a suitable way.

2 Cylinders containing combustible or other hazardous gases and empty cylinders shall be stored in a properly secured way on open deck, and all valves, pressure regulators and pipes leading from such cylinders shall be protected against damage. The cylinders shall be protected against extreme fluctuations of temperature, direct sunlight and accumulation of snow. However, the Danish Maritime Authority may permit that such cylinders are stored in sections complying with the provisions of paragraphs 3-5.

3 Direct access may only be provided from open deck to spaces containing liquid gas and strongly combustible liquids, such as volatile paints, paraffin and benzene, etc. Pressure regulating devices and safety valves shall exit in such sections. Where boundary bulkheads in such sections adjoin other closed spaces, they shall be gastight.

4 Except for what may be necessary for servicing the space, electrical wires and fittings shall not be permitted in sections used for storing strongly combustible liquids or liquid gases. Where such electrical fittings have been fitted, they shall be to the satisfaction of the competent authority in terms of use in a combustible atmosphere. Sources of heat shall not be found in such spaces, and “Smoking prohibited” and “No naked fires” signs shall be posted in conspicuous places.

5 Separate rooms for storing each type of compressed gas shall be provided. Spaces used for storing such gases shall not be used for storing other combustible substances, and they shall not be used for tools or components forming part of the gas distribution system. However, the Danish Maritime Authority may consider alternative arrangements in consideration of the vessel’s size and form as well as the type, volume and intended use of the compressed gases.

Regulation 10 – Escape routes/means of escape

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007, however paragraph 2 shall apply to all new vessels.

1 Two means of escape shall be provided from machinery spaces located as far apart as possible. Ladders and staircases shall be made of steel. If the size of the machinery space renders this impossible, one of these means of escape may be left out in consideration of the location and size of

the space. In such cases, special care shall be taken as regards the arrangement of the remaining exit.[1] One hatch/door to open deck shall have a free opening of minimum 600 x 600 mm.

2 If access to escape routes is provided through separate spaces (steering machinery spaces or similar), doors to such spaces may not be lockable unless fitted with a kick hatch removeable in the direction of escape. The necessary ladders, steps and hand rails shall be provided to ease access through the emergency exit.

Regulation 11 – Automatic fire alarm systems

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007.

1 In vessels made as a combustible structure or where the arrangement of accommodation, service and control spaces is made of combustible material, an automatic fire alarm system shall be installed in these spaces in consideration of the size, arrangement and location of the spaces in relation to the control station.

Regulation 12 – Fixed fire detection and fire extinguishing systems for machinery spaces

1 Machinery spaces shall be protected by an approved, fixed fire detection and fire extinguishing system. The fire detection, which shall be connected to a visual and acoustic alarm, shall be located in the wheelhouse and centrally in accommodation spaces. The power supply of the system shall be located outside the protected space.

2 Existing vessels provided with berths shall no later than 1 January 2002 be provided with a fire detection system for machinery spaces, as stipulated in paragraph 1.

3 The requirements below shall apply to fire extinguishing systems with carbon dioxide (CO_2-systems). Other approved fire extinguishing systems with an equivalent extinction effect, such as systems using water,[2] mixed atmospheric gases[3] or aerosols[4] shall also be permitted.

4 It shall only be possible to release CO_2-systems manually. The release function (two handles) shall be installed in a practical and protected space outside the machinery space and spaces with fuel tanks. Instructions as to how to release the system as well as precautions to be taken after use shall be affixed at the place of release.

5 The CO_2-containers shall be installed outside the machinery space and be protected against mechanical damage and temperatures above 40°C.

6 Manifolds with nozzles shall ensure that the extinguishant is distributed evenly throughout the space. The CO_2 quantity and discharge period shall be adjusted to ensure effective fire extinction in the space.

7 The CO_2 quantity shall be 0.80 kg/m^3, taking into account the gross volume of the machinery space, although 2 kg is the minimum permitted quantity. Half of the filling level shall be achieved in maximum ten seconds.

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1 As regards means of escape in the accommodation, cf. chapter XII.

2. Reference is made to Guidance no. 1 of 11 January 2000 on the installation of open sprinkler systems/water spray systems in engine spaces in ships below 24 m issued by the Danish Maritime Authority.

3. Reference is made to the Guidance on the installation and testing of fire extinguishing systems with mixed atmospheric gases.

4 Guidance no. 4 of 24 November 2004 on fixed fire-extinguishing system using aerosols as fire-extinguishants.

8 Ventilation openings with means of closing shall be located in the upper part of the machinery space designed so that harmful overpressure is avoided when the extinguishant is released into the space.

9 Machinery spaces and spaces or lockers for CO_2 containers shall be arranged so that CO_2 cannot, as a result of leaks or release, penetrate into spaces where persons are accommodated. Spaces or lockers for CO_2 containers shall be separately ventilated to the open deck.

10 CO_2 systems may not be installed in wooden vessels.

11 Fixed fire extinguishing and fire detection systems shall be inspected every two years by an authorised company or person. The inspection shall be recorded in the survey book of the vessel stating date and place.

12 CO2 containers shall be pressure tested every ten years. A discharged container may not be recharged until a new pressure test has been carried out with a satisfactory result if more than 5 years have passed since the last pressure test.

13 If the CO2 containers are found at an external inspection in connection with the biannual inspections to be in satisfactory condition with an intact surfacing, the first pressure test period may be extended for up to 20 years. This does not apply to CO2 containers that have been emptied, have lost their pressure or weight or to CO2 containers that have corroded or are in any other way externally damaged.

14 Subsequent pressure test periods shall be for 10 years.

Regulation 13 – Fire pumps – number, capacity and location

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007.

1 Vessels shall be fitted with at least one engine-driven fire pump. Depending on the trading area, the Danish Maritime Authority may, however, require an emergency fire pump.[5]

2 Sanitary pumps, ballast pumps and general service pumps may be approved as fire pumps provided that they are mechanically driven and not normally used for pumping oil and that they, if occasionally used for pumping oil, have suitable change-over devices so that the pumps cannot be set – even by accident – for suction from tanks that may be used for substances other than ballast water and/or from the vessel's bilge pumping system while providing pressure for the vessel's fire hydrant. Arrangements based on the blinding of certain pipe lines by means of blind flanges shall not be approved.

3 Where pumps not intended as fire pumps are permitted to be used as a fire pump in accordance with paragraph 2, their use shall not limit the possibility of pumping bilge wells at any time.

4 Where pumps are used as fire pumps, they shall be capable of supplying the fire hydrant when only one is required or the fire main.

5 Where it is possible to meet the requirements for maximum permissible suction height, the emergency pump may be a portable diesel-driven pump with independent fuel oil supply for three hours' operation. The necessary tools for starting, suction, coupling of hoses, etc. shall be located in the vicinity of the pump. Pumps requiring priming shall be fitted with a funnel and closing valve. Sanitary, ballast and general service pumps may be accepted as fire pumps provided that they are not normally used for pumping oil. When the pumps are used as fire pumps, they may be capable of supplying only the fire main.

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[5] An emergency fire pump will, among other things, be required within trading area F5 and/or voyages around Greenland within trading area F5 as defined in chapter XI.

6 The prescribed fire pumps may consist of several pumps provided that they are capable of functioning satisfactorily in parallel operation and maintain the stipulated capacity under the conditions mentioned in paragraph 4.

7 The prescribed fire pump shall be capable of maintaining a pressure of at least 0.25 N/mm^2 at the fire hydrants, when the two fire hydrants remotest from the pump are in operation, each fitted with a single hose length with a 12 mm nozzle. Portable pumps shall be capable of maintaining a pressure at the pump hydrant of at least 0.25 N/mm^2 at the capacity stipulated in paragraph 5.

8 The capacity Q of each of the prescribed fire pumps shall at least be in accordance with the below calculation method, however not less than 16 m^3/hour.

$$Q = (0.15\sqrt{L(B+D)} + 2.25)^2 m^3 / hour$$

Where L, B and D are in meters and as defined in chapter I.

The capacity of each fire pump need not, however, exceed 30 m^3/hour.

9 The sea valves and other necessary valves of fire pumps shall be located so that a fire in other places than in the space where 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 greatest permissible working pressure in the pipe lines, fire hydrants or fire hoses, or if they are capable of making 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 on the outlet side.

Regulation 14 – Fire mains

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007.

1 The vessel shall be fitted with fire mains so as to ensure an effective distribution of the prescribed quantity of water. The maximum pressure at a fire hydrant may not exceed the pressure at which the effective handling of a fire hose is provable.

2 Fire mains shall be made of steel or another material that is not easily broken down when exposed to heat and shall be located so that there is the least possible risk of mechanical damage of the pipes. Where there is a risk of damage due to frost, measure shall be taken to avoid such damage.

3 It shall be possible to stop the fire main from a machinery space and from an easily accessible place outside the machinery space in question.

Regulation 15 – Fire hydrants, fire hoses and nozzles

This regulation shall apply to vessels with a length L of or above 12 m constructed on or after 1 January 2007.

1 One or more fire hydrants shall be located so as to permit easy and quick connection of fire hoses and so that it is possible to direct at least one jet of water at any part of the vessel which is normally accessible when at sea; this required jet of water shall be from a single length of fire hose.

2 In addition to the fire hydrant required by paragraph 1, one fire hydrant for a machinery space shall be located outside such space and close to the entrance.

3 For each prescribed fire hydrant, one fire hose shall be provided. In addition, at least one extra fire hose shall be provided. Single lengths of fire hose may not exceed 20 m.

4 Fire hoses shall be of an approved material. Each fire hose shall be fitted with couplings and a dual-purpose nozzle. Couplings on fire hoses and nozzles shall be fully interchangeable and in no case may nozzles have a diameter of less than 12 mm.

Regulation 16 – Portable fire extinguishers

Paragraphs 1-2 and 4-7 of this regulation shall apply to all vessels.

1 An approved ABC fire extinguisher of at least 5 kg shall be installed in the wheelhouse.

2 In vessels with accommodation, an approved ABC fire extinguisher of at least 5 kg shall also be installed in the immediate vicinity of the entrance to the accommodation.

3 In vessels with a length L of or above 12 m constructed on or after 1 January 2007, at least two portable fire-extinguishers (1 of 12 kg and 1 of 5 kg) shall be provided in the vicinity of or in the machinery space of a type suitable for extinguishing fires including fuel oil. The largest of the fire-extinguishers shall be located close to the entrance to the space.

4 At galley ranges, a fire blanket shall be provided satisfying the EN1869 standard.

5 The Danish Maritime Authority may, after a concrete assessment, require that vessels for special purposes be provided with fire extinguishers or other portable fire extinguishing equipment in addition to that stipulated in paragraphs 1 and 2.

6 Hand fire extinguishers shall be inspected, recharged and pressure tested in accordance with the guidelines of DS 2320 by an authorised company, person or test institute.

Regulation 17 – Possibility of quick applicability of fire-extinguishing equipment

1 Equipment for detecting and extinguishing fires shall be kept in good and functional order and continuously be in use or ready for instant use when the vessel is at sea. Fire pumps, including any emergency fire pump, shall be tested every month.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter VI
Crew protection, working environment and safety, etc.

Unless expressly provided otherwise, the provisions of this chapter shall apply to both new and existing vessels.

On new and existing vessels, all work stations and areas where persons move about on board shall be arranged so that the work can be carried out safely and without any risk to health. This shall include ensuring that the provisions of this chapter are observed.

This chapter contains supplementary provisions to the rules of Notice A from the Danish Maritime Authority, technical regulation on the working environment on board ships, in force at any time.

Regulation 1 – General protection measures

1 A lifeline system shall be designed to be effective for all needs and the necessary wires, ropes, shackles, eye bolts and cleats shall be provided.

2 Where hatchways are open and where there is a risk of a fall from a height of or above 2 m, deck openings provided with coamings or sills of less than 600 mm in height shall be provided with guards, such as hinged or portable railings or nettings with a height of 1000 mm. In decked vessels, deck openings for wells may be executed as flush hatchways. It shall be possible to secure hatch covers and they shall have the same integrity as the surrounding deck. Deck openings for wells shall be provided with safety means as stipulated above. The Danish Maritime Authority may exempt small openings such as fish and ice scuttles from satisfying these requirements.

3 The surface of all decks shall be so designed and treated as to minimize the risk of personnel slipping. In particular, decks of working areas, such as machinery spaces, in galleys, at winches, around net and seine drums, and where fish is handled, as well as at the foot and head of ladders and in front of doors, shall be provided with anti-skid surfaces.[1] In wooden vessels, it may be accepted that only partial anti-skid surfaces are provided in working areas and at the foot and head of ladders as well as around doors.

4 When work is carried out or persons move about in areas with an increased risk of falling over board, suitable safety measures shall have been taken, such as the use of lifelines and working jackets, life-jackets or other suitable equipment. In vessels with more than one person on board, the work may be carried out only when fully satisfactory surveillance has been established.

5 Where work cannot be planned and arranged in a way that takes full account of conditions of safety and health, the work may only be carried out if personal life-saving appliances are used, cf. the relevant rules in force at any time.

Regulation 2 – Deck openings

1 Hinged covers of hatchways, manholes and other openings shall be protected against accidental closing by means of a self-locking device. Heavy covers on escape hatches shall be equipped with counterweights or the like and be so constructed as to be capable of being opened from each side of the cover.

2 Dimensions of access hatches shall not be less than 600 by 600 mm or 600 mm diameter.

3 Where practicable, hand-holds shall be provided above the level of the deck over escape openings.

Regulation 3 – Bulwarks, rails and guards

1 Efficient bulwarks or guard rails shall be fitted on all exposed parts of the working deck and on superstructure decks if they are working platforms. The height of bulwarks or guard rails above deck shall be at least 1 m. Provided that this height would interfere with the normal operation of a vessel, a lesser height may be approved by the Danish Maritime Authority according to a concrete assessment. For existing vessels, a height of at least 750 mm may, however, be accepted if it is considered appropriate.

2 At the deepest operating waterline, it shall be ensured that the crew is adequately protected against shipped water on deck. When the protection is determined, account shall be taken of the trading area of the vessel, its type and use, including whether the trading area is seasonally restricted.

3 Clearance below the lowest course of guard rails shall not exceed 230 mm. Other courses shall not be more than 380 mm apart, and the distance between stanchions shall not be more than 1.5 m. In a vessel

1. Wooden decks without anti-skid covering shall not be regarded as satisfying the requirements for anti-skid surfaces.

with rounded gunwales, guard rail supports shall be placed on the flat of the deck. Rails shall be free from sharp points, edges and corners and shall be of sufficient strength.

4 Storm rails and other hand-holds shall be fitted to the extent necessary to provide safety for the crew when moving about or working.

5 Stern trawlers shall be provided with suitable protection, such as doors, gates or removable ramps at the top of the stern ramp at the same height as the adjacent bulwark or guard rails. If this height might impair the normal operations of the vessel, the Danish Maritime Authority may approve a lower height of at least 750 mm. When such protection is not in position, a chain or other means of protection shall be provided across the ramp.

6 For other trawling fishing vessels, it may permitted not to have any bulwark astern provided that the vertical distance from the deepest operating waterline to the edge of the working deck is at least 1800 mm and provides sufficient protection of the crew against shipped water on deck and that a continuous gunwale is provided from the starboard to the port side at a maximum height of 1000 mm and that all other safety precautions are in each individual case to the satisfaction of the Danish Maritime Authority. Such safety precautions shall not be limited to, but may for example be a distance from the net drum to the gunwale of minimum 1000 mm. The breadth of the hole in the bulwark shall be minimized as much as possible by inserting moveable bars with a mutual distance of maximum 400 mm or poundboards of sufficient strength to resist the sea. By providing an edge of at least 50 mm in height in the hole against the vessel's side or similar, and by welding on steel profiles arranged in "fish-bone patterns" covering at least 500 mm from the vessel's side astern towards the net drums. By the deck between the drums and gunwale having extra anti-skid properties. When gear is not being set or recovered through the hole, three chains or wires shall be placed from the port side to starboard side with solid fastenings in the side and, in case of fixed bulwark, amidships. The opening below the lower chain or wire may not exceed 230 mm and the mutual distance between the other chains or wires may not exceed 380 mm. An approved working jacket or working suit with approved buoyancy shall be used when working in this area. The arrangement shall be approved in advance by the Danish Maritime Authority. The pre-approval, which shall be in writing, shall be kept together with the vessel's survey book.

7 If gratings are used at the gunwale, the distance between the surface of the grating and the top of the gunwale shall be at least 600 mm.

Regulation 4 – Stairways and ladders

1 For the safety of the crew, stairways and ladders of adequate size and strength with handrails and non-slip treads shall be provided in accordance with the requirements of the Danish Maritime Authority.

Regulation 5 – Visibility

1 From the wheelhouse it shall be possible to view all workplaces on the weather deck.

2 Where it is not possible for technical reasons to ensure full visibility, cf. regulation 5.1, a video surveillance system shall be installed suitable for maritime use and with the camera located in a place approved by the Danish Maritime Authority.

3 Where it is not possible to establish proper visual and audible communication between the workplace and the wheelhouse, a suitable and reliable communication system shall be established.

4 Operating handles for winches and other machinery, e.g. net hauling equipment, shall be placed so that the person operating the winches has sufficient room. From the manoeuvring platform (operating point) the operator shall have full visibility of the working area for the winch and machinery in question.

5 If it is not possible to have direct visibility of such working areas, it may be accepted in certain cases to use indirect visibility obtained by means of a video surveillance system suitable for maritime use and installed in a place approved by the Danish Maritime Authority.

Regulation 6 – Access to cargo holds

1 Passage between decks shall be via fixed ladders. If the ladders are required to be removable, they shall be provided with fitting so that they are safe and stable when in place.

2 Hatchways – where the force required to open hatch covers is 160 N or more – shall be provided with a device helping to open the hatchway. It shall be possible to secure all hatchways 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 hold. Handgrips shall be fitted where appropriate. The ladder shall be protected against slipping and falling, e.g. by means of loops.

4 The cargo space ladder or the fixed steps shall have a breadth of at least 250 mm, and each step shall have a depth of at least 90 mm. It shall not be possible for the foot to slip to the side of the step.

5 There shall be at least one means of evacuation from cargo spaces where the crew of the vessel are working at sea. This means of evacuation may be the cargo hatchway. It shall be possible to open and close such hatchways from both sides.

6 Access to the cargo hold shall be such that it is possible for a person to enter the hold wearing a fireman's outfit.

7 In vessels constructed after 1 January 2007, fixed stairs shall be provided in cargo spaces over the entire depth of the cargo space. The stairs shall be fitted with handrails on both sides. If the height of the cargo space is less than 3 m, the stairs may, on the basis of a concrete assessment, be replaced by a fixed ladder complying with the provisions of paragraph 4. Where the height of the cargo space is less than 2.2 m, a moveable ladder with securing fittings may be accepted on the basis of a concrete assessment.

Regulation 7 – Embarkation and disembarkation

1 It shall be ensured that the vessel may be embarked and disembarked in a safe way.

2 The master of a vessel where passage is to take place shall ensure that such passage may take place safely. In vessels with fully or partly roofed freeboard decks, arrangements shall be made so that a proper means of access may be established to the vessel or to other vessels moored alongside one another in port.

3 The necessary anti-skid and holding arrangements shall be established, such as handrails, rails and steps, and the arrangement shall be lit properly.

4 There shall be an arrangement to ensure that crewmembers who have fallen over board may be brought aboard. In vessels with more than one person on board, a rescue sling or harness shall be provided to rescue persons fallen overboard. When the person who has fallen overboard has been placed in the rescue sling or the harness, it shall be possible to haul him on board by mechanical

means. In very small vessels with a low freeboard or vessels used for special purposes, the Danish Maritime Authority may exempt the vessel from the requirement for mechanical means. The arrangement shall be tested in connection with surveys. The regulations of chapter VIII on training and drills with life-saving appliances and documentation hereof shall apply to the arrangement for the rescuing of persons who have fallen overboard.

Regulation 8 – Work at heights

1 Masts on which lifting gear, antennas, lights, etc. that may require inspection or repair have been fitted shall be provided with proper ladders and, if necessary, working platforms. This requirement shall not apply to existing vessels with wooden masts. On vessels constructed after 1 January 2007, ladder steps may not be made of round bars.

2 All ladders with an angle to the horizontal plane greater than 70 degrees and a height above deck greater than 5 m shall, from a height of 2.20 m above deck, be provided with approved arrangements for fall prevention. Relevant equipment for fall prevention shall be available on board.

3 At the top of A masts and in other places where repair work, etc. may be carried out, suitable rails shall be established.

4 It shall be possible to check and maintain blocks and suspensions for the tackle wire in a reasonable way in terms of safety and health.

Regulation 9 – Working conditions and conditions of passage

1 Free passage shall be ensured in passageways. To satisfy the requirement for free passage, the breadth of the passageway shall, wherever possible, be at least 600 mm. Sufficient space of at least 600 x 600 mm shall also be ensured at work stations. This applies, for example, in front of net hauling equipment, around winches and the like. For existing vessels, free passage shall be ensured if technically possible. If, according to a concrete assessment made by the Danish Maritime Authority, it is not possible to ensure free passage, other technical measures shall be taken to reduce or minimize the risk of occupational injuries.

2 It shall be ensured as far as possible that all work functions on the vessel, e.g. fish processing, may be carried out under conditions offering effective protection against wind and weather.

3 In the machinery space, there shall be free passage to all important parts and components for maintenance and repair purposes. There shall also be free passage to staircases or emergency exits. In existing vessels, there shall, wherever possible, be free passage to all important parts and components for maintenance and repair purposes.

4 Where equipment for the processing or conveying of the catch prevents free passage, the equipment shall be moveable or in another way flexible so that free passage may be created during periods when the catch is not being processed.

5 In enclosed and partly enclosed working spaces used for the taking in of gear and processing of fish, ventilation shall be provided to the satisfaction of the Danish Maritime Authority. Where fish is being processed as such (filleting, cooking or the like), fish is stored or chemicals are used, a fixed mechanical ventilation system shall be fitted ensuring at least six changes of air per hour. The Danish Maritime Authority may exempt partly enclosed working spaces from the above requirements if, after a concrete assessment, it is found that sufficient natural ventilation is provided.

6 A safety helmet or other similar head protection accepted by the Danish Maritime Authority shall be provided for each member of the crew. After a concrete assessment, the Danish Maritime Authority may refrain from this requirement when it is obviously unreasonable.

Regulation 10 – Lighting

1 All passageways, working spaces and working areas on board the vessel shall be well lit. The lighting shall be sufficient to ensure that the work may be carried out with full regard to health and safety.[2]

2 The amount of light shall be sufficient for distinguishing details. The light shall create suitable contrast conditions and may not blind.

3 Cargo holds shall be provided with fixed lighting ensuring sufficient lighting under all conditions – both for orientation and during work in the hold. For existing vessels, it may be permissible, after a concrete assessment by the Danish Maritime Authority, for the lighting of cargo holds to be established in another way, which shall, however, be as reliable as a fixed system.

4 The lighting may not obstruct the visibility from the wheelhouse.

Regulation 11 – General deck machinery

1 Winches, conveyor belts, net hauling equipment, trawl board arrangements and other deck machinery shall, in respect of design, structure, fittings and safety equipment, be designed so that they can, under the anticipated operating conditions, be fitted, used, maintained and repaired without presenting a risk to health and safety.

2 Winches, conveyor belts, net hauling equipment and other deck machinery shall be used with full regard of health and safety and in accordance with the rules on the use of technical equipment in force at any time.

3 Winches, conveyor belts, net hauling equipment and other deck machinery shall, if technically practicable, be designed so that the power is shut off when the protective devices are removed.

Regulation 12 – Winches

1 Winches shall, as far as practicable, be designed, guarded and fenced so that moving parts may not cause personal injury. All protective devices shall have the required strength.

2 Fairleads shall be provided with protection devices or other equally effective approved safety arrangements.

3 If technically possible, wires along the deck shall be carried in pipes or be covered in an equally safe way. They shall be placed so that passage on deck may take place with full regard of safety.

4 It shall be possible to reverse winches. Operating handles shall automatically return to the neutral position when released and be provided with a locking device preventing unintentional activation. Operating handles for net windlasses, long-line winches and seine drums may be exempted from the requirement to revert to the neutral position on the basis of a concrete assessment in accordance with the instructions and guidelines of the Danish Maritime Authority in force at any time.

5 Winch barrels shall be provided with means for fastening the wire ends.

2. Danish Standard 700 on lighting shall be met as a minimum.

6 If a winch is operable from more than one place, it shall be possible to see from each operating point from where the winch is being operated. It shall only be possible to operate the winch from one point at a time.

7 The design and construction of winches shall be such that the maximum effort necessary for operating handwheels, handles, crank handles, levers, etc. does not exceed 160 N and in the case of pedals not exceed 320 N. The requirement shall not apply to existing vessels the keels of which are laid before 1 September 1984.

8 All parts of the gear, including wires, chains and the like, shall be of a sufficient strength to resist the anticipated loads. The instructions and guidelines of the Danish Maritime Authority for the approval and survey of this equipment in force at any time shall apply.

9 All parts of lifting and hoisting appliances and similar equipment, whether fixed or movable, including all parts and working gear thereof, shall be of good construction, reliable material, adequate strength and free from patent defect. They shall be adequately and suitably anchored, supported or suspended having regard to the purpose for which they are used. The instructions and guidelines of the Danish Maritime Authority for the approval and survey of this equipment in force at any time shall apply.

10 The repair or replacement of any part of the above-mentioned equipment may not lead to a reduction of the original strength.

11 Winches shall be equipped with mechanical brakes capable of effectively arresting and holding the safe working load. Brakes shall be provided with simple and easily accessible means of adjustment. Every winch drum which could be uncoupled from the drive shall be furnished with a separate brake independent of the brake connected with the drive.

12 Winches shall be provided with means to prevent overhoisting and to prevent the accidental release of load if power supply fails.

13 Shielding shall be established around all warping ends. The Danish Maritime Authority may, after a concrete assessment, exempt warping ends from satisfying this requirement.

14 Where a winch is operable from the control station (wheelhouse), emergency control switches shall be installed at suitable points, e.g. around the winch and at the other fixed work stations on deck and in the wheelhouse. Such control switches shall be able to stop the movement of the winch, and the winch shall be secured so that there is no uncontrolled discharge of the wire.

15 Tackle winches may not be able to pull at a greater force than the least permissible workload in any part of the tackling equipment.

16 Trawl winches shall be fitted with a mechanical winding system. The Danish Maritime Authority may, after a concrete assessment in accordance with the instructions and guidelines of the Danish Maritime Authority in force at any time, exempt self-stowing winches from complying with this requirement.

17 Suspended blocks shall be fitted with safety chains or wire protection with at least double the ultimate stress of the suspension point of the blocks.

Regulation 13 – Cargo handling in fishing vessels

1 Reception bins/boxes where the load is brought in hanging freely shall be provided with a solid pipe guard around the bin/box. If necessary, a platform shall be established on the guard at an appropriate height so that the opening and tying of the net may be carried out in a good working posture.

2 Fish processing shall be carried out in a good working height. Auxiliary and other equipment shall, to the extent necessary, be easily adjustable.

3 To reduce the risk of slippery deck surfaces, fish waste shall be collected in separate bins or baskets or be led overboard by means of skids, belts or similar arrangements.

4 Technical measures shall be taken ensuring that the handling of fish and ice on deck, between the deck and the cargo space and in the cargo hold as such may be carried out so that unnecessary physical strains are avoided or reduced to a minimum.

Regulation 14 – Ice handling on fishing vessels

1 Conveyor belts for the carriage of ice for mixing with the catch/fish may be installed on board fishing vessels only when the specific system has been approved separately both at the design stage and finally by the Danish Maritime Authority. When applying for approval at the design stage, a separate risk assessment of the work station shall be submitted for the conveyor belt.

2 Ice shall be handled without causing any unnecessary physical strains. This may, for example, mean installing an ice machine with sufficient capacity, an ice silo with raisable bottom or other technical ice handling auxiliaries to avoid heavy lifting and inappropriate working postures when handling ice.

Regulation 15 – Tiller arrangements on fishing vessels

1 Tiller arrangements on fishing vessels that are used wholly or partly for catching industrial fish shall be mechanically and/or hydraulically operated at the longitudinal net hauling equipment. For the same group of vessels with transversal net hauling equipment, the Danish Maritime Authority shall make a concrete assessment of whether a mechanical tiller arrangement is needed. Tiller arrangements, including supports for tillers that are mechanically operable, shall be secured in such a way that the crew cannot get jammed between them. For existing fishing vessels, the Danish Maritime Authority may, following a concrete assessment, grant exemption from this requirement if it would lead to poor space or other impractical consequences.

2 The tiller arrangement shall be designed so that the trawl or the wire cannot jump over the tiller and so that the tillers cannot "unscrew themselves" from their fastening.

Regulation 16 – Net hauling equipment on fishing vessels

1 Net hauling equipment shall be installed so that persons cannot get jammed.

2 The passageway between bulkheads, deckhouses or the like and fully rolled up hauling equipment with nets shall as a minimum be 600 mm. For existing vessels, the Danish Maritime Authority may, however, permit a smaller passageway after a concrete assessment if it is deemed proper.

3 If the net hauling equipment is operated locally at the winch, the operating handle shall be located so that the danger of the persons operating the winch being jammed is eliminated.[3] Operating handles shall automatically return to the neutral position when released, and they shall be provided with a locking device preventing unintentional activation.

Regulation 17 – Trawl boards on fishing vessels

1 Precautions shall be taken to prevent trawl boards from accidentally swinging inboard, e.g. by erecting one or more movable protective bars or pipe clamps at the gallows.

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3. The operating handle shall be located so that it is impossible to operate the winch and remain at a risky work station at the same time.

2 There shall be effective means of holding trawl boards when changing wires, etc.

3 There shall be a suitable platform or similar arrangement from where wires, shackles, sensors, etc. for trawl boards may be replaced/secured in a safe way.

4 For existing fishing vessels where the master does not have full visibility when trawl boards are being replaced/secured, either an electronic communication system shall be used between the bridge and the working deck or video surveillance shall be established with a system suitable for maritime use and where the location of the camera has been approved by the Danish Maritime Authority.

Regulation 18 – Other deck machinery on fishing vessels

1 On beam trawlers, the arrangement shall, regardless of the size of the power at the winch drums to the trawl wires be arranged so that the drums can be disconnected when loaded by means of a single handle in the wheelhouse independent of the hydraulic pump and brakes. However, sufficient friction braking shall be maintained to avoid uncontrolled freewheeling. There shall also be a similar disconnecting device at a suitable point around the winch.

2 It shall be possible to lower all winches under any circumstances.

Regulation 19 – Fish processing plants

1 Fish processing plants mean plants that mechanically sort, clean, fillet, ice, cook, pack, transport or otherwise process the catch.

2 Fish processing plants shall be designed so that persons working or moving about around the plant are not unintentionally injured. The plant shall be protected in all foreseeable situations, e.g. during normal operation, repairs, maintenance and cleaning.

3 It may not be possible to remove protective shields without using tools unless one of the following special precautions has been taken.

.1 It may not be possible to open the protective shield until the driving power has been switched off and the plant has been shut down. Subsequently, it may not be possible to activate the plant until the protective shields are in place again.

.2 When the shielding is opened, the driving power shall be switched off automatically and the plant shall stop faster than it takes to introduce a part of the body into the danger zone. The plant may not start until the shielding is in place and it may not be possible to reactivate it automatically.

.3 For existing fishing vessels, the Danish Maritime Authority may approve plants that do not comply with the provision provided that the plant is assessed as being equally safe.

4 It shall be possible to switch off fish processing plants easily, fast and safely by means of an emergency control switch if uncontrolled dangerous situations arise in the plant. Emergency control switches shall function in all operating fields, including when part of the plant is disconnected.

5 Plants that can, for technical reasons, not be designed or shielded so that the risk of personal injury is eliminated shall be provided with emergency control switches at danger points. In case of dangerous continuous running, the emergency control switch shall be combined with a brake. It shall be possible to reactivate the plant only by means of the normal starting devices and only after the emergency control switch has been manually placed in the "operational position". Emergency control switches shall be permanently installed. Where the Danish Maritime Authority estimates that there is an increased risk that it is possible to start a system inadvertently with a risk of persons being injured, the

Danish Maritime Authority may require that the system in question be fitted with a key-operated switch-off of the power supply.

6 It shall, as far as practicable, be possible to repair and clean a plant when effective shields are fitted. If this is not possible, a key-operated manoeuvre shall be carried out to make the plant run when the shielding has been removed. Subsequently, it may be possible to run the plant only by means of a dead man's handle.

7 Once a plant has been stopped, it may not retain an accumulated pressure that may lead to a dangerous movement of the machinery during repairs or interventions.

8 Fish processing plants, conveyor belts, etc. shall comply with the following provisions:

.1 Emergency control switches shall be located at suitable points.

.2 The plants shall, in addition to the emergency control switches mentioned in paragraph .1, be provided with emergency control switches that are automatically activated in case of interventions, accidents, during cleaning, inspection or the like.

9 Where several conveyor belts operate in continuation of each other, emergency control switches shall be located at suitable intervals in accordance with the instructions of the Danish Maritime Authority. Each emergency control switch shall stop all conveyor belts in the line.

10 The arrangement shall ensure free passage for inspection, operation and cleaning of the fish processing plant. Working areas around such plants should not have a breadth below 750 mm. However, the Danish Maritime Authority may permit a smaller breadth following a concrete assessment if it is deemed appropriate.

11 Insulating materials for fish processing plants, including pipe connections, shall be non-combustible, solid and stable in a vibrating environment. They may not have an external surface temperature that is harmful to or unpleasant for the crew on contact. The insulating materials shall be securely applied. The provision shall not apply to vessels the keels of which were laid before 1 August 1990. The materials shall also be approved for use in the food industry.

12 Machinery and installations operating under pressure shall comply with the requirements for pressure vessels in chapter IV.

13 Machinery and other installations from which steam, gas, dust or other harmful or annoying substances may escape or be emitted during operation shall be provided with extraction systems.[4] The suction opening of the extraction system shall be located as close as possible to the source of the steam, gas, dust or other harmful or annoying substances, and the piping shall be arranged so that the products that are carried away do not present a danger. The steam or fume outlet from equipment such as lobster, crab, shrimp and liver cookers and equipment using heated water shall be located as high as possible. Outlet pipes shall have a diameter of at least 50 mm and shall be carried to the open air. Steam from the outlet may not hamper bridge visibility.

14 Dampers, valves or other means of closing shall be fitted so that they are easily accessible and safe to operate.

15 Machinery and equipment in working areas shall be erected on strong, fixed foundations securely fastened to the structure of the vessel.

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[4] Sometimes chemicals (such as sodium disulphide in connection with lobster fishing) are used in connection with the operation of machinery and other installations. In connection with any use of chemicals, it is of the utmost importance to personal safety that one acquaints oneself with the instructions for the use of the relevant product and that they are followed closely.

16 Moving parts of machinery and other installations as well as gear that may present a danger shall be effectively shielded.

17 Fish processing plants requiring water shall be provided with effective drainage systems taking account of their special susceptibility to clogging.

18 Machinery and installations requiring routine checks at a height of more than 2 m shall, if technically possible, be provided with 600 mm broad platforms protected with rails of a minimum height of 1 m.

19 The placing in and removal of fish from the plant shall be carried out at a safe and comfortable working height.

20 Feed openings for machinery and other installations shall be within comfortable reach of the crew. Feed opening covers shall be fitted with suitable means of closing so that steam, hot water or fumes are prevented from escaping the room. The cover shall be fitted with a counterbalance or another secure arrangement for securing it in the open position when required.

Regulation 20 – Measures to counteract the health hazards related to industrial fish cargoes

1 The following definitions shall apply in this regulation:
   (a) "Formalin" means the liquid formaldehyde HCHO dissolved in water.
   (b) "Breathing mask" means a protective device ensuring that a person may be supplied with fresh air from stationary compressed air cylinders, compressor plants with pressure vessel or portable pressure vessels.
   (c) "Industrial fish" means fish caught exclusively for use in the fish meal and fish oil industries.
   (d) "Hydrogen sulphide" means the gas H_2S.

2 Vessels used for catching and/or transporting industrial fish shall comply with the provisions laid down in this regulation.

3 To counteract decay in fish cargoes and hence the production of poisonous gases, the provisions laid down by the Danish Ministry of Food shall apply. If the Danish Ministry of Food grants permission to use new preservatives not previously used, the Danish Maritime Authority shall be informed hereof by the shipowner before such preservatives are being used. Such preservatives may not be used until the regulations of the Danish Maritime Authority on the use of the relevant preservatives are available.

4 To counteract health hazards in connection with the unloading of industrial fish, the provisions and guidelines laid down by the Danish Working Environment Service shall be complied with.

5 Formalin shall be stored on open deck in approved containers.

6 In order to check the air in the spaces of the vessel, type-approved gauging equipment shall be available on board capable of measuring the content of oxygen, carbon dioxide and hydrogen sulphide as well as of formalin in case this substance is carried on board.

7 Type-approved safety equipment shall be available on board consisting of at least two safety harnesses and associated lifelines and at least one breathing mask. In existing vessels, existing equipment that has already been approved shall continue to be acceptable.

8 Rubber or plastic gloves as well as protective glasses or a face mask shall be used when working with formalin.

9 Before anyone enters cargo holds, storerooms or similar spaces below deck, it shall be ensured through measurements that the air in the space is not poisonous or presents a health risk.

10 If it has been found, through measurements, that the air in the space is not poisonous or presents a health risk, and that the air contains a sufficient quantity of oxygen (minimum 21%), the person who is

to enter the cargo hold shall wear a safety harness with associated lifeline. A line-holder shall constantly be present as a watch at the hatchway.

11 During the voyage, the master of the vessel shall keep cargo holds containing industrial fish under observation at suitable intervals with a view to releasing dangerous overpressure.

12 On the lower side of each hatch cover (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 may be affixed on the wheelhouse at the place where the vessel is normally embarked.

The text on the sign shall fun as follows:

DANGER
POISONOUS AND SUFFOCATING GASES

It is prohibited to enter the hold before gauging
Safety belts and lifelines must be used
There must be a watch at the hatchway

Danish text:

FARE
GIFTIGE OG KVÆLENDE LUFTARTER

Det er forbudt at gå ned, før målinger er foretaget
Sikkerhedsbælte og livline skal benyttes
Der skal være vagt ved lugen

13 A copy of the latest guideline on precautions to counteract health hazards in connection with work with industrial fish issued by the Danish Working Environment Service shall be carried on board.

14 The master of the ship shall ensure that all persons employed by him or the ship owner who work with the loading, stowing and unloading of industrial fish are aware of the safety provisions and publications mentioned in this regulation.

16 The persons mentioned above shall be instructed in the use of the gauging and safety equipment mentioned in this regulation. Drills shall be held with the equipment every time a new crewmember signs on who is intended to work with the loading, stowing and unloading of industrial fish, however at least once every third month. The master of the ship shall record the time and place of drills in the survey book.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter VII
Life-saving appliances and arrangements

Regulation 1 – Application and definitions

This chapter shall apply to new and existing vessels.

"Approved liferaft" shall mean a liferaft approved and conformity-marked (wheel-marked) in accordance with the technical regulation on marine equipment. Fishing vessels with a scantling number below 100 may use liferafts with a capacity for four persons approved by the Danish Maritime Authority.

"Approved immersion suit" shall mean a thermally insulated immersion suit or protective suit approved and conformity-marked (wheel-marked) in accordance with the technical regulation on marine equipment or previously approved by the Danish Maritime Authority.

"Recognised codes of practice" shall mean standards adopted by the International Maritime Organization (IMO), the International Organization for Standardization (ISO), the European Committee for Standardization (CEN), Dansk Standard (DS) and the recognised organisations.

Regulation 2 – Lifejackets

For every person on board, a lifejacket of an approved type fitted with an approved light shall be carried.

Regulation 3 – Immersion suits

1 For every person on board, an approved immersion suit shall be carried on board fishing vessels covered by these regulations.

2 Immersion suits shall be located close to the life-saving appliances and, insofar as possible, so that they are accessible from open deck.

Regulation 4 – Lifebuoys

1 Vessels with a length of or above 12 m shall carry two approved lifebuoys. One of them shall be fitted with an electric light, the other shall be fitted with a buoyant line of at least 27.5 m.

2 Vessels of a length below 12 m shall carry one approved lifebuoy. The lifebuoy shall be fitted with both an electric light and a buoyant line of at least 27.5 m.

3 Lifebuoys shall be marked with the name and port of registry of the vessel in legible block capitals in the Roman alphabet.

Regulation 5 – Life rafts

1 Every vessel shall carry one or more approved "SOLAS" life rafts or approved four-person life rafts with a total capacity to carry all persons on board. Each life raft shall be equipped with a SOLAS B-pack.

2 Life rafts shall, as far as possible, be arranged so that they can immediately be moved for release from either side of the vessel.

3 Life rafts shall be fitted with a painter permanently fastened to the vessel and with automatic release so that the raft floats freely to the surface and is automatically inflated if the vessel sinks. Life rafts shall, as far as possible, be arranged so that they can immediately be moved for release from either side of the vessel. The lashing of rafts shall be provided with approved hydrostatic release devices.

4 Vessels of a length below 12 m may, instead of an approved "SOLAS" life raft, carry a life raft approved and equipped for use in hire vessels. The raft shall be arranged in the same way as the raft above. The raft shall be thermally insulated at the bottom.

6 Work barges that are used in connection with pound net fishing and that do not move more than 3 nautical miles away from the nearest coast shall not be obliged to carry a life raft when accompanied by a vessel equipped with a raft with a capacity to carry all persons on the vessel and the barge.

7 Vessels used in restricted, protected areas may be exempted from satisfying the requirement for a life raft following a concrete assessment by the Danish Maritime Authority and on specific conditions.

8 Life rafts in vessels only engaged on voyages in areas with low water depths may leave out the weak part in connection with the painter if the painter has a length at least twice the greatest water depth in the area of navigation.

9 Life rafts and hydrostatic release units, except for disposable hydrostatic release units, shall be inspected by an approved service station at an interval of maximum 12 months. If this is not practicable, the Danish Maritime Authority may extend the period to 17 months.

Regulation 6 – Pyrotechnics

1 All vessels shall carry at least three parachute flares with a red light. In case of navigation west of 6° east and north of 58° north, the number of parachute flares shall be at least six.

2 The parachute flares shall be of an approved type and shall be located so that they are immediately accessible. The location shall be clearly marked. The parachute flares shall be replaced in accordance with the instructions of the manufacturer.

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Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter VIII
Emergency procedures, musters and drills

Regulation 1 – Application

1 The provisions of this chapter shall apply to new and existing vessels.

Regulation 2 – General emergency alarm system, muster list and emergency instructions

1 The general alarm signal shall consist of seven or more short blasts followed by one long blast on the vessel's whistle, siren or other device for giving effective sound signals.

2 All vessels shall be provided with clear instructions on what each person on board shall do in case of emergency. A muster list shall be prepared before the vessel proceeds to sea. If any change takes place in the crew that necessitates an alteration of the muster list, the master shall either revise the list or prepare a new list.

Regulation 3 – Abandon ship training and drills

1 At least one abandon ship drill and fire drill shall take place every month. Each drill shall include all life-saving and fire-extinguishing equipment on board. Life-saving appliances and fire-extinguishing equipment shall be inspected in connection with such drills. Information about drills that have taken place shall be recorded in the survey book of the vessel stating the time and place.

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Chapter IX
Radiocommunications

Regulation 1 – Application

1 This chapter shall apply to new and existing vessels except for (corresponds to the exemptions in Notice A from the Danish Maritime Authority, chapter IX B on Medicine Chests, etc.):
  .1 Open vessels,
  .2 Vessels engaged on voyages not exceeding half an hour at sea,
  .3 Tugs and other vessels operating in port areas.

Regulation 2 – Entry into force

1 The provisions shall be complied with as of 1 February 2002, although for vessels whose trading area is exclusively within sea area A1, compliance with the requirements of this chapter may be exposed until 1 February 2005.
  (In Denmark sea area A1 covers internal Danish waters and the North Sea to about 25 nautical miles from the coast).

2 No provision in this chapter shall prevent the use by any vessel or survival craft in distress of any means at their disposal to attract attention, make known their position and obtain help.

Regulation 3 – Terms and definitions

For the purpose of this chapter, the following definitions shall apply:

1 "Digital selective calling (DSC)" means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radiocommunication Sector (ITU-R).

2 "Inmarsat" means the Organization established by the Convention on the International Maritime Satellite Organization (Inmarsat) adopted on 3 September 1976.

3 "EPIRB" (Emergency Position Indicating Radio Beacon) means a satellite emergency position indicator radio transmitter.

4 "MMSI" (Maritime Mobile Service Identity) is a 9-digit number which identifies the ship on, among other things, DSC equipment and EPIRBs.

5 "Float-free EPIRB" means a mechanism making the EPIRB float free of the vessel if it sinks. The EPIRB is activated automatically when afloat.

6 "SART" (Search And Rescue Transponder) means a transmitter/receiver activated by signals from a 3-cm radar and emitting signals registered by a 3-cm radar. It is used for localisation in emergencies.

7 "NAVTEX" means a receiver for automatic reception of maritime safety information (MSI) in the English language on 518 kHz.

8 "Sea area A1" means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.

9 "Sea area A2" means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.

10 "Sea area A3" means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available.

11 "Sea area A4" means an area outside sea areas A1, A2 and A3.

12 "Continuous watch" means that the radio watch concerned shall not be interrupted other than for brief intervals when the vessel's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.

Regulation 4 – Radio equipment

1 Every vessel shall be provided with radio installations as stipulated in the table below:

Sea area	VHF - DSC	MF-DSC	HF-DSC	Inmar-sat-C	EPIRB Float-free	SART	Port-able VHF	NAV-TEX
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 = required equipment

R = recommended equipment

2 As to the functional requirements for each individual radio equipment in the table above and its installation, the provisions of the radio chapters in Notice B (IV) from the Danish Maritime Authority shall apply. Reference is made to these regulations.

3 In vessels operating in sea areas A3 and A4, the DSC equipment shall be of class A or B. In vessels operating in sea 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.

4 All relevant radio equipment (DSC and Inmarsat) shall continuously and automatically be fed information concerning the position of the ship. The purpose is that the position information shall form part of the emergency alarm when the button or buttons on the emergency panel is/are activated.

[1] So far there is no requirement for Navtex receivers in vessels approved for operation in trading area F4, cf. the definition in chapter I.

5 As to navigation in Greenland waters, the Danish Maritime Authority may exempt vessels only engaged on voyages in sea areas A2 and A3 from the requirements for VHF-DSC provided that such vessels maintain a continuous watch on VHF channel 16 when practicable.

6 The radio installation shall be provided with reliable, permanently installed electric lighting offering sufficient light to operate the facilities of the radio installation.

7 The radio installation shall be clearly marked with the name, call signal, MMSI no. and any Inmarsat numbers of the vessel. Furthermore, there shall be a notice at the radio installation instructing persons not acquainted with the installation how to start the radio equipment and transmit a distress alert in case of emergency.

8 The radio equipment in this chapter shall meet the requirements in Council Directive 96/98/EC of 20 December 1996 on marine equipment.

9 Radio equipment that meets the requirements in Council Directive 99/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity is exempted.

Regulation 5 – Watches

1 Every vessel, while at sea, shall maintain a continuous watch:

.1 on VHF DSC channel 70 if the vessel is fitted with VHF-DSC;

.2 on the distress and safety DSC frequency 2,187.5 kHz if the vessel is fitted with MF-DSC;

.3 on the distress and safety DSC frequencies 2,187.5 kHz and 8,414.5 kHz and also on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz, appropriate to the time of day and the geographical position of the vessel if the vessel is fitted with MF-HF-DSC. This watch may be kept by means of a scanning receiver.

.4 for satellite shore-to-ship distress alerts if the vessel is fitted with an Inmarsat-C station.

2 Any vessel, while at sea, shall maintain a radio watch for broadcasts of maritime safety information (MSI) on the appropriate frequency or frequencies on which such information is broadcast for the area in which the vessel is navigating.

3 Any vessel, while at sea, shall maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the vessel is normally navigated.

Regulation 6 – Sources of energy

1 There shall be available at all times, while the vessel is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a source or sources of energy for the radio installations.

2 Until the requirements on radio battery in paragraph 4 has been met, the radio installations shall be connected to a service battery, which by help of a switch, can be connected to either an emergency battery or a starter battery.

3 There shall be an acoustic and visible alarm in the wheelhouse, which is activated if the energy source fails (low-voltage alarm)

4 By 1 January 2007 at the latest, the radio installations shall be connected to a separate radio battery. The radio battery shall be placed above the deepest load line (for fishing vessels, the designed waterline) outside the engine room and arranged in such a way that the functions are secured in case of

fire, flooding or other circumstances resulting in failure of the primary electrical installation. The battery shall be installed in accordance with the Danish Maritime Authority's current regulations.2

5 A battery (emergency power source), as required in regulation IV/12.2 and the radio battery in paragraph 4 may be the same battery provided that the requirements for both batteries are met.

6 The lighting required in regulation 4.6 and any navigational equipment connected to the radio equipment of the ship shall be connected to the same source of energy as the radio equipment. The Danish Maritime Authority may permit that other important safety equipment be connected to the radio battery.

7 The sources of energy shall be capable of supplying power to the following radio equipment at the same time for at least six hours:

.1 VHF-DSC as well as one of the installations below if the vessel has its trading area outside sea area A1,

.2 MF-DSC, or

.3 MF-HF-DSC, or

.4 Inmarsat-C.

Regulation 7 – Maintenance

1 Adequate technical documentation shall be provided to enable the equipment to be properly operated and maintained.

2 Adequate tolls and spares shall be provided to enable the equipment to be maintained.

3 On vessels engaged on voyages in sea area A3, maintenance shall be ensured by using at least one of the following methods: duplication of equipment, shore-based maintenance or at-sea maintenance capability. The chosen method shall be approved by the Danish Maritime Authority.

4 The equipment shall be kept capable of functioning.

5 Satellite EPIRBs shall

.1 be tested at least every 12 months for all matters concerning the operational mode with specific emphasis on control of transmission on operational frequencies, encoding and registration. In cases where it is found reasonable and fair, the Administration may prolong the period with 12 months plus/minus 3 months. The test may be made on board the ship or at an approved testing facility;3 and

.2 be submitted an inspection at a shore-based maintenance supplier at intervals not exceeding 5 years.

Regulation 8 – Radio personnel

1 Every vessel shall carry personnel qualified for distress and safety radiocommunication purposes. The personnel shall be holders of the relevant radio certificates, any one of whom shall be designated to have primary responsibility for radiocommunications during distress incidents.

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2 The Danish Maritime Authority's guidances no. 6 and 7 of 28 August 1995 on installation of valve regulated batteries in Danish ships.

3 Reference is made to the Danish Maritime Authority's guidance no. 1 of 10 January 2003 on annual testing of 406 MHz EPIRBs.

Regulation 9 – Radio records – ship's log book

1 All incidents in connection with radiocommunications that appear to be of importance to safety of life at sea shall be recorded in the ship's log book if one is required to be kept.

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Chapter X
Safety of navigation

Regulation 36 – Navigation lights, shapes and sound signals

Regulation 1 – Application

1 Unless expressly provided otherwise in each individual provision, this chapter shall apply to new and existing vessels.

Regulation 2 – Definitions

1 For the purposes of this chapter, "suitable equipment" means equipment that may be used for the relevant purpose and trade area. Equipment installed in vessels before 1 January 1999 shall, in as far as possible, comply with suitable performance standards.[1]

Regulation 3 – Exemptions and equivalents

1 The Danish Maritime Authority may exempt any vessel from any of the requirements of this chapter where it considers that the nature of the voyage or the vessel's proximity to land does not warrant such requirement.

SOLAS, chapter V, regulations 4-14, on navigational warnings, meteorological services and warnings, the ice patrol service, search and rescue operations, life-saving signals, hydrographical services, ship routeing systems, ship reporting systems, vessel traffic services, the establishment and operation of aids to navigation and manning is primarily addressed at governments, but are included here in brevier for the information of small commercial vessels.

Regulation 4 – Navigational warnings

Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments.2

Regulation 5 – Meteorological services and warnings

1 Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.3 Administrations shall encourage the use of meteorological instruments of a high degree of accuracy and shall facilitate the checking of such instruments upon request. Arrangements may be made by appropriate national meteorological services for this checking to be undertaken, free of charge to the ship.

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1 For example the performance standards adopted by the IMO, including:

1. Resolution A.382(X), "Recommendation on Performance Standards for Magnetic Compasses";

2. Resolution A.224(VII), "Recommendation on Performance Standards for Echo-Sounding Equipment", as amended by MSC.74(69), Annex 2;

3. Resolution MSC.64(67), annex 4, "Recommendation on Performance Standards for Radar Equipment";

4. Resolution A.384(X), "Recommendation on Performance Standards for Radar Reflectors";

5. Resolution A.819(19), "Recommendation on Performance Standards for Shipborne Global Positioning System (GPS) Receiver Equipment", as amended by resolution MSC.112(73).

2 Refer to the IMO resolution A.706(17), as amended, World-Wide Navigational Warning Service.

3 Refer to the Recommendation on weather routeing adopted by the Organization by resolution A.528(13).

2 In particular, Contracting Governments undertake to carry out, in co-operation, the following meteorological arrangements:

.1 To warn ships of gales, storms and tropical cyclones by the issue of information in text and, as far as practicable, graphic form, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.

.2 To issue, at least twice daily, by terrestrial and space radiocommunication services,4 as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form, including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system.

.3 To prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea and to arrange, if practicable, for the publication and making available of daily weather charts for the information of departing ships.

.4 To arrange for a selection of ships to be equipped with tested marine meteorological instruments (such as a barometer, a barograph, a psychrometer and suitable apparatus for measuring sea temperature) for use in this service, and to take, record and transmit meteorological observations at the main standard times for surface synoptic observations (i.e. at least four times daily, whenever circumstances permit) and to encourage other ships to take, record and transmit observations in a modified form, particularly when in areas where shipping is sparse.

.5 To encourage companies to involve as many of their ships as practicable in the making and recording of weather observations; these observations to be transmitted using the ship's terrestrial or space radiocommunications facilities for the benefit of the various national meteorological services.

.6 The transmission of these weather observations is free of charge to the ships concerned.

.7 When in the vicinity of a tropical cyclone, or of a suspected tropical cyclone, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions.

.8 To arrange for the reception and transmission of weather messages from and to ships, using the appropriate shorebased facilities for terrestrial and space radiocommunications services.

.9 To encourage masters to inform ships in the vicinity and also shore stations whenever they experience a wind speed of 50 knots or more (force 10 on the Beaufort scale) *(25 m/sec.).*

.10 To endeavour to obtain a uniform procedure in regard to the international meteorological services already specified, and as far as practicable, to conform to the technical regulations and recommendations made by the World Meteorological Organization, to which Contracting Governments may refer, for study and advice, any meteorological question which may arise in carrying out the present Convention.

.11 Any master of a Danish ship may be ordered, by the reception and transmission of meteorological observations, to contribute to the maintenance of meteorological services to the degree necessary for the safety of navigation. The prescribed reports shall be submitted to the Danish authorities without any costs for the ship in question.

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4 Refer to SOLAS, chapter IV, regulations 7.1.4 and IV/7.1.5.

3 The information provided for in this regulation shall be furnished in a form for transmission and be transmitted in the order of priority prescribed by the Radio Regulations. During transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of the Radio Regulations.

4 Forecasts, warnings, synoptic and other meteorological data intended for ships shall be issued and disseminated by the national meteorological service in the best position to serve various coastal and high seas areas, in accordance with mutual arrangements made by Contracting Governments, in particular as defined by the World Meteorological Organization's system for the preparation and dissemination of meteorological forecasts and warnings for the high seas under the global maritime distress and safety system (GMDSS).

Regulation 6 – Ice Patrol Service

1 The Ice Patrol contributes to safety of life at sea, safety and efficiency of navigation and protection of the marine environment in the North Atlantic. Ships transiting the region of icebergs guarded by the Ice Patrol during the ice season are required to make use of the services provided by the Ice Patrol.

2 The Contracting Governments undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season, i.e., for the period from 1 February through 1 July of each year, the south-eastern, southern and south-western limits of the region of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships and aircraft. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

3 Ships and aircraft used for the Ice Patrol Service and the study and observation of ice conditions may be assigned other duties provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

4 The Government of the United States of America agrees to continue the overall management of the Ice Patrol Service and the study and observation of ice conditions, including the dissemination of information there from.

5 The terms and conditions governing the management, operation and financing of the Ice Patrol are set forth in the Rules for the management, operation and financing of the North Atlantic Ice Patrol appended to this chapter, which shall form an integral part of this chapter.

6 If, at any time, the United States and/or Canadian Governments should desire to discontinue providing these services, it may do so and the Contracting Governments shall settle the question of continuing these services in accordance with their mutual interests. The United States and/or Canadian Governments shall provide 18 months' written notice to all Contracting Governments whose ships entitled to fly their flag and whose ships are registered in territories to which those Contracting Governments have extended this regulation benefit from these services before discontinuing providing these services.

Regulation 7 – Search and rescue services

1 Each Contracting Government undertakes to ensure that necessary arrangements are made for distress communication and co-ordination in their area of responsibility and for the rescue of persons in distress at sea around its coasts. These arrangements shall include the establishment, operation and

maintenance of such search and rescue facilities as are deemed practicable and necessary, having regard to the density of the seagoing traffic and the navigational dangers, and shall, so far as possible, provide adequate means of locating and rescuing such persons.[5]

2 Each Contracting Government undertakes to make available information to the Organization concerning its existing search and rescue facilities and the plans for changes therein, if any.

3 Passenger ships to which chapter I applies shall have on board a plan for co-operation with appropriate search and rescue services in the event of an emergency. The plan shall be developed in co-operation between the ship, the company, as defined in regulation IX/1, and the search and rescue services. The plan shall include provisions for periodic exercises to be undertaken to test its effectiveness. The plan shall be developed based on the guidelines developed by the Organization.

Regulation 8 – Life-saving signals

Contracting Governments undertake to arrange that lifesaving signals are used by search and rescue facilities engaged in search and rescue operations when communicating with ships or persons in distress.

Regulation 9 – Hydrographic services

1 Contracting Governments undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information necessary for safe navigation.

2 In particular, Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation:

.1 to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;

.2 to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;

.3 to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and

.4 to provide data management arrangements to support these services.

3 Contracting Governments undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations.[6]

4 Contracting Governments undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a world-wide scale as timely, reliably, and unambiguously as possible.

Regulation 10 – Ships' routeing

1 Ships' routeing systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. Ships' routeing systems are recommended for use by, and may

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[5] Refer to the International Convention on Maritime Search and Rescue (SAR), 1979, and to the following resolutions adopted by the Organization: Homing capability of search and rescue (SAR) aircraft (resolution A.225(VII)), Use of radar transponders for search and rescue purposes (resolution A.530(13)), Search and rescue homing capability (resolution A.616(15)) and International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (resolution A.894(21)).

[6] Refer to the appropriate resolutions and recommendations adopted by the International Hydrographic Organization.

be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization.7

2 The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ships' routeing systems. Contracting Governments shall refer proposals for the adoption of ships' routeing systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ships' routeing systems.

3 The initiation of action for establishing a ships' routeing system is the responsibility of the Government or Governments concerned. In developing such systems for adoption by the Organization, the guidelines and criteria developed by the Organization[8] shall be taken into account.

4 Ships' routeing systems should be submitted to the Organization for adoption. However, a Government or Governments implementing ships' routeing systems not intended to be submitted to the Organization for adoption or which have not been adopted by the Organization are encouraged to take into account, wherever possible, the guidelines and criteria developed by the Organization.

5 Where two or more Governments have a common interest in a particular area, they should formulate joint proposals for the delineation and use of a routeing system therein on the basis of an agreement between them. Upon receipt of such proposal and before proceeding with consideration of it for adoption, the Organization shall ensure that details of the proposal are disseminated to the Governments which have a common interest in the area, including countries in the vicinity of the proposed ships' routeing system.

6 Contracting Governments shall adhere to the measures adopted by the Organization concerning ships' routeing. They shall promulgate all information necessary for the safe and effective use of adopted ships' routeing systems. A Government or Governments concerned may monitor traffic in those systems. Contracting Governments shall do everything in their power to secure the appropriate use of ships' routeing systems adopted by the Organization.

7 A ship shall use a mandatory ships' routeing system adopted by the Organization as required for its category or cargo carried and in accordance with the relevant provisions in force unless there are compelling reasons not to use a particular ships' routeing system. Any such reason shall be recorded in the ships' log.

8 Mandatory ships' routeing systems shall be reviewed by the Contracting Government or Governments concerned in accordance with the guidelines and criteria developed by the Organization.

9 All adopted ships' routeing systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the 1982 United Nations Convention on the Law of the Sea.

10 Nothing in this regulation nor its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.[9]

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7 Refer to the General provisions on ships' routeing adopted by the Organization by resolution A.572(14), as amended.

8 Refer to the General provisions on ships' routeing adopted by the Organization by resolution A.572(14), as amended.

9 *Archipelago, sea with many islets (e.g. the Indonesian Archipelago).*

Regulation 11 – Ship reporting systems[10]

1 Ship reporting systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. A ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization[11] pursuant to this regulation, shall be used by all ships or certain categories of ships or ships carrying certain cargoes in accordance with the provisions of each system so adopted.

2 The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems. Contracting Governments shall refer proposals for the adoption of ship reporting systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ship reporting system.

3 The initiation of action for establishing a ship reporting system is the responsibility of the Government or Governments concerned. In developing such systems, provision of the guidelines and criteria developed by the Organization[12] shall be taken into account.

4 Ship reporting systems not submitted to the Organization for adoption do not necessarily need to comply with this regulation. However, Governments implementing such systems are encouraged to follow, wherever possible, the guidelines and criteria developed by the Organization.[13] Contracting Governments may submit such systems to the Organization for recognition.

5 Where two or more Governments have a common interest in a particular area, they should formulate proposals for a co-ordinated ship reporting system on the basis of agreement between them. Before proceeding with a proposal for adoption of a ship reporting system, the Organization shall disseminate details of the proposal to those Governments which have a common interest in the area covered by the proposed system. Where a co-ordinated ship reporting system is adopted and established, it shall have uniform procedures and operations.

6 After adoption of a ship reporting system in accordance with this regulation, the Government or Governments concerned shall take all measures necessary for the promulgation of any information needed for the efficient and effective use of the system. Any adopted ship reporting system shall have the capability of interaction and the ability to assist ships with information when necessary. Such systems shall be operated in accordance with the guidelines and criteria developed by the Organization[14] pursuant to this regulation.

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10 This regulation does not address ship reporting systems established by Governments for search and rescue purposes, which are covered by chapter 5 of the 1979 SAR Convention, as amended.

11 Reference is made to "Guidelines and Criteria for Ship Reporting Systems", adopted by the Maritime Safety Committee (MSC) by resolution MSC.43(64), as amended by resolution MSC.111(73). Reference is also made to "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).

12 Refer to the Guidelines and criteria adopted by the Maritime Safety Committee of the Organization by resolution MSC.43(64). Refer also 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).

13 Refer to the Guidelines and criteria adopted by the Maritime Safety Committee of the Organization by resolution MSC.43(64). Refer also 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).

14 Refer to the Guidelines on vessel traffic services adopted by the Organization by resolution A.857(20).

7 The master of a ship shall comply with the requirements of adopted ship reporting systems and report to the appropriate authority all information required in accordance with the provisions of each such system.

8 All adopted ship reporting systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the United Nations Convention on the Law of the Sea.

9 Nothing in this regulation or its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

10 The participation of ships in accordance with the provisions of adopted ship reporting systems shall be free of charge to the ships concerned.

11 The Organization shall ensure that adopted ship reporting systems are reviewed under the guidelines and criteria developed by the Organization.

Regulation 12 – Vessel traffic services

1 Vessel traffic services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.

2 Contracting Governments undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services.

3 Contracting Governments planning and implementing VTS shall, wherever possible, follow the guidelines developed by the Organization.[15] The use of VTS may only be made mandatory in sea areas within the territorial seas of a coastal State.

4 Contracting Governments shall endeavour to secure the participation in, and compliance with, the provisions of vessel traffic services by ships entitled to fly their flag.

5 Nothing in this regulation or the guidelines adopted by the Organization shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Regulation 13 – Establishment and operation of aids to navigation

1 Each Contracting Government undertakes to provide, as it deems practical and necessary, either individually or in co-operation with other Contracting Governments, such aids to navigation as the volume of traffic justifies and the degree of risk requires.

2 In order to obtain the greatest possible uniformity in aids to navigation, Contracting Governments undertake to take into account the international recommendations and guidelines16 when establishing such aids.

3 Contracting Governments undertake to arrange for information relating to aids to navigation to be made available to all concerned. Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected after timely and adequate notice has been promulgated.

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15 Refer to the Guidelines on vessel traffic services adopted by the Organization by resolution A.857(20), as amended by resolution A.955(23).

16 Refer to the appropriate Recommendations and guidelines of IALA and to SN/Circ.107, Maritime buoyage system.

Regulation 14 – Ships' manning

In Denmark, manning conditions are regulated by the Act on the Manning of Vessels and associated administrative regulations.

1 Contracting Governments undertake, each for its national ships, to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned.[17]

2 Every ship to which SOLAS, chapter I, applies *(i.e. shall not apply to fishing vessels)* shall be provided with an appropriate minimum safe manning document or equivalent issued by the Administration as evidence of the minimum safe manning considered necessary to comply with the provisions of paragraph 1.

3 On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's log-book. The company, as defined in *SOLAS, chapter IX,* regulation 1, or the master, as appropriate, shall determine the appropriate working language. Each seafarer shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language.

4 On ships to which SOLAS, chapter I, applies, *(i.e. shall not apply to fishing vessels)* English shall be used on the bridge as the working language for bridge-to-bridge and bridge-to-shore safety communications as well as for communications on board between the pilot and bridge watchkeeping personnel,[18] unless those directly involved in the communication speak a common language other than English.

Regulation 15 – *Not in use.*

Regulation 16 – Maintenance of equipment

1 Sufficient measures shall be taken to ensure that the capability of the equipment required by this chapter is maintained.

2 While all reasonable steps shall be taken to keep the equipment required by this chapter in an effective, useable condition, defects in such equipment shall not be considered to mean that the vessel is unseaworthy or a basis for delaying the vessel in ports where repair facilities are not easily available on the precondition that the master takes suitable measures as regards the defective equipment or the information not available when planning and undertaking a safe journey to a port where repairs may be made.

Regulation 17 – *Not in use.*

Regulation 18 – *Not in use.*

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17 Refer to the Principles of safe manning adopted by the Organization by resolution A.890(21) as amended by A.955(23).

18 The IMO Standard Marine Communication Phrases (resolution A.918(22)), as amended , may be used in this respect.

Regulation 19 – Shipborne navigational equipment

1 *All vessels shall be fitted with an approved standard magnetic compass which, independent of any power supply, is capable of determining the vessel's course and show it at the steering position.*

.1 When placing the magnetic compass, a sufficient distance to magnetic material and objects such as loudspeakers and electronic equipment shall be ensured.

.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 lubber's point of the compass shall be parallel to the vessel's centre line.

.3 The location and lighting of the compass shall ensure a good reading from the steering position and from the place from where the ship is being navigated, both during the day and at night.

.4 The compass shall be properly adjusted, and its table or curve of residual deviations shall be available at all times.

.5 In vessels equipped with an automatic pilot activated by a magnetic sensor that does not show the steering course, an alternative indication of the steering course in the form of a repeater or the like shall, furthermore, be available.

2 Means for taking compass bearings shall be available as nearly as practicable over an arc of the horizon of 360°.

3 All vessels shall be equipped with suitable means for determining the water depth beneath the vessel. Vessels with trading permits for sea area F3, F4 or F5 shall be equipped with an approved echo sounder. If fish-locating equipment is fitted on board the vessel, such equipment may be used for this purpose.

4 All vessels shall, insofar as possible, be equipped with an approved radar reflector.

5 Vessels that are primarily used at night, in fog, in bad weather, in ice-filled waters or have a trading permit for sea area F3, F4 or F5 shall be equipped with an approved radar.

6 Vessels with a trading permit for sea area F3, F4 or F5 shall be equipped with an approved receiver for a global navigation satellite system or a territorial radio navigation system capable of automatically determining and updating the vessel's position at any time during the planned voyage..

7 Vessels with a trading permit for sea area F3, F4 or F5 shall be equipped with a suitable speed and distance measuring device. If the equipment described under paragraph 6 above has a function for registering speed and distance sailed, this equipment may, however, replace a speed and distance measuring device.

8 Vessels with a trading permit for sea area F3, F4 or F5 shall be equipped with a suitable barometer.

Regulation 20 – *Not in use.*

Regulation 21 – *Not in use.*

Regulation 22 – Navigation bridge visibility

1 From the steering position or from the point where the vessel is being navigated, there shall be sufficient view ahead, astern and to the sides.

.1 The horizontal field of vision from the steering position or from the point where the ship is being navigated shall extend over an arc of not less than 225°, that is from right ahead to not less than 22.5° abaft the beam on either side of the vessel.

.2 *No blind sector caused by fishing gear or other obstructions outside of the wheelhouse forward of the beam may exceed 10°. The total arc of blind sectors may not exceed 20°. The clear sectors between blind sectors shall be at least 5°. However, each individual blind sector in an arc from right ahead and 10° on each side may not exceed 5°.*

.3 *In a vessel with wheelhouse, it shall be ensured that, in the fully equipped ship with full tanks and no cargo on board, a horizontal line can be drawn from the lower edge of the wheelhouse windows passing free of the upper edge of the ship's forecastle or the like. Wheelhouse windows shall be at least 0.50 m high and shall cover an area between 1.35 m and 1.90 m above the floor. The lower edge shall be minimum 1.32 m above the floor.*

.4 *Instruments, control levers, control lights, etc. shall be located so as to achieve the best possible operating function and overview. Details shall be made in non-reflecting material on the control desk and within the field of vision.*

2 On vessels constructed before the entry into force of these regulations as well as of unconventional design that cannot, according to an assessment by the Danish Maritime Authority, satisfy this regulation, measures shall be taken to achieve a view that is as close as practicable to that required by this regulation.

Regulation 23 – *Not in use.*

Regulation 24 – Use of the automatic pilot and/or track control systems

1 In areas of high traffic density, in conditions of restricted visibility and in all other hazardous navigational situations where the automatic pilot and/or track control systems are used, it shall be possible to establish manual control of the ship's steering immediately.

2 The manual steering shall be tested after prolonged use of the automatic pilot, and before entering areas where navigation demands special caution.

Regulation 25 – *Not in use.*

Regulation 26 – *Not in use.*

Regulation 27 – Charts and nautical publications

1 All vessels shall carry up-to-date charts and nautical publications, such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for planning and showing the vessel’s route on the intended voyage and for plotting and recording positions during the entire voyage.

2 All vessels carrying the latest edition of the Fishing Yearbook shall not carry Danish sailing directions, Danish lists of lights or Danish tide tables.

3 Charts or nautical publications are specially made charts or books or a specially made database from which it is possible to extract such a chart or book issued officially by or on the authority of a government, an authorised hydrographic office or any other relevant government institution and which has been made to meet the requirements for maritime navigation.

Regulation 28 – *Not in use.*

Regulation 29 – Life-saving signals for vessels, aircraft and persons in distress

An illustrated table describing the life-saving signals[19] shall be readily available to the officer of the watch on every vessel to which this chapter applies. The signals shall be used by vessels or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations.

Regulation 30 – *Not in use.*

Regulation 31 – Danger messages

1 The master of every vessel which meets with dangerous ice, a dangerous derelict, or any other direct danger to navigation, or a tropical storm, or encounters subfreezing air temperatures associated with gale force winds causing severe ice accretion on superstructures, or winds of force 10 *(24-28 m/sec.)* or above on the Beaufort scale for which no storm warning has been received, is bound to communicate the information by all means at his disposal to ships in the vicinity, and also to the competent authorities. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals.

2 Each Contracting Government will take all steps necessary to ensure that when intelligence of any of the dangers specified in paragraph 1 is received, it will be promptly brought to the knowledge of those concerned and communicated to other interested Governments.

3 The transmission of messages regarding the dangers specified is free of cost to the ships concerned.

4 All radio messages issued under paragraph 1 shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations as defined in chapter IV, regulation 2.

Regulation 32 – Information required in danger messages

The following information is required in danger messages:

1 Ice, derelicts and other direct dangers to navigation:

.1 The kind of ice, derelict or danger observed.

.2 The position of the ice, derelict or danger when last observed.

.3 The time and date (Universal Coordinated Time) when the danger was last observed.

2 Tropical cyclones (storms):[20]

.1 A statement that a tropical cyclone has been encountered. This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical cyclone is developing or exists in the neighbourhood.

.2 Time, date (Universal Co-ordinated Time) and position of ship when the observation was taken.

.3 As much of the following information as is practicable should be included in the message:

- barometric pressure,[21] preferably corrected (stating millibars, millimetres, or inches, and whether corrected or uncorrected);

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19 Such life-saving 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).

20 The term “tropical cyclone” is the generic term used by national meteorological services of the World Meteorological Organization. The terms hurricane, “typhoon, cyclone, severe tropical storm”, etc, may also be used, depending on the geographic location.

- barometric tendency (the change in barometric pressure during the past three hours);
- true wind direction;
- wind force (Beaufort scale);
- state of the sea (smooth, moderate, rough, high);
- swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value;
- true course and speed of ship.

Subsequent observations

3 When a master has reported a tropical cyclone or other dangerous storm, it is desirable, but not obligatory, that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than 3 hours, so long as the ship remains under the influence of the storm.

4 Winds of force 10 *(25 m/sec.)* or above on the Beaufort scale for which no storm warning has been received. This is intended to deal with storms other than the tropical cyclones referred to in paragraph 2; when such a storm is encountered, the message should contain similar information to that listed under the paragraph but excluding the details concerning sea and swell.

5 Sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures:

.1 Time and date (Universal Co-ordinated Time).

.2 Air temperature.

.3 Sea temperature (if practicable).

.4 Wind force and direction.

Examples

"Ice"

TTT ICE. LARGE BERG SIGHTED IN 4506 N, 4410W, AT 0800 UTC. MAY 15.

"Derelicts"

TTT DERELICT. OBSERVED DERELICT ALMOST SUBMERGED IN 4006 N, 1243 W, AT 1630 UTC. APRIL 21.

"Danger to navigation"

TTT NAVIGATION. ALPHA LIGHTSHIP NOT ON STATION. 1800 UTC. JANUARY 3.

"Tropical cyclone"

TTT STORM. 0030 UTC. AUGUST 18. 2004 N, 11354 E. BAROMETER CORRECTED 994 MILLIBARS, TENDENCY DOWN 6 MILLIBARS. WIND NW, FORCE 9, HEAVY SQUALLS. HEAVY EASTERLY SWELL. COURSE 067, 5 KNOTS.

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[21] The standard international unit for barometric pressure is the hectopascal (hPa), which is numerically equivalent to the millibar (mbar).

TTT STORM. APPEARANCES INDICATE APPROACH OF HURRICANE. 1300 UTC. SEPTEMBER 14. 2200 N, 7236 W. BAROMETER CORRECTED 29.64 INCHES, TENDENCY DOWN .015 INCHES. WIND NE, FORCE 8, FREQUENT RAIN SQUALLS. COURSE 035, 9 KNOTS.

TTT STORM. CONDITIONS INDICATE INTENSE CYCLONE HAS FORMED. 0200 UTC. MAY 4. 1620 N, 9203 E. BAROMETER UNCORRECTED 753 MILLIMETRES, TENDENCY DOWN 5 MILLIMETRES. WIND S BY W, FORCE 5. COURSE 300, 8 KNOTS.

TTT STORM. TYPHOON TO SOUTHEAST. 0300 UTC. JUNE 12. 1812 N, 12605 E. BAROMETER FALLING RAPIDLY. WIND INCREASING FROM N.

TTT STORM. WIND FORCE 11, NO STORM WARNING RECEIVED. 0300 UTC. MAY 4. 4830 N, 30 W. BAROMETER CORRECTED 983 MILLIBARS, TENDENCY DOWN 4 MILLIBARS.
WIND SW, FORCE 11 VEERING. COURSE 260, 6 KNOTS.

“Icing”
TTT EXPERIENCING SEVERE ICING. 1400 UTC. MARCH 2. 69 N, 10 W. AIR TEMPERATURE 18° F (-7.8°C). SEA TEMPERATURE 29°F (-1.7° C). WIND NE, FORCE 8.

Regulation 33 – Distress messages: obligations and procedures

1 The master of a vessel at sea which is in a position to be able to provide assistance, on receiving information from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service that the vessel is doing so. This obligation to provide assistance applies regardless of the nationality or status of such persons or the circumstances in which they are found. If the vessel receiving the distress alert is unable or, in the special circumstances of the case, considers it unreasonable or unnecessary to proceed to their assistance, the master must enter in the log-book the reason for failing to proceed to the assistance of the persons in distress, taking into account the recommendation of the Organization to inform the appropriate search and rescue service accordingly.

1-1 Contracting Governments shall co-ordinate and co-operate to ensure that masters of vessels providing assistance by embarking persons in distress at sea are released from their obligations with minimum further deviation from the vessel’s intended voyage, provided that releasing the master of the vessel from the obligations under the current regulation does not further endanger the safety of life at sea. The Contracting Government responsible for the search and rescue region in which such assistance is rendered shall exercise primary responsibility for ensuring such co-ordination and co-operation occurs, so that survivors assisted are disembarked from the assisting vessel and delivered to a place of safety, taking into account the particular circumstances of the case and guidelines developed by the Organization. In these cases the relevant Contracting Governments shall arrange for such disembarkation to be effected as soon as reasonably practicable.

2 The master of a vessel in distress or the search and rescue service concerned, after consultation, so far as may be possible, with the masters of vessels which answer the distress alert, has the right to requisition one or more of those vessels as the master of the vessel in distress or the search and rescue service considers best able to render assistance, and it shall be the duty of the master or masters of the

vessel or vessels requisitioned to comply with the requisition by continuing to proceed with all speed to the assistance of persons in distress.

3 Masters of vessels shall be released from the obligation imposed by paragraph 1 on learning that their vessels have not been requisitioned and that one or more other vessels have been requisitioned and are complying with the requisition. This decision shall, if possible, be communicated to the other requisitioned vessels and to the search and rescue service.

4 The master of a vessel shall be released from the obligation imposed by paragraph 1 and, if his vessel has been requisitioned, from the obligation imposed by paragraph 2 on being informed by the persons in distress or by the search and rescue service or by the master of another vessel which has reached such persons that assistance is no longer necessary.

5 The provisions of this regulation do not prejudice the Convention for the Unification of Certain Rules of Law relating to Assistance and Salvage at Sea, signed at Brussels on 23 September 1910, particularly the obligation to render assistance imposed by article 11 of that Convention.[22]

6 Masters of vessels who have embarked persons in distress at sea shall treat them with humanity, within the capabilities and limitations of the vessel.

Regulation 34 – Safe navigation and avoidance of dangerous situations

1 Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organization.[23]

2 The voyage plan shall identify a route which:

.1 takes into account any relevant ships' routeing systems;

.2 ensures sufficient sea room for the safe passage of the vessel throughout the voyage;

.3 anticipates all known navigational hazards and adverse weather conditions; and

.4 takes into account the marine environmental protection measures that apply, and avoids, as far as possible, actions and activities which could cause damage to the environment.

3 The owner, the charterer, the company operating the vessel as defined in chapter IX, regulation 1, or any other person shall not prevent the master of the vessel from taking or executing any decision which, in the master’s professional judgement, is necessary for safety of navigation and protection of the marine environment.

Regulation 34-1 Master's discretion

The owner, the charterer, the company operating the vessel or any other person shall not prevent or restrict the master of the vessel from taking or executing any decision which, in the master’s professional judgement, is necessary for safety of navigation and protection of the marine environment.

Regulation 35 – Misuse of distress signals

The use of an international distress signal, except for the purpose of indicating that a vessel, an aircraft or a person or persons are in distress, and the use of any signal which may be confused with an international distress signal are prohibited.

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22 International Convention on Salvage, 1989, done at London on 28 April 1989, entered into force on 14 July 1996.

23 Refer to the Guidelines for voyage planning adopted by the Organization by resolution A.893(21).

Regulation 36 – Navigation lights, shapes and sound signals

1 All ships shall be provided with navigation lights, shapes and sound signal devices to such an extent that they comply with the Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended. The design of the shapes and the effectiveness and installation of the sound signal devices on board shall be in accordance with the International Regulations for Preventing Collisions at Sea as well as the regulations issued by the Danish Maritime Authority in force at any time.

2 Navigation lights and sound signal devices shall be of an approved type and comply with the provisions of the Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XI
Special provisions for Greenland

Regulation 1 – Application for Greenland

1 In addition to the other provisions of these regulations, this chapter shall apply to vessels registered in Greenland.

2 Trading areas for vessels covered by these provisions and registered in Greenland shall be determined individually on the basis of the following principles.

.1 Open vessels may be allocated a trading area within trading area F2. However, normally open vessels not protected against the ingress of water from the sea by means of full decks may only be allocated a trading area within F1.

.2 Decked vessels may be allocated a trading area that is appropriate from a safety perspective considering the size, construction and design of the vessel.

.2.1 Decked vessels of a length of up to 10 m may normally be allocated a trading area within F3.

.2.2 Decked vessels of a length of more than 10 m may normally be allocated a trading area within F4.

.3 Decked vessels of a length of more than 15 m may only in special cases and only following a concrete assessment be allocated a trading area within F5.

.4 For areas around the villages of Qaanaaq, Ittoqqortoormiit and Tasiilaq, the trading areas are allocated individually and following a concrete assessment in each case.

3 "Trading area F1" comprises fjord navigation, i.e. voyages within the outermost rocks (the Base line).

4 "Trading area F2" comprises local voyages around Greenland within 3 nautical miles of the outermost rocks (the Base line) in the area of Prins Christianssund on the east coast to Kullorsuag (Djævelens Tommelfinger – the Devil's Thumb) north of Upernavik.

5 "Trading area F3" comprises local voyages around Greenland within 12 nautical miles of the outermost rocks (the Base line) in the area of Cape Cort Adeler on the east coast to Kullorsuag (Djævelens Tommelfinger – the Devil's Thumb) north of Upernavik.

6 "Trading area F4" comprises local voyages around Greenland within 30 nautical miles of the outermost rocks (the Base line) in the area of Cape Cort Adeler on the east coast to Kullorsuag (Djævelens Tommelfinder – the Devil's Thumb) north of Upernavik.

7 "Trading area F5" comprises voyages around Greenland within 100 nautical miles of the outermost rocks (the Base line) in the area of Cape Cort Adeler on the east coast to Kullorsuag (Djævelens Tommelfinger – the Devil's Thumb) at Upernavik.

Regulation 2 – Special regulations for Greenland

1 For all commercial vessels registered in Greenland and covered by these regulations, the length "L1" shall be used as this length is defined in chapter I, regulation 2, paragraph 15. The length "L1" is the length that is evident from the tonnage certificate of the vessel.[1]

2 If loose GRP tanks are used for fuel oil, they shall be constructed in accordance with chapter IV, regulation 5.3.

3 Vent arrangements for fuel oil tanks shall be constructed so that a vacuum cannot develop in the fuel oil tank as a consequence of the vent pipe icing up.

4 Cooling systems for onboard machinery shall be provided by means of freshwater cooling, except for cooling of machinery in wooden ships.

5 All vessels with trading area around Greenland shall carry approved immersion suits for everyone on board.

6 Instead of the liferaft prescribed in chapter VII, vessels with trading area within F2 may carry a dinghy of an approved material capable of carrying everybody on board. The dinghy shall be equipped with a full set of oars and rowlocks, a bailer or a bucket and three hand flares.

7 The latest edition of the Fishing Yearbook prescribed in chapter X, regulation 27, may be replaced by the latest edition of Greenland's Fishing Yearbook.

8 The following regulations shall not apply in Greenland:
Chapter I, regulation 1b, regulation 2, paragraphs 14, 16 and paragraphs 45-50
Chapter VII, regulation 5, paragraphs 5 and 6.
Chapter V, regulation 12, paragraph 3, on extinguishants with equivalent fire-extinguishing effect when using systems with water.

Regulation 3 – Radiocommunications

1 Chapter IX on radiocommunications shall apply to vessels registered in Greenland.

2 Vessels holding a sailing permit within the VHF coverage of the Greenland coast radio stations shall **only** be equipped with:
   1. VHF radio equipment
   2. a float-free 406 MHz EPIRB
   3. a radar transponder (SART)

4 The requirement for VHF radio equipment stipulated in subparagraph 2.1 may be complied with either by means of traditional VHF radio equipment (without DSC) or by means of combined VHF-DSC radio equipment.

1. Cf. Order no. 620 of 10 July 1992 on the measuring of small vessels, section 5.

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Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XII
Accommodation

Regulation 1 – General

1 Accommodation spaces in vessels of a length of 12 metres or more shall comply with the provisions of Notice E from the Danish Maritime Authority, chapter XII, unless, under normal conditions, they exclusively sail by day and are hauled up onto the beach after sailing.

2 For vessels with a length between 12 and 15 m the Danish Maritime Authority may, after a concrete assessment of the conditions of each individual vessel, permit exemptions from the provisions of Notice E from the Danish Maritime Authority, chapter XII. Consideration may be taken of the vessel's size and use, including the period for which the vessel is normally at sea and whether the crew spend the night on board. However, in all cases, sufficient sanitary installations, a possibility of storing provisions as well as the possibility of preparing and eating meals will be required.

3 In other vessels, accommodation spaces or deck shelters shall be arranged to the extent necessary taking into account the duration for which the vessel is at sea as well as its use, trading area and the number of persons on board.

.1 Vessels of a length below 12 m that exclusively sail by day shall be provided with a deck shelter or another protected accommodation space with seating for all the persons on board. Decked vessels shall, furthermore, be provided with a toilet.

.2 Other vessels that are at sea for longer periods of time than by day shall be equipped with heating facilities, seating for all persons on board, berths, a galley or pantry as well as a toilet, cf. regulation 7.

Regulation 2 – Location and design

1 Accommodation spaces shall be designed and located so that they offer good protection against the weather, sea, cold, heat and unnecessary noise.

2 Floors, internal bulkheads or lining as well as ceilings shall be adequately insulated against noise and heat, and the surfaces shall be easy to keep clean.

3 Floors and decks shall be made of non-slip material in passageways and in other places where persons move about.

4 Access shall be ensured by fitting ladders or steps at all ascents and descents to accommodation spaces. Corridors and ladders in accommodation spaces shall be fitted with secure handrails or handgrips, wherever possible on both sides.

5 The standing height shall be at least 1.98 m in the wheelhouse and at least 1.80 in other accommodation spaces. However, a lower height may be accepted in door openings, emergency exits and above seating.

6 Doors, corridors and passageways shall normally have a free breadth of at least 600 mm.

7 From enclosed accommodation spaces, as well as from the wheelhouse, there shall normally be at least two exits, one of which may be an emergency exit. Smaller spaces may, however, be approved with only one exit, after assessment, if it cannot be blocked in case of fire in the machinery space, pantry or the like.

8 Exits shall be located as far apart as possible and shall be designed so that they can be used in case of emergency.

9 One of the exits may be an emergency exit through a hatchway/door or a porthole/window, for which the following requirements are laid down:

.1 A hatchway/door to the open deck shall have an inside diameter of at least 600 x 600 mm.

.2 It shall be possible to open the hatchway/door from the inside without using keys or tools. It shall also be possible to open the hatchway/door directly from the outside, although it is permissible for handles or other fittings to be removable and kept in a central place, e.g. the wheelhouse. The hatchway/door may not be provided with padlock fittings.

.3 A porthole/window used as an emergency exit shall have an inside diameter of at least 450 mm for portholes and an inside width across of at least 450 mm for windows.

.4 If the route from the accommodation to the emergency exit runs through separate spaces (steering gear spaces, cabins or similar), it may not be possible to lock doors to such spaces unless they are fitted with kick hatches that may be removed in the direction of escape.

.5 The necessary ladders, steps and handgrips shall be installed to facilitate access via the emergency exit.

.6 Appropriate points, e.g. doors, kick hatches, around windows/portholes, etc., shall be marked "EMERGENCY EXIT, Do not Block" (Danish text: "NØDUDGANG, må ikke blokeres).

10 Furthermore, exits shall be located so that a fire at one deck level cannot cause persons to be trapped at another deck level.

11 If a radio station does not have direct access to the weather deck, it shall have at least two exits. One of these exits may be a window or a porthole complying with the requirements of regulation 2.9.

Regulation 3 – Lighting and heating

1 All accommodation spaces shall be adequately lit and it shall be possible to heat them to at least 20°C.

2 Wherever possible, there shall be daylight in accommodation spaces. Furthermore, electrical lighting shall have been installed consisting of:

.1 Suitable general lighting.

.2 Individual lighting at berths and the like.

Regulation 4 – Ventilation

1 It shall be possible to effectively ventilate all rooms where persons may be accommodated.

2 Accommodation spaces shall be ventilated so that there is sufficient supply and discharge of air when doors, portholes, skylights, etc. are closed.

3 Vent holes for the supply and discharge of air shall be located so that the space is well ventilated. The vent hole for the supply of air shall be located so that there is no risk of harmful waste gases being sucked in.

4 Vent holes may not exit above or immediately next to a berth.

5 In the case of natural ventilation, the ducts shall be as short as possible with a minimum of bends. The flow area in both supply and discharge ducts shall be at least 7.5 cm^2 for each seat in the space. In sleeping quarters, there shall be a flow area of at least 30 cm^2 per berth.

6 In case of mechanical ventilation, it shall be possible to regulate the air quantity and to exchange the air at least six times per hour. Supply and discharge ducts shall be large enough for the air speed in the ducts not to exceed 6 m/s.

7 Mess locations shall be provided with an exhaust hood with outlet to the open air. In the open air, the duct shall be fitted with an exhaust hood if suction is not mechanical.

8 Toilet rooms shall have separate ventilation to the open air.

9 Spaces designed for combustible, corrosive or smelly materials shall be separately ventilated.

Regulation 5 – Berth and seating

1 The internal minimum dimensions of berths shall be at least 1.98 x 0.58 m. Where special conditions so necessitate, the Danish Maritime Authority may permit a smaller breadth at one end of the berths.

2 There may not be more than two berths above one another, and they may not be placed next to each other in such a way that one berth can be reached only by climbing over the other.

3 Berths shall be made of hard, smooth and rustproof material. Where berths are placed one above the other, there shall be a dustproof bottom made of wood, canvas or another suitable material beneath the upper berth.

4 Seats shall have a breadth of at least 0.5 m, a height above the seat of at least 0.9 m and legroom of 0.75 m measured from the back of the seat.

Regulation 6 – Galley, pantry and storerooms

1 If a galley or pantry is installed on board, it shall be of a suitable size, well lit, well ventilated as well as easy to keep clean. Cooking facilities and utensils shall be available as well as a stainless sink and suitable worktop space for preparing food. Furthermore, it shall possible to store provisions nearby in a suitable and cool place.

2 It shall be easy to clean the freshwater tank. It shall have an inspection hatch with a diameter of at least 0.15 m, and it shall be possible to empty it completely via a bottom valve at the lowest point of the tank or via a suction pipe from the bottom of the tank.

3 For cooker installations, F-gas installations and cookers using methylated spirits or kerosene, reference is made to chapter V, regulation 7.

Regulation 7 – Toilets

1 If there are toilets on board, they shall be located in a space separated from the other accommodation spaces by a lockable door. In vessels that are on voyages for more than 24 hours, the toilet shall be of a water-flushing type, and the room shall be provided with a washbasin with water supply and drain.

2 For toilet systems, reference is made to chapter XX, regulations 3 and 4.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XXI
Prevention of pollution by oil

This chapter has been drawn up on the basis of Denmark's obligation to issue detailed regulations for small vessels, cf. annex I, regulation 14.4 of the International Convention for the Prevention of Pollution from Ships, the MARPOL 73/78 Convention. Annex I of the convention has been printed in its entirety, including national Danish provisions, in chapter XXI of Notice B from the Danish Maritime Authority.

Regulation 1 – Application

1 This chapter shall apply to new vessels and to existing vessels the keels of which are laid after 2 October 1989. Existing vessels the keels of which are laid before 2 October 1989 shall at least comply with the provisions of regulation 4, paragraph 5.

Regulation 2 – Definitions

1 "Oil" means any kind of mineral oil, including fuel and lubricating oils as well as sludge and waste connected hereto.

2 "Oil-containing mixture" means a mixture that contains oil.

Regulation 3 – Discharge of oil and oil-containing mixtures

1 It is not permitted to discharge oil and oil-containing mixtures into the sea. All oil-containing mixtures shall be collected or treated in accordance with the provisions of regulation 4.

Regulation 4 – Collection and treatment of oil and oil-containing mixtures

1 It shall be possible to lead oil and oil-containing mixtures from the machinery space as well as from other spaces where they may occur via a fixed pump (mechanical or hand-driven) with pipelines to a waste oil tank/tanks with a suitable capacity. The installation shall be separate and may not be connected to the bilge pumping system of the vessel or to its sea valves or overboard valves.

2 The waste oil tank/tanks may, in accordance with an assessment by the Danish Maritime Authority in each case, be fixed or consist of one or more loose tanks of a maximum of 25 litres each suitable for taking ashore.

3 Fixed waste oil tanks shall be fitted with outlet pipes led to the open deck and through which it is possible to empty the tanks into reception facilities ashore via a suitable connection on deck.

4 As an alternative to waste oil tanks, the vessels may be provided with an oil/water separator with an alarm and stop approved in accordance with the recognised international standards as well as with an associated waste oil tank, which it shall be possible to empty into reception facilities ashore, or with other systems that may, after a concrete assessment by the Danish Maritime Authority, be approved.

5 Existing vessels the keels of which are laid before 2 October 1989 shall as a minimum be fitted with an arrangement on the bilge suction side for the separation of water and oil as well as an arrangement for the collection of oil with associated storage facility.

6 Automatically starting bilge pumps capable of discharging oil-containing waste water shall be installed in such a way that the oil-containing waste water does not pollute the marine environment. This may consist in the waste water being led to a reception tank.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XXII
Prevention of pollution by harmful liquid substances in bulk

1 Unless expressly provided otherwise, the provisions of this chapter shall apply to all vessels carrying harmful, liquid substances in bulk.

2 The provisions, including national Danish provisions, have been printed in their entirety in chapter XXII of Notice B from the Danish Maritime Authority.

3 None of these provisions shall apply to the discharge of bilge or ballast water.

4 None of these provisions shall apply to the discharge into the sea of pure ballast or separated ballast.

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Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XXIII
Prevention of pollution by harmful liquid substances carried by sea in packaged form

1 Unless expressly provided otherwise, the provisions of this chapter shall apply to all vessels carrying harmful substances in packaged form. They shall not apply to the vessel's equipment and stores.

2 The provisions, including national Danish provisions, have been printed in their entirety in chapter XXIII of Notice B from the Danish Maritime Authority.

3 The provisions have been drawn up on the basis of Annex III to the International Convention for the Prevention of Pollution from Ships, the 1973 MARPOL Convention.

4 In connection with the implementation of the provisions of the MARPOL Convention in Denmark, Orders have been issued by the Danish Ministry for the Environment in addition to the technical regulations of the Danish Maritime Authority.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XXIV
Treatment and storage of sewage

Regulation 1 – Application

1 The provisions of this chapter shall apply to new and existing vessels which have been approved to carry fewer than 15 persons, provided with a toilet, and engaged on voyages in the Baltic area and in Danish territorial waters.

2 Vessels approved to carry 15 or more persons shall comply with the provisions of Notice B from the Danish Maritime Authority, chapter XXIV.

Regulation 2 – Definitions

1 "New vessel" means a vessel the keel of which is laid on or after 1 January 2000.

2 "Existing vessel" means a vessel that is not new.

3 "Sewage" means drainage and other wastes from toilets and urinals.

4 "Fixed toilet system" means a toilet system consisting of a lavatory bowl, storage tank with associated valves, pipes and hose connections as well as a shore connection.

5 "Portable toilet" means a toilet system consisting of a lavatory bowl with associated portable storage tank without any sea connection, where the tank may be emptied manually by tipping.

6 "Shore connection" means a standard connection through which the storage tank may be emptied via an external pump arrangement.

7 "Sea toilet" means a toilet system that is not connected to a storage tank and which has a direct connection to the sea.

8 "The Baltic area" means the Baltic, the Gulf of Bothnia, the Gulf of Finland, the Belts and the Kattegat until the parallel of latitude 57°44.8'N through Skaw.

Regulation 3 – Requirements for new vessels

Fixed and portable toilet systems shall comply with the technical requirements stipulated in the latest edition of the ISO 8099 standard at the time of construction.

Regulation 4 – Requirements for existing vessels

1 Existing vessels shall comply with the provisions of regulation 3 from 1 January 2005, however:

.1 Existing portable toilet systems may be retained;

.2 Existing fixed toilet systems may be retained if the system is provided with a shore connection pursuant to the ISO 8099 standard.

.3 Existing sea toilets may be retained if the system is provided with a storage tank and a shore connection pursuant to the ISO 8099 standard.

Regulation 5 – Use of products for disinfecting and other purposes

In any toilet system, only products that are not harmful to the marine environment may be used for disinfecting and other purposes.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Chapter XXV
Prevention of pollution by garbage

This chapter has been drawn up in accordance with the provisions of annex V to the International Convention for the Prevention of Pollution from Ships, the MARPOL 73/78 Convention. Annex V of the convention has been printed in its entirety in chapter XXV of Notice B from the Danish Maritime Authority.

Regulation 1 – Application

1 This chapter shall apply to new and existing vessels, though existing signs may be retained.

Regulation 2 – Definitions

For the purposes of this chapter:

1 "Garbage" means any kind of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other chapters on the prevention of pollution in these regulations.

2 "Nearest land". The term "from the nearest land" means from the baseline from which the territorial sea of the territory in question is established in accordance with international law.

Regulation 3 – Disposal of garbage in the areas of the North Sea and the Baltic

1 The disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and ashes from plastic products that may contain residues of poison or heavy metals, and all other waste, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials, is prohibited. Such garbage shall be disposed of via garbage containers on land.

2 However, victual garbage may be disposed of as far from land as possible, but under no circumstances less than 12 nautical miles from the nearest land.

3 When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements shall apply.

Regulation 4 – Placards and storage facilities

1 Every vessel of 12 m or more in length shall display placards which notify the crew of the disposal requirements of the annex of this chapter. The placard shall be affixed in a conspicuous place.

2 Every vessel shall, irrespective of size, be provided with garbage storage facilities with capacities adequate to store on board the garbage that occurs, including victual waste, taking account of the vessel's navigation area and time at sea before reaching port.

Annex

Placard on the treatment of garbage on board

Garbage		Disposal at sea
Plastics, including synthetic ropes and fishing nets and garbage bags		Prohibited
Dunnage, lining and packing materials that can float		Prohibited
Paper, rags, glass, metal, bottles, crockery and similar materials		Prohibited
Victual waste		12 nautical miles from nearest land

Translation. Only the Danish document has legal validity. **14 December 2010**

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc.
of small commercial vessels

Chapter XXVI
Prevention of air pollution from ships

Introduction

The provisions of this chapter have been drawn up on the basis of annex VI to the International Convention for the Prevention of Pollution from Ships – the 73/78 MARPOL Convention – as adopted by the 1997 Protocol at the International Conference for the Parties to MARPOL 73/78 in September 1997.

The administration of the rules has been distributed so that the Danish Environmental Protection Agency is responsible for the rules on discharge, while the Danish Maritime Authority is responsible for the technical installations on board the ships, including the records and plans. This distribution of responsibility has been indicated in the list of content with either an "M" for the Danish Environmental Protection Agency or an "S" for the Danish Maritime Authority.

In connection with the implementation of the provisions of the MARPOL Convention in Denmark, orders have been issued by the Danish Ministry of the Environment in addition to the technical regulations of the Danish Maritime Authority, which shall be followed as well.

In the provisions, the IMO is referred to as the Organization, MARPOL 73/78 is referred to as the Convention and the Danish Environmental Protection Agency and the Danish Maritime Authority, respectively, are referred to as the Administration.

The chapter is issued with similar wording in the regulations Notice B, D, E and F of the DMA, and may consequently be inserted in each of the mentioned regulations.

Part 1 – General

Regulation 1 – Application

The provisions of this Chapter shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 16 and 18 of this Chapter. *The regulations shall not apply to ships registered in Greenland.*

Regulation 2 – Definitions

For the purpose of this Chapter:

1. "Chapter" means Chapter VI to the International Convention for the Prevention of Pollution from Ships 1973 (MARPOL), as modified by the Protocol of 1978 relating thereto, and as modified by the Protocol of 1997, as amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the MARPOL Convention.
2. A "similar stage of construction" means the stage at which:

2.1. construction identifiable with a specific ship begins; and

2.2. assembly of that ship has commenced comprising at least 50 tons or one per cent of the estimated mass of all structural material, whichever is less.

3. "Anniversary date" means the day and the month of each year which will correspond to the date of expiry of the International Air Pollution Prevention Certificate.
4. "Auxiliary control device" means a system, function, or control strategy installed on a marine diesel engine that is used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure, or that is used to facilitate the starting of the engine. An auxiliary control device may also be a strategy or measure that has been satisfactorily demonstrated not to be a defeat device.
5. "Continuous feeding" is defined as the process whereby waste is fed into a combustion chamber without human assistance while the incinerator is in normal operating conditions with the combustion chamber operative temperature between 850°C and 1200°C.
6. "Defeat device" means a device which measures, senses, or responds to operating variables (e.g., engine speed, temperature, intake pressure or any other parameter) for the purpose of activating, modulating, delaying or deactivating the operation of any component or the function of the emission control system such that the effectiveness of the emission control system is reduced under conditions encountered during

normal operation, unless the use of such a device is substantially included in the applied emission certification test procedures.

7. "Emission" means any release of substances, subject to control by this Chapter, from ships into the atmosphere or sea.

8. "Emission control area" means an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution from NO_x or SO_x and particulate matter or all three types of emissions and their attendant adverse impacts on human health and the environment. Emission control areas shall include those listed in, or designated under, regulations 13 and 14 of this Chapter.

9. "Fuel oil" means any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including distillate and residual fuels.

10. "Gross tonnage" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in Annex I to the International Convention on Tonnage Measurements of Ships, 1969 or any successor Convention.

11. "Installations" in relation to regulation 12 of this Chapter means the installation of systems, equipment including portable fire-extinguishing units, insulation, or other material on a ship, but excludes the repair or recharge of previously installed systems, equipment, insulation, or other material, or the recharge of portable fire-extinguishing units.

12. "Installed" means a marine diesel engine that is or is intended to be fitted on a ship, including a portable auxiliary marine diesel engine, only if its fuelling, cooling, or exhaust system is an integral part of the ship. A fuelling system is considered integral to the ship only if it is permanently affixed to the ship. This definition includes a marine diesel engine that is used to supplement or augment the installed power capacity of the ship and is intended to be an integral part of the ship.

13. "Irrational emission control strategy" means any strategy or measure that, when the ship is operated under normal conditions of use, reduces the effectiveness of an emission control system to a level below that expected on the applicable emission test procedures.

14. "Marine diesel engine" means any reciprocating internal combustion engine operating on liquid or dual fuel, to which regulation 13 of this chapter applies, including booster/compound systems if applied.

15. "NO_x Technical Code" means the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines adopted by resolution 2 of the 1997 MARPOL Conference, as amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the MARPOL Convention.

16. "Ozone-depleting substances" means controlled substances defined in paragraph 4 of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annexes A, B, C or E to the said Protocol in force at the time of application or interpretation of this Chapter.

    Ozone-depleting substances that may be found on board ship include, but are not limited to:

    Halon 1211 Bromochlorodifluoromethane

    Halon 1301 Bromotrifluoromethane

    Halon 2402 1,2-Dibromo-1,1,2,2-tetrafluoroethane (also known as Halon 114B2)

    CFC-11 Trichlorofluoromethane

CFC-12	Dichlorodifluoromethane
CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane
CFC-114	1,2-Dichloro-1,1,2,2-tetrafluoroethane
CFC-115	Chloropentafluoroethane

17. "Shipboard incineration" means the incineration of wastes or other matter on board a ship, if such wastes or other matter were generated during the normal operation of that ship.
18. "Shipboard incinerator" means a shipboard facility designed for the primary purpose of incineration.
19. "Ships constructed" means ships the keels of which are laid or which are at a similar stage of construction.
20. "Sludge oil" means sludge from the fuel oil or lubricating oil separators, waste lubricating oil from main or auxiliary machinery, or waste oil from bilge water separators, oil filtering equipment or drip trays.
21. "Tanker" means an oil tanker as defined in regulation 1 of Notice from the Danish Maritime Authority B, chapter XXI, or a chemical tanker as defined in regulation 1 of Notice from the Danish Maritime Authority B, chapter XXII.

Regulation 3 – Exceptions and exemptions

General

1. Regulations of this Chapter shall not apply to:
1.1. any emission necessary for the purpose of securing the safety of a ship or saving life at sea; or
1.2. any emission resulting from damage to a ship or its equipment:
1.2.1. provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the emission for the purpose of preventing or minimizing the emission; and
1.2.2. except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result.

Trials for ship emission reduction and control technology research

2. The Administration of a Party may, in co-operation with other Administrations as appropriate, issue and exemption from specific provisions of this chapter for a ship to conduct trials for the development of ship emission reduction and control technologies and engine design programmes. Such an exemption shall only be provided if the applications of specific provisions of the chapter or the revised NO_x Technical Code 2008 could impede research into the development of such technologies or programmes. A permit for such an exemption shall only be provided to the minimum number of ships necessary and be subject to the following provisions:
2.1. for marine diesel engines with a per cylinder displacement up to 30 litres, the duration of the sea trial shall not exceed 18 months. If additional time is required, a permitting Administration or Administrations may permit a renewal for one additional 18-month period; or
2.2. for marine diesel engines with a per cylinder displacement at or above 30 litres, the duration of the ship trial shall not exceed 5 years and shall require a progress review by the permitting Administration or Administrations at each intermediate survey. A permit may be withdrawn based on this review if the testing has not adhered to the conditions of permit or if it is determined that the technology or programme

is not likely to produce effective results in the reduction and control of ship emissions. If the reviewing Administration or Administrations determine that additional time is required to conduct a test of a particular technology or programme, a permit may be renewed for an additional time period not to exceed five years.

Emissions from sea-bed mineral activities

3.1 Emissions directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources are, consistent with article 2(3)(b)(ii) of the MARPOL Convention, exempt from the provisions of this chapter. Such emissions include the following:

3.1.1 emissions resulting from the incineration of substances that are solely and directly the result of exploration, exploitation and associated offshore processing of sea-bed mineral resources, including but not limited to the flaring of hydrocarbons and the burning of cuttings, muds, and/or stimulation fluids during well completion and testing operations, and flaring arising from upset conditions;

3.1.2 the release of gases and volatile compounds entrained in drilling fluids and cuttings;

3.1.3 emissions associated solely and directly with the treatment, handling, or storage of sea-bed minerals; and

3.1.4 emissions from marine diesel engines that are solely dedicated to the exploration, exploitation and associated offshore processing of sea-bed mineral resources.

3.2 The requirements of regulation 18 of this chapter shall not apply to the use of hydrocarbons which are produced and subsequently used on site as fuel, when approved by the Administration.

M/S Regulation 4 – Equivalents

1. The Administration of a Party may allow any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Chapter if such fitting, material, appliance or apparatus or other procedures, alternative fuel oils, or compliance methods are at least as effective in terms of emissions reductions as that required by this Chapter, including any of the standards set forth in regulations 13 and 14.
2. The Administration of a Party which allows a fitting, material, appliance or apparatus or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Chapter shall communicate to the Organization for circulation to the Parties particulars thereof, for their information and appropriate action, if any.
3. The Administration of a Party should take into account any relevant guidelines developed by the Organization pertaining to the equivalents provided for in this regulation.
4. The Administration of a Party which allows the use of an equivalent as set forth in paragraph of this regulation shall endeavour not to impair or damage its environment, human health, property, or resources or those of other States.

Part II – Survey, certification and means of control

S Regulation 5 – Surveys

1. Every ship of 400 gross tonnage and above and every fixed and floating drilling rig and other platforms shall be subject to the surveys specified below:

1.1. An initial survey before the ship is put into service or before the certificate required under regulation 6 of this Chapter is issued for the first time. This survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Chapter;

1.2. A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation 9.2, 9.5, 9.6 or 9.7 of this Chapter is applicable. The renewal survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with applicable requirements of this Chapter;

1.3. An intermediate survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the certificate which shall take the place of one of the annual surveys specified in paragraph 1.4 of this regulation. The intermediate survey shall be such as to ensure that the equipment and arrangements fully comply with the applicable requirements of this Chapter and are in good working order. Such intermediate surveys shall be endorsed on the certificate issued under regulation 6 or 7 of this Chapter;

1.4. An annual survey within three months before or after each anniversary date of the certificate, including a general inspection of the equipment, systems, fittings, arrangements and material referred to in paragraph 1.1 of this regulation to ensure that they have been maintained in accordance with paragraph 4 of this regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the certificate issued under regulation 6 or 7 of this Chapter; and

1.5. An additional survey either general or partial, according to the circumstances, shall be made whenever any important repairs or renewals are made as prescribed in paragraph 4 of this regulation or after a repair resulting from investigations prescribed in paragraph 5 of this regulation. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory and that the ship complies in all respects with the requirements of this Chapter.

2. In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of this Chapter are complied with.

3. Surveys of ships as regards the enforcement of the provisions of this chapter shall be carried out by officers of the Administration.

3.1. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it. Such organizations shall comply with the guidelines adopted by the Organization;[1)]

3.2. The survey of marine diesel engines and equipment for compliance with regulation 13 of this Chapter shall be conducted in accordance with the revised NO_X Technical Code 2008;

3.3. When a nominated surveyor or recognized organization determines that the condition of the equipment does not correspond substantially with the particulars of the certificate, they shall ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken, the

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1) Refer to the Guidelines for the authorization of organizations acting on behalf of the Administration, adopted by the Organization by resolution A.739 (18), as may be amended by the Organization, and the Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration, adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

certificate shall be withdrawn by the Administration. If the ship is in a port of another Party, the appropriate authorities of the port State shall also be notified immediately. When an officer of the Administration, a nominated surveyor or recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this regulation; and

3.4. In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.

4. The equipment shall be maintained to conform with the provisions of this Chapter and no changes shall be made in the equipment, systems, fittings, arrangements, or material covered by the survey, without the express approval of the Administration. The direct replacement of such equipment and fittings with equipment and fittings that conform with the provisions of this Chapter is permitted.

5. Whenever an accident occurs to a ship or a defect is discovered which substantially affects the efficiency or completeness of its equipment covered by this Chapter, the master or owner of the ship shall report at the earliest opportunity to the Administration, a nominated surveyor, or recognized organization responsible for issuing the relevant certificate.

S Regulation 6 – Issue or endorsement of a Certificate

1. An International Air Pollution Prevention Certificate shall be issued, after an initial or renewal survey in accordance with the provisions of regulation 5 of this Chapter, to:

1.1. any ship of 400 gross tonnage and above engaged in *domestic* voyages *or* to ports or offshore terminals under the jurisdiction of other Parties; and

1.2. platforms and drilling rigs engaged in *domestic* voyages *or* to waters under the sovereignty or jurisdiction of other Parties.

2. A ship constructed before 19 May 2005 shall be issued with an International Air Pollution Prevention Certificate in accordance with paragraph 1 of this regulation no later than the first scheduled dry-docking after 19 May 2005, but in no case later than 19 May 2008.

3. Such certificate shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.

S Regulation 7 – Issue of a Certificate by another Party

1. A Party may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Chapter are complied with, shall issue or authorize the issuance of an International Air Pollution Prevention Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that certificate on the ship, in accordance with this Chapter.

2. A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

3. A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued under regulation 6 of this Chapter.

4. No International Air Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

S Regulation 8 – Form of Certificate

The International Air Pollution Prevention Certificate shall be drawn up in a form corresponding to the model given in appendix I to this Chapter *(see appendix 1C to Notice B from the DMA)* and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy.

S Regulation 9 – Duration and validity of Certificate

1. An International Air Pollution Prevention Certificate shall be issued for a period specified by the Administration, which shall not exceed five years.
2. Notwithstanding the requirements of paragraph 1 of this regulation:

2.1. when the renewal survey is completed within three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate;

2.2. when the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate; and

2.3. when the renewal survey is completed more than three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.

3. If a certificate is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in paragraph 1 of this regulation, provided that the surveys referred to in regulations 5.1.3 and 5.1.4 of this Chapter applicable when a certificate is issued for a period of five years are carried out as appropriate.
4. If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period which shall not exceed five months from the expiry date.
5. If a ship, at the time when a certificate expires, is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.
6. A certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one

month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.

7. In special circumstances, as determined by the Administration, a new certificate need not be dated from the date of expiry of the existing certificate as required by paragraph 2.1.5 or 6 of this regulation. In these special circumstances, the new certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

8. If an annual or intermediate survey is completed before the period specified in regulation 5 of this Chapter, then:

8.1. the anniversary date shown on the certificate shall be amended by endorsement to a date which shall not be more than three months later than the date on which the survey was completed;

8.2. the subsequent annual or intermediate survey required by regulation 5 of this Chapter shall be completed at the intervals prescribed by that regulation using the new anniversary date; and

8.3. the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation 5 of this Chapter are not exceeded.

9. A certificate issued under regulation 6 or 7 of this Chapter shall cease to be valid in any of the following cases:

9.1. if the relevant surveys are not completed within the periods specified under regulation 5.1 of this Chapter;

9.2. if the certificate is not endorsed in accordance with regulation 5.1.3 or 5.1.4 of this Chapter;

9.3. upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 5.4 of this Chapter. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

S Regulation 10 – Port State control on operational requirements

1. A ship, when in a port or an offshore terminal under the jurisdiction of another Party, is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Chapter, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution from ships.

2. In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as to ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Chapter.

3. Procedures relating to the port State control prescribed in article 5 of the MARPOL Convention shall apply to this regulation.

4. Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the MARPOL Convention.

S/M Regulation 11 – Detection of violations and enforcement

1. Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Chapter, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.
2. A ship to which this Chapter applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has emitted any of the substances covered by this Chapter in violation of the provision of this Chapter. If an inspection indicates a violation of this Chapter, a report shall be forwarded to the Administration for any appropriate action.
3. Any Party shall furnish to the Administration evidence, if any, that the ship has emitted any of the substances covered by this Chapter in violation of the provisions of this Chapter. If it is practicable to do so, the competent authority of the former Party shall notify the master of the ship of the alleged violation.
4. Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the other Party to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with its law as soon as possible. The Administration shall promptly inform the Party which has reported the alleged violation, as well as the Organization, of the action taken.
5. A Party may also inspect a ship to which this Chapter applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party together with sufficient evidence that the ship has emitted any of the substances covered by the Chapter in any place in violation of this Chapter. The report of such investigation shall be sent to the Party requesting it and to the Administration so that the appropriate action may be taken under the present Convention.
6. The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in force at the time of application or interpretation of this Chapter, applies, mutatis mutandis, to the rules and standards set forth in this Chapter.

Part III – Requirements for control of emissions from ships

M Regulation 12 – Ozone-depleting substances

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation, reference is made to the Ministry of the Environment.

1. This regulation does not apply to permanently sealed equipment where there are no refrigerant charging connections or potentially removable components containing ozone depleting substances.
2. Subject to the provisions of regulation 3.1, any deliberate emissions of ozone-depleting substances shall be prohibited. Deliberate emissions include emissions occurring in the course of maintaining, servicing, repairing or disposing of systems or equipment, except that deliberate emissions do not include minimal releases associated with the recapture or recycling of an ozone-depleting substance. Emissions arising

from leaks of an ozone-depleting substance, whether or not the leaks are deliberate, may be regulated by Parties.

3.1 Installations which contain ozone-depleting substances, other than hydro-chlorofluorocarbons, shall be prohibited:

3.1.1 on ships constructed on or after 19 May 2005; or

3.1.2 in the case of ships constructed before 19 May 2005, which have a contractual delivery date of the equipment to the ship on or after 19 May 2005 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 19 May 2005.
This exception shall not apply to ships registered in Denmark. [2)]

3.2 Installations which contain hydro-chlorofluorocarbons shall be prohibited:

3.2.1 on ships constructed on or after 1 January 2020; or

3.2.2 in the case of ships constructed before 1 January 2020, which have a contractual delivery date of the equipment to the ship on or after 1 January 2020 or, in the absence of a contractual delivery date, the actual delivery date of the equipment to the ship on or after 1 January 2020.

4 The substances referred to in this regulation, and equipment containing such substances, shall be delivered to appropriate reception facilities when removed from ships.

5 Each ship subject to regulation 6.1 shall maintain a list of equipment containing ozone depleting substances.[1]

6 Each ship subject to regulation 6.1 which has rechargeable systems that contain ozone depleting substances shall maintain an Ozone Depleting Substance Record Book. This Record Book may form part of an existing log-book or electronic recording system as approved by the Administration.

7 Entries in the Ozone Depleting Substances Record Book shall be recorded in terms of mass (kg) of substance and shall be completed without delay on each occasion, in respect of the following:

7.1 recharge, full or partial, of equipment containing ozone depleting substances;

7.2 repair or maintenance of equipment containing ozone depleting substances;

7.3 discharge of ozone depleting substances to the atmosphere:

7.3.1 deliberate; and

7.3.2 non-deliberate;

7.4 discharge of ozone depleting substances to land-based reception facilities; and

7.5 supply of ozone depleting substances to the ship.

S Regulation 13 – Nitrogen oxides (NO_x)

Application

1.

1.1. This regulation shall apply to:

1.1.1. each marine diesel engine with a power output of more than 130 kW which is installed on a ship; and

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[2)] *HCFC is no longer allowed in EU flagged ships, cf. EC Regulation no. 2037/2000 on substances that deplete the ozone layer.*

[1] See Appendix I, Supplement to International Air Pollution Prevention Certificate (IAPP Certificate), section 2.1.

1.1.2. each marine diesel engine with a power output of more than 130 kW which undergoes a major conversion on or after 1 January 2000, except when demonstrated to the satisfaction of the Administration that such engine is an identical replacement to the engine which it is replacing and is otherwise not covered under paragraph 1.1.1 of this regulation.

1.2. This regulation does not apply to:

1.2.1. a marine diesel engine intended to be used solely for emergencies, or solely to power any device or equipment intended to be used solely for emergencies on the ship on which it is installed, or a marine diesel engine installed in lifeboats intended to be used solely for emergencies; and

1.2.2. a marine diesel engine installed on a ship solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly, provided that such engine is subject to an alternative NO_x control measure established by the Administration.

1.3. Notwithstanding the provisions of subparagraph 1.1 of this paragraph, the Administration may provide an exclusion from the application of this regulation for any marine diesel engine which is installed on a ship constructed, or for any marine diesel engine which undergoes a major conversion before 19 May 2005, provided that the ship on which the engine is installed is solely engaged in voyages to ports or offshore terminals within the State the flag of which the ship is entitled to fly.

Major conversion

2.

2.1. For the purpose of this regulation, major conversion means a modification on or after 1 January 2000 of a marine diesel engine that has not already been certified to the standards set forth in paragraph 3, 4, or 5.1.1 of this regulation where:

2.1.1. the engine is replaced by a marine diesel engine or an additional marine diesel engine is installed, or

2.1.2. any substantial modification, as defined in the revised NO_x Technical Code 2008, is made to the engine, or

2.1.3. the maximum continuous rating of the engine is increased by more than 10% compared to the maximum continuous rating of the original certification of the engine.

2.2. For a major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine or the installation of an additional marine diesel engine, the standards in this regulation in force at the time of the replacement or addition of the engine shall apply. On or after 1 January 2016, in the case of replacement engines only, if it is not possible for such a replacement engine to meet the standards set forth in paragraph 5.1.1 of this regulation (Tier III), then that replacement engine shall meet the standards set forth in paragraph 4 of this regulation (Tier II). Guidelines are to be developed by the Organization to set forth the criteria of when it is not possible for a replacement engine to meet the standards in subparagraph 5.1.1 of this regulation.

2.3. A marine diesel engine referred to in paragraph 2.1.2 or 2.1.3 shall meet the following standards:

2.3.1. for ships constructed prior to 1 January 2000, the standards set forth in paragraph 3 of this regulation shall apply; and

2.3.2. for ships constructed on or after 1 January 2000, the standards in force at the time the ship was constructed shall apply.

Tier I

3. Subject to regulation 3 of this Chapter, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2000 and prior to 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO_2) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

3.1. 17.0 g/kWh when *n* is less than 130 rpm;

3.2. 45.0 x $n^{(-0.2)}$ g/kW·h when *n* is 130 or more but less than 2000 rpm;

3.3. 9.8 g/kWh when *n* is 2000 rpm or more.

Tier II

4. Subject to regulation 3 of this Chapter, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2011 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO_2) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

4.1. 14.4 g/kWh when *n* is less than 130 rpm;

4.2. 44 x $n^{(-0.23)}$ g/kW·h when *n* is 130 or more but less than 2000 rpm;

4.3. 7.7 g/kWh when *n* is 2000 rpm or more.

Tier III

5.

5.1. Subject to regulation 3 of this Chapter, the operation of a marine diesel engine which is installed on a ship constructed on or after 1 January 2016:

5.1.1. is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO_2) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

5.1.1.1. 3.4 g/kWh when *n* is less than 130 rpm;

5.1.1.2. 9 x $n^{(-0.2)}$ g/kWh when *n* is 130 or more but less than 2000 rpm;

5.1.1.3. 2.0 g/kWh when *n* is 2000 rpm or more.

5.1.2. is subject to the standards set forth in subparagraph 5.1.1 of this paragraph when the ship is operating in an Emission Control Area designated under paragraph 6 of this regulation; and

5.1.3. is subject to the standards set forth in paragraph 4 of this regulation when the ship is operating outside of an Emission Control Area designated under paragraph 6 of this regulation.

5.2. Subject to the review set forth in paragraph 10 of this regulation, the standards set forth in paragraph 5.1.1 of this regulation shall not apply to:

5.2.1. a marine diesel engine installed on a ship with a length (L), as defined in regulation 1.19 of Annex I to the MARPOL Convention, less than 24 metres when it has been specifically designed, and is used solely, for recreational purposes; or

5.2.2. a marine diesel engine installed on a ship with a combined nameplate diesel engine propulsion power of less than 750 kW if it is demonstrated, to the satisfaction of the Administration, that the ship cannot

comply with the standards set forth in paragraph 5.1.1 of this regulation because of design or construction limitations of the ship.

Emission Control Area

6. For the purpose of this regulation, an Emission Control Area shall be any sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in appendix III to this chapter.

Marine diesel engines installed on a ship constructed prior to 1 January 2000

7.

7.1. Notwithstanding paragraph 1.1.1 of this regulation, a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 litres installed on a ship constructed on or after 1 January 1990 but prior to 1 January 2000 shall comply with the emission limits set forth in subparagraph 7.4 of this paragraph, provided that an Approved Method for that engine has been certified by an Administration of a Party and notification of such certification has been submitted to the Organization by the certifying Administration. Compliance with this paragraph shall be demonstrated through one of the following:

7.1.1. installation of the certified Approved Method, as confirmed by a survey using the verification procedure specified in the Approved Method File, including appropriate notation on the ship's International Air Pollution Prevention Certificate of the presence of the Approved Method; or

7.1.2. certification of the engine confirming that it operates within the limits set forth in paragraph 3, 4, or 5.1.1 of this regulation and an appropriate notation on the engine certification on the ship's International Air Pollution Prevention Certificate.

7.2. Subparagraph 7.1 shall apply no later than the first renewal survey that occurs 12 months or more after deposit of the notification in subparagraph 7.1. If a shipowner of a ship on which an Approved Method is to be installed can demonstrate to the satisfaction of the Administration that the Approved Method was not commercially available despite best efforts to obtain it, then that Approved Method shall be installed on the ship no later than the next annual survey of that ship which falls after the Approved Method is commercially available.

7.3. With regard to a ship with a marine diesel engine with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 litres installed on a ship constructed on or after 1 January 1990 but prior to 1 January 2000, the International Air Pollution Prevention Certificate shall, for a marine diesel engine to which paragraph 7.1 of this regulation applies, indicate that either an Approved Method has been applied pursuant to paragraph 7.1.1 of this regulation or the engine has been certified pursuant to paragraph 7.1.2 of this regulation or that an Approved Method does not yet exist or is not yet commercially available as described in subparagraph 7.2 of this regulation.

7.4. Subject to regulation 3 of this chapter, the operation of a marine diesel engine described in subparagraph 7.1 is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO_2) from the engine is within the following limits, where n = rated engine speed (crankshaft revolutions per minute):

7.4.1. 17.0 g/kWh when *n* is less than 130 rpm;

7.4.2. 45 x $n^{(-0.2)}$ g/kWh when *n* is 130 or more but less than 2000 rpm;

7.4.3. 9.8 g/kWh when *n* is 2000 rpm or more.

7.5. Certification of an Approved Method shall be in accordance with chapter 7 of the revised NO_x Technical Code 2008 and shall include verification:

7.5.1. by the designer of the base marine diesel engine to which the Approved Method applies that the calculated effect of the Approved Method will not decrease engine rating by more than 1.0%, increase fuel consumption by more than 2.0% as measured according to the appropriate test cycle set forth in the revised NO_x Technical Code 2008, or adversely affect engine durability or reliability; and

7.5.2. that the cost of the Approved Method is not excessive, which is determined by a comparison of the amount of NO_x reduced by the Approved Method to achieve the standard set forth in subparagraph 7.4 of this paragraph and the cost of purchasing and installing such Approved Method.[2]

Certification

8. The revised NO_x Technical Code 2008 shall be applied in the certification, testing and measurement procedures for the standards set forth in this regulation.

9. The procedures for determining NO_x emissions set out in the revised NO_x Technical Code 2008 are intended to be representative of the normal operation of the engine. Defeat devices and irrational emission control strategies undermine this intention and shall not be allowed. This regulation shall not prevent the use of auxiliary control devices that are used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure or that are used to facilitate the starting of the engine.

Review

10. Beginning in 2012 and completed no later than 2013, the Organization shall review the status of the technological developments to implement the standards set forth in paragraph 5.1.1 of this regulation and shall, if proven necessary, adjust the time periods set forth in that subparagraph.

S/M Regulation 14 – Sulphur oxides (SO_x) and particulate matter

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation, reference is made to the Danish Ministry of the Environment.

General requirements

1. (M) The sulphur content of any fuel oil used on board ships shall not exceed the following limits:

1.1. 4.5% m/m prior to 1 January 2012;

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[2] The cost of an Approved Method shall not exceed 375 Special Drawing Rights/metric ton NO_x calculated in accordance with the Cost-Effectiveness formula below:

$$Ce = \frac{\text{Cost of Approved Method x } 10^6}{\text{P(kW) x } 0.768 \text{ x } 6000(\text{hours/year}) \text{ x } 5\,(\text{years}) \text{ x } \Delta\,\text{NO}_x\,(g/kWh)}$$

1.2. 3.50% m/m on and after 1 January 2012; and

1.3. 0.50% m/m on and after 1 January 2020.

2. (M) The world-wide average sulphur content of residual fuel oil supplied for use on board ships shall be monitored taking into account guidelines to be developed by the Organization.[3]

Requirements within emission control areas

3. (M) For the purpose of this regulation, emission control areas shall include:

3.1. the Baltic Sea area as defined in regulation 1.11.2 of Chapter XXI, the North Sea area as defined in regulation 5(1)(f) of Chapter XXV; and

3.2. any other sea area, including port areas, designated by the Organization in accordance with criteria and procedures set forth in appendix III to this Chapter.

4. (M) While ships are operating within an emission control area, the sulphur content of fuel oil used on board ships shall not exceed the following limits:

4.1. (M) 1.5% m/m prior to 1 July 2010;

4.2. (M) 1.00% m/m on and after 1 July 2010; and

4.3. (M) 0.10% m/m on and after 1 January 2015.

5. (M) The sulphur content of fuel oil referred to in paragraph 1 and paragraph 4 of this regulation shall be documented by its suppliers as required by regulation 18 of this Chapter.

6. (M) Those ships using separate fuel oils to comply with paragraph 4 of this regulation and entering or leaving an Emission Control Area set forth in paragraph 3 of this regulation shall carry a written procedure showing how the fuel oil change-over is to be done, allowing sufficient time for the fuel oil service system to be fully flushed of all fuel oils exceeding the applicable sulphur specified in paragraph 4 of this regulation prior to entry into an emission control area. The volume of low-sulphur fuel oils in each tank as well as the date, time, and position of the ship when any fuel-oil-change-over operation is completed, shall be recorded in such log-book as prescribed by the Administration.

7. (M) During the first 12 months immediately following an amendment designating a specific emission control area under paragraph 3.2 of this regulation, ships operating in that emission control area are exempt from the requirements in paragraphs 4 and 6 of this regulation and from the requirements of paragraph 5 of this regulation insofar as they relate to paragraph 4 of this regulation.

Review provision

8. A review of the standard set forth in subparagraph 1.3 of this regulation shall be completed by 2018 to determine the availability of fuel oil to comply with the fuel oil standard set forth in that paragraph and shall take into account the following elements:

8.1. the global market supply and demand for fuel oil to comply with paragraph 1.3 of this regulation that exist at the time that the review is conducted;

8.2. an analysis of the trends in fuel oil markets; and

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[3] Refer to resolution MEPC.82(43), Guidelines for monitoring the world-wide average sulphur content of residual fuel oils supplied for use on board ships.

8.3. any other relevant issue.

9. The Organization shall establish a group of experts, comprising of representatives with the appropriate expertise in the fuel oil market and appropriate maritime, environmental, scientific, and legal expertise, to conduct the review referred to in paragraph 8 of this regulation. The group of experts shall develop the appropriate information to inform the decision to be taken by the Parties.

10. The Parties, based on the information developed by the group of experts, may decide whether it is possible for ships to comply with the date in paragraph 1.3 of this regulation. If a decision is taken that it is not possible for ships to comply, then the standard in that subparagraph shall become effective on 1 January 2025.

M Regulation 15 – Volatile organic compounds

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation in force, reference is made to the Danish Ministry of the Environment.

1. If the emissions of volatile organic compounds (VOCs) from a tanker are to be regulated in a port or ports or a terminal or terminals under the jurisdiction of a Party, they shall be regulated in accordance with the provisions of this regulation.

2. A Party regulating tankers for VOC emissions shall submit a notification to the Organization. This notification shall include information on the size of tankers to be controlled, the cargoes requiring vapour emission control systems, and the effective date of such control. The notification shall be submitted at least six months before the effective date.

3. A Party which designates ports or terminals at which VOC emissions from tankers are to be regulated shall ensure that vapour emission control systems, approved by that Party taking into account the safety standards for such systems developed by the Organization,[4] are provided in any designated port and terminal and are operated safely and in a manner so as to avoid undue delay to a ship.

4. The Organization shall circulate a list of the ports and terminals designated by the Parties to other Parties and Member States of the Organization for their information.

5. A tanker to which paragraph 1 of this regulation applies shall be provided with a vapour emission collection system approved by the Administration taking into account the safety standards for such systems developed by the Organization[5], and shall use this system during the loading of relevant cargoes. A port or terminal which has installed vapour emission control systems in accordance with this regulation may accept tankers which are not fitted with vapour collection systems for a period of three years after the effective date identified in paragraph 2 of this regulation.

6. A tanker carrying crude oil shall have on board and implement a VOC Management Plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organization. The plan shall be specific to each ship and shall at least:

6.1. provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo;

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4 Refer to resolution MEPC.130(53), "Guidelines for on-board exhaust gas SOx cleaning systems."

5 Refer to MSC/Circ.585, "Standards for vapour emission control systems".

6.2. give consideration to the additional VOC generated by crude oil washing;

6.3. identify a person responsible for implementing the plan; and

6.4. for ships on international voyages, be written in the working language of the master and officers, and, if the working language of the master and officers is not English, French, or Spanish, include a translation into one of these languages.

7. This regulation shall apply to gas carriers only if the type of loading and containment systems allow safe retention of non-methane VOCs on board or their safe return ashore.[6]

S/M Regulation 16 – Shipboard incineration

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation in force, reference is made to the Danish Ministry of the Environment.

1. (M) Except as provided in paragraph 4 of this regulation, shipboard incineration shall be allowed only in a shipboard incinerator.

2. (M) Shipboard incineration of the following substances shall be prohibited:

2.1. residues of cargoes subject to Annex I, II or III of the MARPOL Convention or related contaminated packing materials;

2.2. polychlorinated biphenyls (PCBs);

2.3. garbage, as defined by Annex V of the MARPOL Convention, containing more than traces of heavy metals;

2.4. refined petroleum products containing halogen compounds;

2.5. sewage sludge and sludge oil either of which are not generated on board the ship; and

2.6. exhaust gas cleaning system residues.

3. (M) Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerator for which an IMO Type Approval Certificate[7] has been issued.

4. (M) Shipboard incineration of sewage sludge and sludge oil generated during normal operation of a ship may also take place in the main or auxiliary power plant or boilers, but in those cases, shall not take place inside ports, harbours and estuaries.

5.

5.1. (M) Nothing in this regulation affects the prohibition in, or other requirements of, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended, and the 1996 Protocol thereto.

5.2. (S) Nothing in this regulation precludes the development, installation and operation of alternative design shipboard thermal waste treatment devices that meet or exceed the requirements of this regulation.

6. (S)

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6 Refer to resolution MSC.30(61), International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, chapter 5.

7 Type Approval Certificates issued in accordance with resolution MEPC.59(33) or MEPC.76(40).

6.1. Except as provided in subparagraph 6.2 of this paragraph, each incinerator on a ship constructed on or after 1 January 2000 or incinerator which is installed on board a ship on or after 1 January 2000 shall meet the requirements contained in appendix IV to this Chapter. Each incinerator subject to this subparagraph shall be approved by the Administration taking into account the standard specifications for shipboard incinerators developed by the Organization;[8] or

6.2. The Administration may allow exclusion from the application of subparagraph 6.1 of this paragraph to any incinerator which is installed on board a ship before 19 May 2005, provided that the ship is solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly.

7. (S) Incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation shall be provided with a manufacturer's operating manual which is to be retained with the unit and which shall specify how to operate the incinerator within the limits described in paragraph 2 of appendix IV of this Chapter.

8. (S) Personnel responsible for the operation of an incinerator installed in accordance with the requirements of paragraph 6.1 of this regulation shall be trained to implement the guidance provided in the manufacturer's operating manual as required by paragraph 7 of this regulation.

9. (S) For incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation the combustion chamber gas outlet temperature shall be monitored at all times the unit is in operation. Where that incinerator is of the continuous-feed type, waste shall not be fed into the unit when the combustion chamber gas outlet temperature is below 850°C. Where that incinerator is of the batch-loaded type, the unit shall be designed so that the combustion chamber gas outlet temperature shall reach 600°C within five minutes after start-up and will thereafter stabilize at a temperature not less than 850°C.

(M) Regulation 17 – Reception facilities

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation in force, reference is made to the Danish Ministry of the Environment.

1. Each Party undertakes to ensure the provision of facilities adequate to meet the:

1.1. needs of ships using its repair ports for the reception of ozone-depleting substances and equipment containing such substances when removed from ships;

1.2. needs of ships using its ports, terminals or repair ports for the reception of exhaust gas cleaning residues from an approved exhaust gas cleaning system,
without causing undue delay to ships, and

1.3. needs in ship breaking facilities for the reception of ozone depleting substances and equipment containing such substances when removed from ships.

2. If a particular port or terminal of a Party is – taking into account the guidelines to be developed by the Organization – remotely located from, or lacking in, the industrial infrastructure necessary to manage and process those substances referred to in paragraph 1 of this regulation and therefore cannot accept such

[8] Refer to resolution MEPC.76(40), Standard specification for shipboard incinerators.

substances, then the Party shall inform the Organization of any such port or terminal so that this information may be circulated to all Parties and Member States of the Organization for their information and any appropriate action. Each Party that has provided the Organization with such information shall also notify the Organization of its ports and terminals where reception facilities are available to manage and process such substances.

3. Each Party shall notify the Organization for transmission to the Members of the Organization of all cases where the facilities provided under this regulation are unavailable or alleged to be inadequate.

S/M Regulation 18 – Fuel oil availability and quality

Attention is drawn to the fact that the following regulation is only the Danish Maritime Authority's translation of MARPOL. As regards Danish legislation in force, reference is made to the Danish Ministry of the Environment.

Fuel oil availability

1. Each Party shall take all reasonable steps to promote the availability of fuel oils which comply with this chapter and inform the Organization of the availability of compliant fuel oils in its ports and terminals.

2.

2.1. If a ship is found by a Party not to be in compliance with the standards for compliant fuel oils set forth in this chapter, the competent authority of the Party is entitled to require the ship to:

2.1.1. present a record of the actions taken to attempt to achieve compliance; and

2.1.2. provide evidence that it attempted to purchase compliant fuel oil in accordance with its voyage plan and, if it was not made available where planned, that attempts were made to locate alternative sources for such fuel oil and that despite best efforts to obtain compliant fuel oil, no such fuel oil was made available for purchase.

2.2. The ship should not be required to deviate from its intended voyage or to delay unduly the voyage in order to achieve compliance.

2.3. If a ship provides the information set forth in subparagraph 2.1 of this paragraph, a Party shall take into account all relevant circumstances and the evidence presented to determine the appropriate action to take, including not taking control measures.

2.4. A ship shall notify its Administration and the competent authority of the relevant port of destination when it cannot purchase compliant fuel oil.

2.5. A Party shall notify the Organization when a ship has presented evidence of the non-availability of compliant fuel oil.

Fuel oil quality

3. (M) Fuel oil for combustion purposes delivered to and used on board ships to which this Chapter applies shall meet the following requirements:

3.1. except as provided in sub-paragraph 3.2:

3.1.1. the fuel oil shall be blends of hydrocarbons derived from petroleum refining. This shall not preclude the incorporation of small amounts of additives intended to improve some aspects of performance;

3.1.2. the fuel oil shall be free from inorganic acid; and

3.1.3. the fuel oil shall not include any added substance or chemical waste which:

3.1.3.1. jeopardizes the safety of ships or adversely affects the performance of the machinery, or

3.1.3.2. is harmful to personnel, or

3.1.3.3. contributes overall to additional air pollution.

3.2. fuel oil for combustion purposes derived by methods other than petroleum refining shall not:

3.2.1. exceed the sulphur content set forth in regulation 14 of this Chapter;

3.2.2. cause an engine to exceed the applicable NO_x emission limit set forth in paragraphs 3, 4, 5.11 and 7.4 of regulation 13;

3.2.3. contain inorganic acid; or

3.2.4.

3.2.4.1. jeopardize the safety of ships or adversely affect the performance of the machinery, or

3.2.4.2. be harmful to personnel, or

3.2.4.3. contribute overall to additional air pollution.

4. (M) This regulation does not apply to coal in its solid form or nuclear fuels. Paragraphs 5, 6, 7.1, 7.2, 8.1, 8.2, 9.2, 9.3 and 9.4 of this regulation do not apply to gas fuels such as Liquefied Natural Gas, Compressed Natural Gas or Liquefied Petroleum Gas. The sulphur content of gas fuels delivered to a ship specifically for combustion purposes on board that ship shall be documented by the supplier.

5. (M) For each ship subject to regulations 5 and 6 of this Chapter, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Chapter.

6. (S) The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board.

7. (S)

7.1. The competent authority of a Party may inspect the bunker delivery notes on board any ship to which this Chapter applies while the ship is in its port or offshore terminal, may make a copy of each delivery note, and may require the master or person in charge of the ship to certify that each copy is a true copy of such bunker delivery note. The competent authority may also verify the contents of each note through consultations with the port where the note was issued.

7.2. The inspection of the bunker delivery notes and the taking of certified copies by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

8.

8.1. (M) The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered taking into account guidelines to be developed by the Organization[9]. The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion

[9] Refer to MEPC.96(47), "Guidelines for the sampling of fuel oil for determination of compliance with Annex VI of MARPOL 73/78".

of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.

8.2. If an Administration requires the representative sample to be analysed, it shall be done in accordance with the verification procedure set forth in appendix VI to determine whether the fuel oil meets the requirements of this chapter.

9. (M) Parties undertake to ensure that appropriate authorities designated by them:

9.1. maintain a register of local suppliers of fuel oil;

9.2. require local suppliers to provide the bunker delivery note and sample as required by this regulation, certified by the fuel oil supplier that the fuel oil meets the requirements of regulations 14 and 18 of this Chapter;

9.3. require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the port State as necessary;

9.4. take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the bunker delivery note;

9.5. inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulations 14 or 18 of this Chapter; and

9.6. inform the Organization for transmission to Parties and Member States of the Organization of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations 14 or 18 of this Chapter.

10. (M) In connection with port State inspections carried out by Parties, the Parties further undertake to:

10.1. inform the Party or non-Party under whose jurisdiction a bunker delivery note was issued of cases of delivery of noncompliant fuel oil, giving all relevant information; and

10.2. ensure that remedial action as appropriate is taken to bring noncompliant fuel oil discovered into compliance.

11. For every ship of 400 gross tonnage and above on scheduled services with frequent and regular port calls, an Administration may decide after application and consultation with affected States that compliance with paragraph 6 of this regulation may be documented in an alternative manner which gives similar certainty of compliance with regulations 14 and 18 of this chapter.

Appendix 1
Form of International Air Pollution Prevention (IAPP) Certificate (regulation 8)

Reference is made to Annex 1C of Notice B.

Appendix II

Test cycles and weighting factors (regulation 13)

The following test cycles and weighting factors should be applied for verification of compliance of marine diesel engines with the applicable NO_x limit in accordance with regulation 13 of this Chapter using the test procedure and calculation method as specified in the revised NO_x Technical Code 2008.

1. For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 shall be applied;
2. For controllable-pitch propeller sets test cycle E2 shall be applied.
3. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
4. For constant-speed auxiliary engines test cycle D2 shall be applied.
5. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

Test cycle for "constant-speed main propulsion application" (including diesel-electric drive or variable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Test cycle for "propeller-law-operated main and propeller-law-operated auxiliary engine" application

Test cycle type E3	Speed	100%	91%	80%	63%
	Power	100%	75%	505	25%
	Weighting factor	0.2	0.5	0.15	0.15

Test cycle for "constant-speed auxiliary engine" application

Test cycle type D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

Test cycle for "variable-speed and load auxiliary engine" application

Test cycle type C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighing factor	0.15	0.15%	0.15%	0.1	0.1	0.1	0.1	0.15

Appendix III
Criteria and procedures for designation of emission control areas
(regulation 13.6 and regulation 14.3)

1. Objectives

1.1. The purpose of this appendix is to provide the criteria and procedures to Parties for the formulation and submission of proposals for the designation of Emission Control Areas and to set forth the factors to be considered in the assessment of such proposals by the Organization.

1.2. Emissions of NO_x, SO_x and particulate matter from ocean-going ships contribute to ambient concentrations of air pollution in cities and coastal areas around the world. Adverse public health and environmental effects associated with air pollution include premature mortality, cardiopulmonary disease, lung cancer, chronic respiratory ailments, acidification and eutrophication.

1.3. An Emission Control Area should be considered for adoption by the Organization if supported by a demonstrated need to prevent, reduce, and control emissions of NO_x or SO_x and particulate matter or all three types of emissions (hereinafter emissions) from ships.

2. **Process for the designation of emission control areas**

2.1. A proposal to the Organization for designation of an Emission Control Area for NO_x or SO_x and particulate matter or all three types of emissions may be submitted only by Parties. Where two or more Parties have a common interest in a particular area, they should formulate a coordinated proposal.

2.2. A proposal to designate a given area as an Emission Control Area should be submitted to the Organization in accordance with the rules and procedures established by the Organization.

3. **Criteria for designation of an Emission Control Area**

3.1. The proposal shall include:

3.1.1. a clear delineation of the proposed area of application, along with a reference chart on which the area is marked;

3.1.2. the type or types of emission(s) that is or are being proposed for control (i.e. NO_x or SO_x and particulate matter or all three types of emissions);

3.1.3. a description of the human populations and environmental areas at risk from the impacts of ship emissions;

3.1.4. an assessment that emissions from ships operating in the proposed area of application are contributing to ambient concentrations of air pollution or to adverse environmental impacts. Such assessments shall include a description of the impacts of the relevant emissions on human health and the environment, such as adverse impacts to terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The sources of relevant data including methodologies used shall be identified;

3.1.5. relevant information pertaining to the meteorological conditions in the proposed area of application to the human populations and environmental areas at risk, in particular prevailing wind patterns, or to topographical, geological, oceanographic, morphological, or other conditions that contribute to ambient concentrations of air pollution or adverse environmental impacts;

3.1.6. the nature of the ship traffic in the proposed Emission Control Area, including the patterns and density of such traffic;

3.1.7. a description of the control measures taken by the proposing Party or Parties addressing land-based sources of NO_x, SO_x and particulate matter emissions affecting the human populations and environmental areas at risk that are in place and operating concurrent with the consideration of measures to be adopted in relation to provisions of regulations 13 and 14 of chapter XXVI; and

3.1.8. the relative costs of reducing emissions from ships when compared with land-based controls, and the economic impacts on shipping engaged in international trade.

3.2. The geographical limits of an Emission Control Area will be based on the relevant criteria, outlined above, including emissions and deposition from ships navigating in the proposed area, traffic patterns and density, and wind conditions.

4. **Procedures for the assessment and adoption of Emission Control Areas by the Organization**

4.1. The Organization shall consider each proposal submitted to it by a Party or Parties.

4.2. In assessing the proposal, the Organization shall take into account the criteria which are to be included in each proposal for adoption as set forth in section 3 above.

4.3. An Emission Control Area shall be designated by means of an amendment to this chapter, considered, adopted and brought into force in accordance with article 16 of the MARPOL Convention.

5. **Operation of Emission Control Areas**

5.1. Parties which have ships navigating in the area are encouraged to bring to the Organization any concerns regarding the operation of the area.

Appendix IV
Type approval and operating limits for shipboard incinerators (regulation 16)

1. Ships incinerators described in regulation 16.6.1 on board shall possess an IMO type approval certificate for each incinerator. In order to obtain such certificate, the incinerator shall be designed and built to an approved standard as described in regulation 16.6.1. Each model shall be subject to a specified type approval test operation at the factory or an approved test facility, and under the responsibility of the Administration, using the following standard fuel/waste specification for the type approval test for determining whether the incinerator operates within the limits specified in paragraph 2 of this appendix:

Sludge oil consisting of:	75% sludge oil from HFO; 5% waste lubricating oil; and 20% emulsified water
Solid waste consisting of:	50% food waste 50% rubbish containing approx. 30% paper, approx. 40% card-board, approx. 10% rags, approx. 20% plastic The mixture will have up to 50% moisture and 7% incombustible solids.

2. Incinerators described in regulation 16.6.1 shall operate within the following limits:

O_2 in combustion chamber:	6-12%
CO in flue gas maximum average:	200 mg/MJ
Soot number maximum or average:	Bacharach 3 or Ringelman 1 (20% opacity) (A higher soot number is acceptable only during very short periods such as starting up)
Unburned components in ash residues:	Maximum 10% by weight
Combustion chamber flue gas outlet temperature range:	850-1200°C

Appendix V
Information to be included in the bunker delivery note (regulation 18(5))

Name and IMO number of receiving ship

Port

Date of commencement of delivery

Name, address, and telephone number of marine fuel oil supplier

Product name(s)

Quantity (metric tons)

Density [10]at 15°C (kg/m^3)

Sulphur content[11)] (% m/m)

A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with the applicable subparagraph of regulation 14.1 or 14.4 and regulation 18.3 of this chapter.

[10] Fuel oil shall be tested in accordance with ISO 3675:1998 or ISO 12185:1996.
[11)] Fuel oil shall be tested in accordance with ISO 8754:2003.

Appendix VI
Fuel verification procedure for MARPOL Annex VI. Fuel oil samples
(regulation 18.8.2)

The following procedure shall be used to determine whether the fuel oil delivered to and used on board ships is compliant with the sulphur limits required by regulation 14 of chapter XXVI.

1. General requirements

1.1. The representative fuel oil sample, which is required by paragraph 8.1 of regulation 18 (the "MARPOL sample") shall be used to verify the sulphur content of the fuel oil supplied to a ship.

1.2. An Administration, through its competent authority, shall manage the verification procedure.

1.3. The laboratories responsible for the verification procedure set forth in this appendix shall be fully accredited for the purpose of conducting the tests.

2. **Verification procedure stage 1**

2.1. The MARPOL sample shall be delivered by the competent authority to the laboratory.

2.2. The laboratory shall:

2.2.1. record the details of the seal number and the sample label on the test record;

2.2.2. confirm that the condition of the seal on the MARPOL sample has not been broken; and

2.2.3. reject any MARPOL sample where the seal has been broken.

2.3. If the seal of the MARPOL sample has not been broken, the laboratory shall proceed with the verification procedure and shall:

2.3.1. ensure that the MARPOL sample is thoroughly homogenized;

2.3.2. draw two sub-samples from the MARPOL sample; and

2.3.3. reseal the MARPOL sample and record the new reseal details on the test record.

2.4. The two sub-samples shall be tested in succession, in accordance with the specified test method referred to in appendix V. For the purposes of this verification procedure, the results of the test analysis shall be referred to as "A" and "B":

2.4.1. If the results of "A" and "B" are within the repeatability (r) of the test method, the results shall be considered valid.

2.4.2. If the results of "A" and "B" are not within the repeatability (r) of the test method, both results shall be rejected and two new sub-samples should be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 2.3.3 above after the new sub-samples have been taken.

2.5. If the test results of "A" and "B" are valid, an average of these two results should be calculated thus giving the result referred to as "X":

2.5.1. If the result of "X" is equal to or falls below the applicable limit required by chapter XXVI, the fuel oil shall be deemed to meet the requirements.

2.5.2. If the result of "X" is greater than the applicable limit required by chapter XXVI, Verification Procedure Stage 2 should be conducted; however, if the result of "X" is greater than the specification limit by 0.59R (where R is the reproducibility of the test method), the fuel oil shall be considered non-compliant and no further testing is necessary.

3. Verification Procedure Stage 2

3.1. If Stage 2 of the verification procedure is necessary in accordance with paragraph 2.5.2 above, the competent authority shall send the MARPOL sample to a second accredited laboratory.

3.2. Upon receiving the MARPOL sample, the laboratory shall:

3.2.1. record the details of the reseal number applied in accordance with 2.3.3 and the sample label on the test record;

3.2.2. draw two sub-samples from the MARPOL sample; and

3.2.3. reseal the MARPOL sample and record the new reseal details on the test record.

3.3. The two sub-samples shall be tested in succession, in accordance with the test method specified in appendix V. For the purposes of this verification procedure, the results of the test analysis shall be referred to as “C” and “D”:

3.3.1. If the results of “C” and “D” are within the repeatability (r) of the test method, the results shall be considered valid.

3.3.2. If the results of “C” and “D” are not within the repeatability (r) of the test method, both results shall be rejected and two new sub-samples shall be taken by the laboratory and analysed. The sample bottle should be resealed in accordance with paragraph 3.2.3 after the new sub-samples have been taken.

3.4. If the test results of “C” and “D” are valid, and the results of “A”, “B”, “C” and “D” are within the reproducibility (R) of the test method then the laboratory shall average the results, which is referred to as “Y”:

3.4.1. If the result of “Y” is equal to or falls below the applicable limit required by chapter XXVI, the fuel oil shall be deemed to meet the requirements.

3.4.2. If the result of “Y” is greater than the applicable limit required by chapter XXVI, then the fuel oil fails to meet the standards required by chapter XXVI.

3.5. If the result of “A”, “B”, “C” and “D” are not within the reproducibility (R) of the test method then the Administration may discard all of the test results and, at its discretion, repeat the entire testing process.

3.6. The results obtained from the verification procedure are final.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Annex 1
Forms, checklists and signs

Commercial vessel type certificate

Checklist for annual self-monitoring survey on fishing vessels

Daily checklist for fishing vessels surveyed in accordance with Notice F

Daily checklist for fishing vessels below 7 m in length

Danish Working Environment Authority Guidelines no. 4.04.12 on work with industrial fish in ships in port

Commercial vessel type certificate

This is to certify that the vessel mentioned below has been type-approved as a ”decked”/”open” fishing vessel/cargo vessel[8] by the Danish Maritime Authority in accordance with Notice F from the Danish Maritime Authority and in accordance with:

Official letter from the Danish Maritime Authority of.....…….……

Type of ship: .....……

Construction number: .....…… Date of construction: …….....

Main dimensions:[9]

Length L ….…….....….……...m

Length overall ……....…….....…….m

Length L_1…….....……..……..……..m

Breadth B (Greatest breadth) ...…...……..……m

Depth amidships …….....-…….....…..……..m

Maximum power output: .....…….…..…… kW

It is certified

that the above-mentioned vessel forms part of a series constructed in accordance with the same drawings and specifications and with the same design and quality as the prototype approved and tested in accordance with the given conditions and the regulations in force on the date of approval.

Drawn up on the authority of the Danish Maritime Authority

Issued in: .....…….....Date: .....…….....

……..
(signature)

[8] Delete as appropriate.

[9] As defined in Notice F from the Danish Maritime Authority, chapter I, regulation 2. To be given to two decimals.

Annual self-monitoring survey of fishing vessels surveyed in accordance with Notice F from the Danish Maritime Authority.	*Danish Maritime Authority Self-monitoring form*

This checklist must be kept on board at all times

NAME OF VESSEL	*OFFICIAL NUMBER*	*PORT OF REGISTRY*

Areas to be checked:	**Date of self-monitoring**
Has the vessel been converted and has the Danish Maritime Authority been contacted for a survey?	
Are life-saving appliances in place and in working order?	
Has VHF (DCS) been checked and found in working order?	
Have radio installation batteries been checked and found in working order?	
Has the automatic change-over for other batteries been checked and found in working order?	
Has the magnetic compass been checked and adjusted with deviation table?	
Has the echo sounder been checked and found in working order?	
Is the radio reflector in working order and in place?	
Have the necessary charts been adjusted?	
Are the necessary nautical publications available?	
Is the latest edition of the Danish Fisheries Yearbook on board?	
Are the required signs and posters in place?	
Are all lights in working order?	
Are all shapes on board and in working order?	
Is the sound-signalling device in working order?	
Are the clearing ports functional?	
Have the packings of weathertight doors and fasteners been checked and found in working order?	
Have ice-covers been checked and fitted with safety chains?	
Have all closing devices on ventilation grates, etc. been checked and found in working order?	
Have all air pipes been fitted with non-return devices?	
Has the anchor equipment been found in working order and ready for use?	
Have all sea valves been checked and found in working order?	
Has the propeller shaft and its stuffing box been checked and found in working order?	
Has the rudder stock and its stuffing box and bushings been checked and found in working order?	
Has the steering gear been checked and found in working order?	
Has the propeller head been separated and found in working order?	
Has the stability information been adjusted in connection with alterations?	
Have the two independent starter systems for the main engine been checked and found in working order?	

Annual self-monitoring survey of fishing vessels surveyed in accordance with Notice F from the Danish Maritime Authority.	*Danish Maritime Authority Self-monitoring form*

Have quick-closing devices for fuel supply been checked and found in working order?	
Have the pumping arrangements been checked and found in working order?	
Have the water level alarms been checked and found in working order?	
Have electrical systems been checked and found in working order (Megger test)?	
Has the fire-detection and fire-extinguishing system been checked and found in working order?	
Have portable fire-extinguishers been checked and found in working order?	
Has the fire blanket, if any, been checked and found in working order?	
Have gas rings or spirit heaters been checked and found in working order?	
Has the hand rope system been checked and found in working order?	
Is it possible to secure hatches in the open position?	
Has non-skid surfaces been checked and found in order?	
Are access ways for cargo holds, etc. safe and in order (companionways and ladders)?	
Have bulwarks, railings and fall-arrest arrangements been checked and found in order?	
Are the gangway arrangements in order?	
Are the fall-arrest arrangements, if any, in working order?	
Has the lighting in corridors, spaces and working areas been checked and found in working order?	
Have safety devices on deck machinery been checked and found in working order?	
Do control levers on winches and net drums automatically return to the neutral position?	
Are safety hoops on fairleads intact?	
Has the tiller arrangement been checked and found in working order?	
Has the safety device against jamming on trawl boards been checked and found in working order?	
Is the medicine chest intact and updated in accordance with the trade area?	
Are the arrangements against falling overboard in order?	
Is a rescue sling on board and in working order?	

IT IS HEREBY CERTIFIED:
That this checklist has been followed during the annual survey and that mandatory defects are being rectified. A number of the above-mentioned items are not mandatory requirements. In cases where such equipment is not on board or the requirement must not be met, the letters NA are inserted in the NO box for Not applicable.

Place	Date	Signature

The port safety committees recommends that all items in *italics* are checked at intervals corresponding to the intervals for periodical surveys on fishing vessels surveyed in accordance with Notice E from the Danish Maritime Authority since the regulations should not be stricter for F vessels than for E vessels.

Annual self-monitoring survey of fishing vessels surveyed in accordance with Notice F from the Danish Maritime Authority.	*Danish Maritime Authority Self-monitoring form*

Misissortagassat allassimaffiat una angallammiittuassaaq

UMIARSUUP AQQA	MISISSUINERUP NR.	***ANGERL.NAJUGAQ***

Misissuifftgineqartariaqartut:	**Ulloq misissuiffik**
Angallat allanngortinneqarnikuuva – aammalu Søfartsstyrelsen – ni angallatip misissortinnissaanut nalunaarfigineqarnikuuva?	
Annanniutit inissaminniippat ajoquteqanngillallu?	
VHF (DCS) misissorneqarpa ajoquteqanngilalu?	
Radiutigut ikkussukkat batteriivi misissorneqarlutillu ajoquteqanngillat?	
Batteriinut allanut nikittaat automatiskiusoq misissorneqarlunilu ajunngila?	
Saviup kajungerisaanik pujorsiut misissorneqarlunilu deviationstabelimut naleqqussarneqarpa?	
Itissusersiut misissorneqarlunilu ajoquteqarsorinanngila?	
Radarip reflektoria ajoquteqaranilu inissisimava?	
Immat angallaviit assingi pigisariaqartut pilersitaasimappat?	
Umiartornermut ilisimatusaatinik naqitikkanik pigisarialinnik peqarpa?	
Aalisarnermik ukiumoortumik nalunaarusiaq kingulleq angallammiippa?	
Allagarsiussassatut allagartassallu piumasarineqartut inissaminniippat?	
Umiarsuup silami qullii tamarmik ajoquteqanngillat?	
Kalerrisaarutit figurit tamarmik pigineqarlutillu ajoquteqanngillat?	
Nipilimmik kalerrisaarut (siggartaat) ajoquteqanngila?	
Imaarsaateqarfiit atorsinnaappat?	
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Erngup killiffiinut kalerrisaasutit misissorneqarpat ajoquteqanngillallu?	
Innaallagissamoortut misissorneqarpat ajoquteqanngillallu (Meggertest)?	
Ikuallattumik sumiissusersiut qatserutillu misissorneqarpat ajoquteqanngillallu?	
Qatserutit angallattakkat misissorneqarpat ajunngillallu?	
Ulissuaq ikuallattumut qatserut pigineqarpat misissorneqarpa ajunngilalu?	
Apparitit gassitortut spritit ortullu misissorneqarpat ajunngillallu?	
Stræktovssystemet misissorneqarpa ajoquteqanngilalu?	
Ammartartut ammatillugit aalangeerneqarsinnaappat?	
Quaattoornaveeqqutitut qalliut misissorneqarpa ajoquteqanngilalu?	
Lastimut ikisarfiit il.il. (majuartarfiit allunaallu) qajannaallutillu ajoquteqanngillat?	
Umiarsuup quleruaa, ungalut nakkarnaveeqqutillu misissorneqarpat ajunngillallu?	
Nunamut niusarfeqarfiit ajoquteqanngillat?	
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Nakorsaataasivik tamarmiusunik imaqarpa angallavigisassamullu naapertuuttunngorsa-gaava?	
Imaanut nakkartoqarnerani iliuusissiat pissusissamissoorpat?	
Qaqitsiniutissanik umiarsuarmiittoqarpa ajoquteqanngillallu?	

MATUMUUNA UPPERNARSARLUGU ATSIORNEQARPOQ:
Misissukkanut allattuiffik una ukiumoortumik misissuinermi misissuataarneqarmat, inatsisillu malillugit iluarsisassat iluarsiniarneqalermata. Siuliini taaneqartut arlallit inatsisit malillugit pinngitsoorani piumasaqaataanngillat. Atortut pineqartut angallammiitsinnagit piumaqaatilluunniit naammassineqartinnagit allaffissami NAAGGA allanneqassaaq naqinneq M Maannakkorpiaanngitsoq-p naalisarnera ilanngullugu.

Annual self-monitoring survey of fishing vessels surveyed in accordance with Notice F from the Danish Maritime Authority.	*Danish Maritime Authority Self-monitoring form*

Sumiiffik	Ulloq	Atsiorneq

Uingaartumik allatat tamarmik Havnesikkerhedsudvalginit misissoqqusaapput angallatinik Søfartsstyrelsip nalunaarutai E malillugit pisarnertut tamakkiisumik misissuinertulli akuttutigisunik, tassami angallatit F-mi pineqartut pillugit angallatiniit E-mi pineqartuniit sakkortunerusunik malittarisassaqartariaqarsorinanngimmat.

Fishing vessels surveyed in accordance with Notice F from the Danish Maritime Authority. **Not all the equipment mentioned is mandatory.** **The Danish Maritime Authority recommends that the equipment of the vessel is always – in addition to mandatory requirements – adjusted for the relevant type and trade area of the vessel.**	*Daily Checklist*

This checklist should be kept on board at all times

NAME OF SHIP	*OFFICAL NUMBER*	*PORT OF REGISTRY*

Areas that should be checked:	**Remarks**
Are the life-saving appliances in place and in working order?	
Do all lights function?	
Is the sound-signalling device in working order?	
Are the clearing ports free?	
Are pumps and other pumping arrangements in working order?	
Are the water level alarms in working order?	
Are the hose and sea connections free of leakages?	
Is the fire-detection and fire-extinguishing system in working order?	
Do control levers on winches/net drums automatically return to the neutral position?	
Is the tiller arrangement in working order?	
Is there sufficient fuel on board?	
Have the weather forecasts for intended fishing operations been checked?	
Will the vessel have sufficient stability and freeboard during the entire intended voyage?	
Are hatches and covers closed and battened down?	
Is it possible to secure hatches and doors in the open position?	
Are the safety devices on rigging blocks and beam in working order?	
Is a rescue sling on board and in working order?	

Rev. 1 28-5-2004

Fishing vessels below 7 metres. **Not all the equipment mentioned is mandatory.** **The Danish Maritime Authority recommends that the equipment of the vessel is always – in addition to mandatory requirements – adjusted for the relevant type and trade area of the vessel.**	*Daily Checklist*

This checklist should be kept on board at all times

NAME OF SHIP	*OFFICIAL NUMBER*	*PORT OF REGISTRY*

Areas that should be checked:	**Remarks**
Are the life-saving appliances in place and in working order?	
Does the VHF (DSC) function?	
Are the necessary aids to navigation available and in working order?	
Do all lights work?	
Is the sound-signalling device in working order?	
Are the clearing ports free?	
Are the pumps and other pumping arrangements in working order?	
Are the water level alarms in working order?	
Are the hose and sea connections free of leakages?	
Are the portable fire-extinguishers in place?	
Has the weather forecast for the intended fishing operations been checked?	
Will the vessel have sufficient stability and freeboard during the entire intended voyage?	
Have the hatches and covers been closed and battened down?	
Do control levers on winches/net drums automatically return to the neutral position?	
Is it possible to secure hatches and doors in the open position?	
Are safety devices on rigging blocks and beams in working order?	
Is a rescue sling on board and in working order?	

Rev. 1 28-5-2004

Danish Working Environment Authority

Unloading of industrial fish on ships in port

Guidelines no. 4.04.12
June 1996
Replaces: December 1986

Background

- Order on the performance of work
- Order on the arrangement of technical aids
- Order on the use of technical aids
- Order on the use of personal protective equipment

Introduction

These guidelines provide more detailed information about the health risk related to and guidelines on the unloading of industrial fish on ships in port. The work must be carried out in a sound way in accordance with the provisions of the Danish occupational health legislation on, among other things, technical aids, personal protective equipment and the performance of work.

Work methods

At the moment, there are three work methods for the unloading of industrial fish, viz.:

1. Use of bucket conveyor
2. Suction method
3. Pumping

If a bucket conveyor is used, a conveyor belt with shovels is lowered into the hold, and subsequently the unloaders "shovel the fish to the bucket conveyor" by means of tridents. This method means that persons are in the hold during the entire unloading and involves much shovel work. The method requires that suitable ventilators are used that supply the hold with fresh air.

If the suction method is used, a suction hose is lowered into the hold, and by means of its flexible suction head it is capable of sucking the fish from a large area in the hold. In a short period of time, the suction apparatus is capable of exchanging the air in the hold in case a pocket of poisonous gases occur in the hold. This method is less physically straining than the bucket conveyor, but on the other hand it produces more noise.

If the pumping method is used, a fish pump is lowered into the hold, and the fish is pumped up. The fish is carried to the pump by softening it by means of water from washing spears. Washing spears are used to avoid the generation of aerosols of water containing residual products, such as trimethylamine and endotoxins which are harmful to health. The method requires the use of suitable ventilators.

Hazardous substances

At temperatures above 0 C, the fish cargo will gradually putrefy. The use of ice can reduce the putrefaction if sufficiently large quantities of ice are used.

During putrefaction, carbon dioxide, hydrogen sulphide and other poisonous and smelly gases are generated, which all replace the lighter ordinary air, which will involve a risk of suffocation due to a lack of oxygen.

Carbon dioxide does not smell. If you enter a hold with much carbon dioxide in the air – and consequently not sufficient oxygen – you will faint and die within a few minutes if oxygen is not supplied.

Hydrogen sulphide is a smelly, very poisonous gas (mortal at high concentrations). However, high concentrations of hydrogen sulphide (above 150 ppm) do not smell. In the same way, tolerance can increase the smell threshold of the exposed persons so that the smell warning of a danger does not occur.

For assessing whether the above-mentioned substances and the like are present in hazardous concentrations, reference is made to Guidelines no. 3.1.0.2 in force of the Danish Working Environment Authority on limit values for substances and materials.

Other hazardous substances in connection with fish cargoes are amines and endotoxins that may lead to serious irritation or burns as well as poisoning with indisposition and flue-like symptoms such as fever, diarrhea, headache and muscular soreness.

Persons are especially exposed to these substances when aerosols occur in connection with washing, pump unloading and cleaning that contain fish juice, putrefaction germs and hazardous products.

1. Unloading of cargoes (non-rejected cargoes)

Measures

During unloading operations, suitable ventilators must be provided to supply the unloaders with fresh air so that they are not exposed to hazardous gases or a lack of oxygen.

Before anyone enters a hold, it must be ensured that sufficient oxygen is provided. This may be ensured by using an oxygen flowmeter. Samples must be taken regularly when someone is in the hold.

If it is found – irrespective of the above-mentioned measures – that there is a danger that the air in the hold contains gases such as carbon dioxide, hydrogen sulphide, etc. or aerosols with amines and endotoxins of hazardous concentrations or that the air in the hold contains too little oxygen, the cargo must be rejected. In case of doubt, the cargo must not be unloaded until the Danish Working Environment Authority has assessed the working conditions.

If the Danish Working Environment Authority assesses that it is not possible to carry out the work in a reasonable way as regards health and safety, the cargo must be unloaded as a rejected cargo (cf. section 2). If the cargo is sub-divided into more sections by means of airtight bulkheads, each section must be assessed separately.

During the unloading, there must be one person on deck keeping an eye on the crew in the hold and with access to the life-saving appliances mentioned below.

It must be possible for the unloaders to stop the discharge crane, the suction apparatus or the pump from the hold in an emergency.

It shall be possible for the unloaders to pass up and down the hatch opening without hindrance. Pumps and/or other equipment must not block the access way. Any ice conveyor must be sufficiently shielded.

Measures in case of accidents

If a person feels indisposed, he must leave the hold immediately. The work must not be restarted until the hold has been sufficiently vented and the Danish Working Environment Authority has assessed the working conditions.

Life-saving crews must use safety harnesses with a line as well as air-supplied breathing apparatuses.

Persons who have fainted must be examined at a hospital as soon as possible.

Persons who suffer from eye or skin irritation or the like in connection with work in holds must see a doctor as soon as possible.

Personal protective equipment

Two safety harnesses fitted with a bayonet fastening, two D-rings and associated line must be located in an easily accessible place close to the discharge crane or the steering compartment of the suction apparatus so that it is possible for a rescuer to don one safety harness fast and place the other one on the person to be rescued.

If everyone working in the hold wears harness suits complying with the requirements for lifting harnesses, they may replace the safety harnesses mentioned above. In such cases, the rescuer must also wear a harness suit.

An air-supplied breathing apparatus must be located in a sound and easily accessible place close to the discharge crane or the steering compartment of the suction apparatus for use by the rescuer.

Breathing apparatuses must be supplied with fresh air from stationary compressed-air bottle batteries, compressor systems with pressure vessel or pressure cylinders carried by persons. If air is supplied from bottles with sufficiently clean air, purifying filters may be omitted.

2. Unloading of rejected cargoes

Education and training

Ships carrying rejected cargoes must be unloaded only by persons who have passed special training, for example as offered by a local rescue and fire training institution.

Measures

When work is carried out below deck, a maximum of three persons must be employed per hatch/hold section from which unloading takes place.

The unloading team must be made so that there is always one man on deck per man in the hold. However, at least two persons must be on deck.

When work is carried out in the hold, there must be a safety guard at the hatch. The safety guard must keep an eye on the crew in the hold and may help controlling hoses and assist at ascents and descents.

Work hours and rest hours

Work in the hold should take place for only 30 minutes at a time, and subsequently there should be a rest period of 30 minutes. After the rest period, work should be carried out on deck for 30 minutes, for example as a safety guard at the hatch.

Personal protective equipment

When working in the hold, an air-supplied breathing apparatus must be used.

Breathing apparatuses must be supplied with fresh air from stationary compressed-air bottle batteries, compressor systems with pressure vessel or pressure cylinders carried by persons. If air is supplied from bottles with sufficiently clean air, purifying filters may be omitted.

Everyone working on the ship must carry a harness for fastening hoses. The harness must be designed and have a strength so that it is possible to fasten a lifeline to the harness by means of a snap hook for hauling up in case of an accident.

When working in the hold, the lifeline must be fastened to the harness.

For use by each safety guard at the hatches, one set of air-supplied breathing apparatus must be available on deck, which may be portable, as well as a ready lifeline.

3. Special work clothes

Persons working in the hold must use special work clothes consisting of:

- Rubber boots with non-skid soles
- Over trousers of rubber
- Rubber gloves covering the entire lower arm or short rubber gloves and rubber arm protectors
- Sweat-absorbing underwear
- Woollen socks

- Furthermore, the person carrying out the washing must use a rubber overcoat

4. Instructions, etc.

The employees must be instructed how to perform the work in a safe way, including the use of personal protective equipment. Personal protective equipment must be provided by and paid by the employer.

The employer must pay the expenses for cleaning the special work clothes, for example by making the washing machine and the necessary time available for the employees.

5. Stay on board

It may be highly dangerous to stay on deck with a cargo on board. Consequently, no one should stay the night or even rest for short periods of time until the ship has been emptied and vented.

6. Wardrobe and washing room

Because of the smell of industrial fish and the special persistent nature of the smell, the following must be available for unloaders:

- Separate wardrobe for ordinary clothes
- Special wardrobe for work clothes
- Special room for dirty work clothes (covering clothes, etc.)
- Washing room with cabinet showers

In order to remove the smell of industrial fish in the best possible way, it is desirable to arrange a sauna in connection with the washing room.

The spaces must be arranged in relation to each other so that the “direction of use” seems natural. They must be ventilated so that the wardrobe for ordinary clothes is kept free of smell.

Notice F from the Danish Maritime Authority
Technical regulation on the construction, equipment, etc. of small commercial vessels

Annex II
Signs and placards

Type-approval sign
cf. chapter I, regulation 6.7.4

The sign shall be made in metal with the text engraved or carved with a size of about 7 x 11 cm and shall be fixed in a visible place on board.

This vessel belongs to a type approved by the Danish Maritime Authority		
Manufacture:		
Type:		
Construction number and year:		
Dimensions: (in metres to two decimals) **Length:**[1)]	**B:**	**D:**
Total loading capacity:		
Maximum engine output kW:		

1) Length as defined in chapter F I, regulation 2.16.

Approval sign for hull
cf. chapter II (2), regulation 22.5

The sign shall be made in metal with the text engraved or carved with a size of about 5 x 11 cm and shall be fixed in a visible place on board.

This hull has been approved by the Danish Maritime Authority		
Manufacture:		
Hull type:		
Construction number and year:		
Dimensions: (in metres to two decimals) **Length:**[1)]	**B:**	**D:**
Total loading capacity:		
Maximum engine output kW:		

1) Length as defined in chapter F I, regulation 2.16.

Placard on the treatment of garbage on board
cf. chapter XXV, regulation 4

Garbage		Disposal at sea
Plastics, including synthetic ropes and fishing nets and garbage bags		Prohibited
Dunnage, lining and packing materials that can float		Prohibited
Paper, rags, glass, metal, bottles, crockery and similar materials		Prohibited
Victual waste		12 nautical miles from nearest land