Maritime & Coastguard Agency

MARINE GUIDANCE NOTE

MGN 670(M)

The Merchant Shipping (Cargo and Passenger Ship Construction and Miscellaneous Amendments) Regulations 2022: Application to Ships built on or after 1st January 2009 and Engaged on International Voyages – Guidance in the Application of SOLAS Chapter II-1

Notice to all Shipowners, Certifying Authorities, Shipbuilders, Ship repairers, Ship Masters and Surveyors

This Note should be read in conjunction with the Merchant Shipping (Cargo and Passenger Ship Construction and Miscellaneous Amendments) Regulations 2022

Summary

This Marine Guidance Note provides advice and recommendations in relation to the requirements contained in SOLAS Chapter II-1.

1. Introduction

1.1 In accordance with the Merchant Shipping (Cargo and Passenger Ship Construction and Miscellaneous Amendments) Regulations 2022 ("2022 Regulations"), ships built on or after 1 January 2009 engaged on international voyages are required to comply with provisions of Chapter II-1 of the Annex to SOLAS ("SOLAS Chapter II-1") as those provisions apply to those ships, and as amended from time to time. Amendments made to SOLAS Chapter II-I will be incorporated into UK law by means of the ambulatory reference provision in the 2022 Regulations.

1.2 SOLAS Chapter II-1 contains a number of provisions in which there is reference to technical requirements which are required to be done "to the satisfaction of the Administration", or otherwise require Administration approval. The intention of this Marine Guidance Note is to provide guidance where this terminology is used in SOLAS Chapter II-1. The guidance provided is not exhaustive and may be subject to future amendment.

1.3 As such, the Annex to this Note sets out guidance relating to those occasions where SOLAS Chapter II-1 makes such provision. Each table in the Annex refers to a specific Part of SOLAS Chapter II-1 for ease of reference.

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1.4 In column 3 of each table, actions are usually attributed to the MCA as this is the body ultimately responsible for the safety of ships under the UK flag. Often, for certain types and classes of ship, the Secretary of State will authorise other organisations to give approvals (for example, classification societies). In some instances, only the Secretary of State has the authority to take action (for example, the decision to exempt ships in accordance with regulation 1.4 and 1.5 of SOLAS Chapter II-1). In general, unless expressly stated otherwise, no distinction is made in this document between actions which may be taken by the Secretary of State, the MCA or a body authorised by the Secretary of State as this will often depend on the type and size of ship being approved.

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ANNEX

Table 1 – Part A - General

SOLAS Chapter II-1		Guidance/ clarification of application in UK context
Part / Reg. No.	Obligation	
A. Reg. 1.3	**Application** "Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable".	The MCA will decide each case on its own merits, being guided by the explanatory notes[1] to Regulation 1.3, with the aim of either achieving the appropriate Required Index R or maintaining the Attained Index A at the highest level practicable. However, if alterations or modifications of major character significantly impact the watertight subdivision of the ship, it should comply with the damage stability regulations in part B-1 applicable when the alterations or modifications of major character are carried out unless the Administration determines that this is not reasonable and practicable, in which case the attained subdivision index A should be raised above the original construction required subdivision index R as much as practical.

Table 2 – Part A1 – Structure of ships

A-1. Reg. 3-2.4 **Structure of Ships**	**Protective Coatings of Dedicated Seawater Ballast Tanks in All Types of Ships and Double-Side Skin Spaces of Bulk Carriers** Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme. The effectiveness of the protective	See MSC.1/Circ1330 (Guidelines for maintenance and repair of protective coatings). The mandatory standard applies in accordance with Resolution MSC.215(82) which sets out the

[1] See MSC.429(98)/Rev.2 adopted on 11 November 2020.

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	coating system shall be verified during the life of a ship by the Administration or an organisation recognised by the Administration, based on the guidelines developed by the Organization.	Performance Standard for Protective Coatings (PSPC). This is fully delegated to ROs who should follow the above standard. There is no scope for application of the Administration's discretion.
A-1. Reg. 3-3.2	**Safe Access to Tanker Bows** Every tanker shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. Such means of access shall be approved by the Administration based on the guidelines developed by the Organization.	See MSC.62(67)/Rev.1 (Revised Guidelines for safe access to tanker bows). This is fully delegated to ROs who should apply the relevant standard set out in MSC.62(67)/Rev.1. The only consideration to be applied by MCA is where an exemption from compliance is sought for an equivalent arrangement on smaller vessels.
A-1. Reg. 3-4.1.2.2	**Emergency Towing Arrangements and Procedures** Emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.	See the Guidelines on emergency towing arrangements for tankers (resolution MSC.35(63), as amended by MSC.132(75)). This is fully delegated to ROs who should apply the relevant standard set out in MSC.35(63), as amended by MSC.132(75). There is no scope for application of the Administration's discretion.
A-1. Reg. 3-6.2.2	**Access to and within Spaces in, and forward of, the Cargo Area of Oil Tankers and Bulk Carriers** Where a permanent means of access may be susceptible to damage during normal cargo loading and unloading operations or where it is impracticable to fit permanent means of access, the Administration may allow, in lieu thereof, the provision of movable or portable means of access, as specified in the Technical provisions, provided that the means of attaching, rigging, suspending or supporting the permanent means of access forms a permanent part of the ship's structure. All portable	See MSC.133(76) (Technical Provisions for means of access for inspections). This is fully delegated to ROs who should apply the relevant standard introduced in MSC.133(76) but now set out in MSC.158(78). There is no scope for application of the Administration's discretion other than if MCA prohibits application of specific provisions relating to portable means of access. No justification is seen for this. Agreed to keep text

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	equipment shall be capable of being readily erected or deployed by ship's personnel.	
A-1. Reg. 3-6.2.3	**Access to and within Spaces in, and forward of, the Cargo Area of Oil Tankers and Bulk Carriers** The construction and materials of all means of access and their attachment to the ship's structure shall be to the satisfaction of the Administration. The means of access shall be subject to survey prior to, or in conjunction with, its use in carrying out surveys in accordance with regulation I/10.	This is fully delegated to ROs who should apply the relevant standard introduced in MSC.133(76) but now set out in MSC.158(78) (as amend by MSC.1/Circ.1507), including survey of all means of access and their permanently affixed mounting points (including any portable means) during ESP surveys. There is no scope for application of the Administration's discretion other than if MCA prohibits application of specific provisions relating to portable means of access permitted by Regulation 3-6.2.2. No justification is seen for this.
A-1. Reg. 3-6.5.3	**Access to and within Spaces in, and forward of, the Cargo Area of Oil Tankers and Bulk Carriers** For oil tankers of less than 5,000 tonnes deadweight, the Administration may approve, in special circumstances, smaller dimensions for the openings referred to in paragraphs 5.1 and 5.2, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.	This is fully delegated to ROs. On this basis, it is therefore the ROs which may approve the alternative arrangements.
A-1. Reg.3-8.3	**Towing and Mooring Equipment** Arrangements, equipment and fittings provided in accordance with paragraph 2 shall meet the appropriate requirements of the Administration or an organization recognized by the Administration under regulation I/6.	See MSC.1/Circ.1175/Rev.1 (Revised Guidance on Shipboard Towing and Mooring Equipment). This is a fully delegated Class function which is already covered in assignment of Class notation on Convention vessels. The IMO requirement in MSC.1/Circ.1175/Rev.1 will only apply to vessels from 1 January 2024, as specified in MSC.474(102) (adopted on 11 November 2020). For existing vessels, MSC.1/Circ.1175 applies unamended. This is effectively a parallel system

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		and should only apply on other ships where there this is not already covered by delegated Class survey, as an alternative to applying LR Class rules by default on a UK vessel. There is no evidence the IMO requirement is fully adopted by IACS through a Unified Interpretation or Unified Requirement.
.A-1. Reg, 3-9.1	**Means of Embarkation on and Disembarkation from Ships** Ships constructed on or after 1 January 2010 shall be provided with means of embarkation on and disembarkation from ships for use in port and in port related operations, such as gangways and accommodation ladders, in accordance with paragraph 2, unless the Administration deems the compliance with a particular provision is unreasonable or impractical.	Circumstances where compliance may be deemed unreasonable may include where the ship: .1 has small freeboards and is provided with boarding ramps; or .2 is engaged in voyages between designated ports where appropriate shore accommodation /embarkation ladders (platforms) are provided. Circumstances are defined above but are not necessarily exhaustive. Discretion would be retained by MCA to allow non-compliance for other reasons on application e.g. boarding by tender.
A-1. Reg. 3-11.4	**Corrosion Protection of Cargo Oil Tanks of Crude Oil Tankers** The Administration may exempt a crude oil tanker from the requirements of paragraph 3 to allow the use of novel prototype alternatives to the coating system specified in paragraph 3.1, for testing, provided they are subject to suitable controls, regular assessment and acknowledgement of the need for immediate remedial action if the system fails or is shown to be failing. Such exemption shall be recorded on an exemption certificate.	Exemption is only permitted within the terms of the regulation. This is for testing of a 'novel' alternative coating to the coating specified in MSC.288(87) or for a different form of alternative construction to that specified in MSC.289(87), both subject to the provisions described on application via the RO.
A-1. Reg. 3-11.5	**Corrosion Protection of Cargo Oil Tanks of Crude Oil Tankers**	See MSC.1/Circ.1421 - Guidelines on exemptions for crude oil tankers solely engaged in the carriage

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	The Administration may exempt a crude oil tanker from the requirements of paragraph 3 if the ship is built to be engaged solely in the carriage of cargoes and cargo handling operations not causing corrosion. Such exemption and conditions for which it is granted shall be recorded on an exemption certificate.	of cargoes and cargo-handling operations not causing corrosion. Exemption is permitted under the terms of the regulation for cargoes defined in MSC.1/Circ.1421 on application from the owner prior to signing of the construction contract.
A-1. Reg. 3-12.1	**Protection against Noise** This regulation shall apply to ships of 1600 gross tonnage and above: .1 for which the building contract is placed on or after 1 July 2014; or .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2015; or .3 the delivery of which is on or after 1 July 2018, unless the Administration deems that compliance with a particular provision is unreasonable or impractical.	Paragraph 1.3.6 of the 2014 Code on Noise Levels on Ships ("Noise Code") (see MSC.337(91)) provides that "Dispensations from certain requirements may in special circumstances be granted by the Administration, if it is documented that compliance will not be possible despite relevant and reasonable technical noise reduction measures. Such dispensation shall not include cabins, unless exceptional circumstances prevail. If dispensation is granted, it shall be ensured that the goal of [the] Code is achieved and the noise exposure limits should be considered in conjunction with chapter 5 [of the Code]". The applicable IMO standard is MSC.337(91) Noise Code 2014. The Administration needs to retain the flexibility for dispensation from mandatory parts of the 2014 Code as indicated at paragraph 1.3.6, with some reservation regarding whether application of exceptional circumstances to cabins should ever be considered. This is separate from the Administration's general ability to dispense with a provision deemed to be unreasonable or impracticable through Regulation 3-12.1, which may possibly be regarded as an ability to extend disapplication of all or parts of the

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		2014 Code to types of vessel beyond those identified in paragraph 1.3.4.
A-1. Reg, 3-12.2	**Protection against Noise** On ships delivered before 1 July 2018 and: .1 contracted or constructed before 1 July 2014 and the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009; or .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009 but before 1 January 2015, measures shall be taken to reduce machinery noise in machinery spaces to acceptable levels as determined by the Administration. If this noise cannot be sufficiently reduced the source of excessive noise shall be suitably insulated or isolated or a refuge from noise shall be provided if the space is required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.	Maximum allowable or recommended noise levels are described in Chapters 4 and 5 of the 2014 Noise Code, and apply to new ships. The levels defined in A.468(XII) may be applied to existing ships, and used to determine when additional protective measures require to be taken for the protection of personnel as indicated in the footnote.

Table 3 – Part B - Subdivision and Stability

B. Reg. 4.3	**General** The Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.	The MCA will listen sympathetically to any proposals for using alternative methodologies, examining each case on its own merits. Detailed justification for not following the usual SOLAS Ch II-1 methodology must be provided as well as clear demonstration that the safety levels provided are at least equivalent.
B. Reg. 4.5	**General**	Such consideration will form part of the usual approval process for assessing the damage stability for each individual ship on a case-by-case

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	Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.	basis, guided by the explanatory notes to Regulation 7-2.2.

Table 4 – Part B1 - Stability

B-1 Reg. 5.2	**Intact Stability** The Administration may allow the inclining test of an individual cargo ship 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 Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by regulation 5-1.	The assessment of the data from a sister ship to allow the inclining test of an individual cargo ship to be exempted from an inclining test will be made on a case-by-case basis as part of the usual process for assessing the damage stability using the explanatory notes to Regulation 5.2.
B-1 Reg. 5.3	**Intact Stability** The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.	The ship types and classes which have an excess of metacentric height enabling the inclining test to be dispensed with are well known to the MCA and approving authorities and an application for such dispensation will usually be favourably received. In case of doubt, advice should be sought from the MCA's stability unit.
B-1 Reg. 5-1.1	**Stability information to be supplied to the Master** The master shall be supplied with such information to the satisfaction of the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.	The suitability of the stability information supplied to the master will be assessed by the approving authorities as part of the usual approval process for each individual ship on a case-by-case basis.
B-1 Reg 5-1.6	**Stability information to be supplied to the Master**	This provision is intended to address cases where an Administration approves an alternative means

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	When curves or tables of minimum operational metacentric height (*GM*) or maximum allowable KG versus draught are not provided, the master shall ensure that the operating condition does not deviate from approved loading conditions, or verify by calculation that the stability requirements are satisfied for this loading condition.	of verification. See comment under Regulation 4.3. above.
B-1 Reg. 7.7	**Attained Subdivision Index A** If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.	What constitutes "minor progressive flooding" is defined in paragraph 2 of the explanatory note to Reg. 7.7. and will be assessed in the context of the overall approval process of the damage stability on a ship-by-ship and case-by-case basis.
B-1 Reg. 7-2.2	**Calculation of the factor Si** For passenger ships, and cargo ships fitted with cross-flooding devices, the factor $s_{intermediate,i}$ is taken as the least of the *s*-factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows: $$s_{\text{intermediate,i}} = \left[\frac{GZ_{\max}}{0.05} \cdot \frac{Range}{7} \right]^{\frac{1}{4}}$$ where *GZ*max is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{intermediate,i}$ = 0, if the intermediate heel angle exceeds 15º for passenger ships and 30º for cargo ships. For cargo ships not fitted with cross-flooding devices the factor $s_{intermediate,i}$ is taken as unity, except if the Administration considers that the stability in intermediate stages of flooding may be insufficient, it should require further investigation thereof.	The need for further investigation of the damage stability of cargo ships during intermediate stages of flooding is to be decided on a case-by-case during the approval process.

	For passenger and cargo ships, where cross-flooding devices are fitted, the time for equalization shall not exceed 10 min.	
B-1 Reg. 7-2.5	**Calculation of the factor Si** Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalization devices are provided they shall be operable from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. These fittings together with their controls shall be acceptable to the Administration, Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.	The MCA's strong preference for correcting large angles of heel by means of equalization devices is that such devices should be self-acting as they work quicker and are less prone to human error. If the fitting of such devices is not practicable for any reason, then proposals for alternatives will be examined as part of the approval process on a case-by case basis.
B-1 Reg. 7-3.3	**Permeability** Other figures for permeability may be used if substantiated by calculations.	This paragraph allows for the recalculation of permeabilities. This should only be considered in cases where it is evident that there is a major discrepancy between the values shown in the regulation and the real values. It is not designed for improving the attained value of a deficient ship of regular type by the modification of chosen spaces in the ship that are known to provide significantly onerous results. All proposals should be considered on a case-by-case basis by the Administration and should be justified with adequate calculations and arguments.

Table 5 – Subdivision, watertight and weathertight integrity

Reg. 9.1 and 2	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers**	The non-fitment of a double bottom, either completely or partially is, in general, to be avoided for both safety and environmental reasons. Where clearly non-practical, proposals will be considered

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	1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as is practicable and compatible with the design and proper working of the ship. 2 Where a double bottom is required to be fitted, the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection shall be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance *h* measured from the keel line, as calculated by the following formula: *h* = B/20 However, in no case is the value of *h* to be less than 760 mm, and need not be taken as more than 2000 mm.	on a case-by-case basis as part of the usual damage stability approval process. The determination regarding the requirement to fit a double bottom "as far as this is practicable and compatible with the design and proper working of the ship" is made, or should be accepted by, the Administration or a recognised organisation acting on its behalf.
B-2 Reg. 9.3.2	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** Other wells (e.g. for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation. 3.2.1 For a cargo ship of 80 m in length and upwards or for a passenger ship, proof of equivalent protection is to be shown by demonstrating that the ship is capable of withstanding bottom damages as specified in paragraph 8. Alternatively, wells for lubricating oil below main engines may protrude into the double bottom below the boundary line defined by the distance *h* provided that the vertical distance between the well bottom and a plane coinciding with the keel line is not less than *h*/2 or 500 mm, whichever is greater.	The MCA will check the arrangements for "other wells" in accordance with sub-paragraphs 3.2.1 and 3.2.2 of Regulation 9. For cargo ships of less than 80 m in length the MCA will apply the guidance contained in the explanatory notes to Regulations 9.3.2.2, 9.6 and 9.7 (see below).

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	3.2.2 For cargo ships of less than 80 m in length the arrangements shall provide a level of safety satisfactory to the Administration.	
B-2 Reg. 9.5	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in Regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.	Proposals for non-fitment of a double bottom will be considered on a case-by-case basis in the context of the overall safety of the ship and taking into account the area of trading.
B-2 Reg. 9.6	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** Any part of a cargo ship of 80 m in length and upwards or of a passenger ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5, as specified in paragraph 2, shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.	For cargo ships of less than 80 m in length see explanatory notes to Reg. 9 (3.2.2.2, 9.6 and 9.7) above.
B-2 Reg. 9.7	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** In the case of unusual bottom arrangements in a cargo ship of 80 m in length and upwards or a passenger ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.	For cargo ships of less than 80 m in length see explanatory notes to Reg. 9 (3.2.2.2, 9.6 and 9.7) above.

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B-2 Reg. 9.3.2.2.2, 9.6 and 9.7	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** 9.3.2.2 For cargo ships of less than 80 m in length the arrangements shall provide a level of safety to the satisfaction of the Administration. 9.6 Any part of a cargo ship of 80 m in length and upwards or of a passenger ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5, as specified in paragraph 2, shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration. 9.7 In the case of unusual bottom arrangements in a cargo ship of 80 m in length and upwards or a passenger ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.	See previous comments under Reg. 9.3.2. In relation to this requirement, the EN states: For cargo ships of less than 80 m in length (L), the alternative arrangements to provide a level of safety satisfactory to the Administration should be limited to compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the h/2 or 500 mm limit indicated in regulation 9.3.2.1. In these cases compliance with the bottom damage standard in regulation 9.8 should be demonstrated assuming that the damage will only occur between the transverse watertight bulkheads in compartments not having a double bottom, having an unusual bottom arrangement, or having an "other well" extending below the required double bottom height that is greater than the h/2 or 500 mm limit indicated in regulation 9.3.2.1.
B-2 Reg. 9.9	**Double Bottoms in Passenger Ships and Cargo Ships Other than Tankers** In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than *B*/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.	The MCA will be guided by the explanatory notes to Regulation 9.9 and agree with the involved parties which alternative is most appropriate for the ship in question.
B-2 Reg. 12.1	**Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.**	The MCA will discuss with the involved parties should there be any practical reason why the location of the collision bulkhead cannot comply

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	A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. This bulkhead shall be located at a distance from the forward perpendicular of not less than 0.05*L* or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 0.08*L* or 0.05*L* + 3 m, whichever is the greater.	with this regulation. Agreement will be sought on an individual case-by-case basis.
B-2 Reg. 12.6.1	**Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.** Except as provided in paragraph 6.2, the collision bulkhead may be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the valve being located inside the forepeak at the collision bulkhead. The Administration may, however, authorize the fitting of this valve on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. Alternatively, for cargo ships, the pipe may be fitted with a butterfly valve suitably supported by a seat or flanges and capable of being operated from above the freeboard deck. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.	The MCA will discuss with the involved parties should there be a need to fit a screw-down valve on the after side of the collision bulkhead. Agreement is likely to be given on a case-by-case basis provided the conditions given in the regulation for so locating the valve are met.
B-2 Reg. 12.6.2	**Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.** If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by two pipes, each of which is fitted as required by paragraph 6.1, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.	The MCA will decide this issue on a case-by-case basis bearing in mind any practical issues balanced against the need to ensure that the overall safety of the ship is maintained.

B-2 Reg. 12.10[.2]	**Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.** 12.10 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. An afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck or the freeboard deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck or the freeboard deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.	In relation to this requirement, the EN states: In cargo ships with a raised quarter deck, it may be impracticable to extend the afterpeak bulkhead to the freeboard deck as the freeboard deck does not extend to the aft perpendicular. Provided that the afterpeak bulkhead extends above the deepest load line, and that all rudderstock bearings are housed in a watertight compartment without open connection to spaces located in front of the afterpeak bulkhead, termination of the afterpeak bulkhead on a watertight deck lower than the freeboard deck can be accepted by the Administration. Should this situation arise the MCA will be guided by this EN.
B-2 Reg. 12.11	**Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.** In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck will not be immersed. In cargo ships other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration.	The MCA will be guided by the explanatory note to this regulation in assessing the safety of the stern tube arrangements in cargo ships. The watertight shaft tunnel, or other watertight space in which, the stern gland is to be situated, should be of sufficient height and width to allow proper attention to be given to shaft couplings, bearings etc. within the space.
B-2 Reg. 13.7.1	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships** Each power-operated sliding watertight door:	(1) The MCA may permit a clear opening width greater than 1.2 m if satisfied that it is necessary for the effective operation of the ship and that, as a minimum, conditions 7.1.2.1 and .2 in this regulation are complied with. Each application to fit

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	.1 shall have a vertical or horizontal motion; .2 shall, subject to paragraph 9, be normally limited to a maximum clear opening width of 1.2 m. The Administration (1) may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration: .1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and .2 the door shall be located inboard the damage zone *B*/5; .3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration; .4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all-round crank motion or some other movement providing the same degree of safety acceptable to the Administration (2). Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position. Visual indicators to show whether the door is open or closed shall be provided at the accessible position above the bulkhead deck. .5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console required by paragraph 7.1; .6 shall be provided with an audible alarm, distinct from any other	wide doors will be treated on a case-by-case basis and examined in the context of the overall safety of the ship from the damage stability aspect. See also B-4 Reg. 22.2. (2) The mechanism for operating sliding watertight doors by hand from above the bulkhead deck should be rapid in its action and be such as to be capable of operating the doors under unfavourable conditions. The mechanical operating gear above the bulkhead deck and, in the case of non-power operated doors, at the door itself, should consist of a crank handle or wheel and handle for all-round operation which should, in general, be permanently attached to the shafting. It is desirable that the hand gear of power operated doors fitted at the door itself should be of a similar type, but other types can be considered if the local gear is such that it could not interfere with the operation of the door from above the bulkhead deck. The lead of shafting to the door from above the bulkhead should be as direct as possible. Suitable provision should be made for lubricating the working parts of the mechanism; guards should be fitted where necessary. The hand operated gear of power operated doors should be permanently engaged unless satisfactory means are provided for engaging it from above the bulkhead deck. A suitable hand/hydraulic system for operating the watertight doors from above the bulkhead deck may be accepted. (3) The decision on fitting an additional intermittent visual signal will be agreed with the involved parties on a case-by-case basis depending on the

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	alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door (3); and .7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position shall in no case be less than 20 s or more than 40 s with the ship in the upright position.	circumstances of the individual ship and the location of each door.
B-2 Reg. 13.7.6	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships** The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.	Refer to the following publication IEC 60529:2003: .1 electrical motors, associated circuits and control components; protected to IPX 7 standard; .2 door position indicators and associated circuit components; protected to IPX 8 standard; and .3 door movement warning signals; protected to IPX 6 standard. Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36h.
B-2 Reg. 13.9.1	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships**	Whether such doors are essential will be discussed as part of the approval process for each individual ship on a case-by-case basis.

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	If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo spaces on 'tween decks. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.	
B-2 Reg. 13.9.2	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships** Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.	If the fitting of such doors is proposed, their number and arrangements will be discussed and agreed as part of the approval process for each individual ship on a case-by-case basis.
B-2 Reg. 13.10	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships** Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door larger than those specified in paragraph 7.1.2 to be substituted for these portable plates in each watertight bulkhead, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.	The MCA will apply the regulation concerning the permitted number of power-operated SWT doors and will agree on a case-by-case basis which doors may opened during navigation at the discretion of the master as part of the approval process.

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B-2 Reg. 13.11.2	**Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships** Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.	Where a watertight door must be fitted at one end of a tunnel, surveyors should note that an exemption from this requirement can be considered for short tunnels situated near the centre line of the ship, if the safety of the ship in the event of damage is not impaired. In other cases, where the tunnel is used as a passage at sea, access shall also be obtained by means of a trunkway extending watertight to above the margin line.
B-2 Reg. 13-1.1	**Openings in Watertight Bulkheads and Internal Decks in Cargo Ships** The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.	The MCA will consider any proposals for relaxation of the watertightness of openings above the freeboard deck as part of the damage stability approval process and any decisions thereon will be made on a case-by-case basis for each individual ship to ensure that overall safety is not impaired.
B-2 Reg. 13-1.4	**Openings in Watertight Bulkheads and Internal Decks in Cargo Ships** Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled. Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized	The MCA will discuss with all interested parties any proposals for fitting watertight doors or ramps to internally subdivide large cargo spaces on an individual ship to confirm that they are essential for the operation of the ship.

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	opening.	
B-2 Reg. 15.2	**Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships** The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.	(1) The arrangements of side scuttles should be re-examined for compliance when an increase in draught is proposed. Any side scuttle found not to comply must be blanked off. (2) Where it is proposed to fit heavy duty side scuttles bolted to the shell, particular attention should be made where the connection is not bolted through the shell plating. Full guidance on the fitting of side scuttles and windows is contained in MSIS 042 (Reg.15.3).
B-2 Reg. 15.6	**Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships** Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.	Whilst in general not encouraging the fitting of such sidescuttles the MCA will consider proposals on a case-by-case basis to ensure they are not to the detriment of the ship's overall safety.
B-2 Reg. 15.8.4	**Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships** Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Administration. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck of passenger ships and the freeboard deck of cargo ships will not be submerged. The Administration may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship.	The watertight sealing arrangements acceptable to the MCA are detailed in Load Line Instructions to Surveyors MSIS 001 paragraph 2.12.3. Ensuring that the bulkhead/freeboard deck is not submerged as a result of flooding the watertight space surrounding the inboard gland will be dealt with as part of the approval process as will ensuring continuity of supply to the specified emergency services.

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B-2 Reg. 15.8.5	**Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships** All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.	The MCA will accept the standards applied by the appropriate Classification Society to the materials used for the pipes referred to in this regulation.
B-2 Reg. 15.10	**Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships[2]** For ships constructed on or after 1 January 2024, cargo ports and other similar openings (e.g. gangway and fueling ports) in the side of ships below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be fitted with doors so designed as to ensure the same watertightness and structural integrity as the surrounding shell plating. Unless otherwise granted by the Administration, these openings shall open outwards. The number of such openings shall be the minimum compatible with the design and proper working of the ship. In no case shall these openings be so fitted as to have their lowest point below the deepest subdivision draught.	The MCA will only permit inward opening doors in specific circumstances of practical need, determined on a case-by-case basis, and only if satisfied that an equivalent level of safety to an outward-opening door is achieved. Where, in exceptional circumstances, the doors are permitted to open inwards, the framing of the door panel and the securing arrangements of the door will be specially considered.
B-2 Reg. 16.1.1	**Construction and Initial Tests of Watertight Closures** The design, materials and construction of all watertight closures such as doors, hatches, sidescuttles, gangway and cargo ports, valves and pipes referred to in these regulations shall be to the satisfaction of the Administration.	In general, the design, materials and construction of all watertight closures and valves referred to is to be in accordance with recognised standards such as the requirements of a Classification Society, or BSI/ISO. More details on each item can be found in Instruction to Surveyors MSIS 042.
B-2 Reg 16-1.1	**Construction and Initial Tests of Watertight Decks, Trunks, etc.**	In general, the means for making the listed items watertight and the arrangements made for closing openings in them are to be in accordance with

[2] This requirement is contained in IMO Resolution MSC.474(102) and does not come into force until 1 January 2024.

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	Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.	recognised standards such as the requirements of a Classification Society. More details on each item can be found in Instruction to Surveyors MSIS 042.
B-2 Reg. 17.1	**Internal Watertight Integrity of Passenger Ships above the Bulkhead Deck** The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.	The MCA will examine the measures taken to limit the entry and spread of water above the bulkhead deck for each individual passenger ship on a case-by-case basis as part of the approval process, being guided by MSC/Circ.541 (as may be amended) and by the explanatory notes to this regulation.
B-2 Reg 17-1.2	**Integrity of the Hull and Superstructure, Damage Prevention and Control on Ro-Ro Passenger Ships** Indicators shall be provided on the navigation bridge for all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if	As part of the approval process for a specific ship, the MCA will agree with all parties concerned which of the doors and other closing appliances should be provided with indicators.

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	such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function “harbour/sea voyage” so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.	
B-2 Reg. 17-1.1.3	**Integrity of the Hull and Superstructure, Damage Prevention and Control on Ro-Ro Passenger Ships** The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.	The MCA will examine the issue of fitting particular accesses to spaces below the bulkhead deck for each individual ro-ro passenger ship on a case-by case basis as part of the approval process, being guided by the explanatory notes to this regulation

Table 6 – Subdivision load line assignment for passenger ships

B-3 Reg. 18.1	**Assigning, Marking and Recording of Subdivision Load Lines for Passenger Ships** In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.	Additional load lines to correspond with subdivision draughts for alternative service conditions will be considered and assigned by the MCA as part of the approval process prior to issue of the Passenger Ship Safety Certificate (PSSC). .

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Table 7 – Stability Management

B-4 Reg. 19.2	**Damage Control Information** General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.	As part of the approval process, the MCA will agree a list of general precautions for the items shown with all interested parties on a ship-by-ship basis taking into account the Guidelines in MSC.1/Circ.1245 as amended by MSC.1/Circ.1570 and, for tankers, MSC.1/Circ.1461.
B-4 Reg. 19.3	**Damage Control Information** Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers and crew.	The MCA will agree a list of elements considered to be vital to the survival of the ship and persons on board with all interested parties on a ship-by-ship basis as part of the approval process.
B-4 Reg. 20.1	**Loading of Ships** On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is upright and in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation or by ensuring that the ship is loaded according to one of the pre-calculated loading conditions within the approved stability information. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.	In general, the MCA encourages the use of electronic loading and stability computers and will apply the guidance in MSC.1/Circ. 1229 and 1589 and for tankers, MSC.1/Circ.1461 in association with MGN 611 where the use of Type 3 loading instruments is strongly recommended as the best means of validating tanker damage stability upon departure.
B-4 Reg. 20.2	**Loading of Ships** Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the	For the fuel oil/water ballast tank, any discharges from this tank must meet both the Ballast Water Management Convention and MARPOL Annex I discharge requirements.

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	Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.	
B-4 Reg. 22.2	**Prevention and Control of Water Ingress, etc.** Watertight doors located below the bulkhead deck of passenger ships and the freeboard deck of cargo ships having a maximum clear opening width of more than 1.2 m shall be kept closed during navigation, except for limited periods when absolutely necessary as determined by the Administration.	Proposals for opening such doors for limited periods during navigation will be considered by the MCA on a case-by-case basis for individual ships. See also B-2 Reg. 13.7.1 and B-4 Reg. 22.3.
B-4 Reg. 22.3	**Prevention and Control of Water Ingress, etc.** A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished. The Administration shall authorize that such a watertight door may be opened during navigation only after careful consideration of the impact on ship operations and survivability taking into account guidance issued by the Organization*. A watertight door permitted to be opened during navigation shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.	The MCA will consider proposals for opening watertight doors during navigation on a case-by-case basis, guided by MSC.1/Circ.1564, and will only authorize the opening of such doors if satisfied that the overall safety of the ship and persons on board is not unduly compromised. This will be done as part of the damage stability approval process.
B-4 Reg. 22.3	**Prevention and Control of Water Ingress, etc.** A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished. The Administration shall authorize that such a watertight door may be opened during navigation only after careful consideration of the impact on ship operations and survivability	Regarding the requirement that Administrations authorise watertight doors that may be opened during navigation only after careful consideration of the impact on ship operations and survivability taking into account guidance issued by the Organization, no prescribed guidance with respect to stability survivability is considered necessary for cargo ships, For cargo ships, these authorizations are left at the discretion of the Administration.

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	taking into account guidance issued by the Organization. A watertight door permitted to be opened during navigation shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.	Authorisation for permitting certain watertight doors to remain open during navigation on cargo ships will only be granted by the MCA after due consideration has been given to the overall safety of the ship and will be dealt with on a case-by-case basis as part of the stability approval process.
B-4 Reg. 22.5	**Prevention and Control of Water Ingress, etc.** Watertight doors fitted in watertight bulkheads dividing cargo spaces on 'tween decks in accordance with regulation 13.9.1 shall be closed before the voyage commences and shall be kept closed during navigation. The time at which such doors are opened or closed shall be recorded in such log-book as may be prescribed by the Administration.	Requirements for entries in the official log book are prescribed in regulation 26 of SI 1998/2514.
B-4 Reg. 22.9	**Prevention and Control of Water Ingress, etc.** Notwithstanding the requirements of paragraphs 8.1 and 8.4, the Administration may authorize that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.	Authorization for permitting certain doors to be opened when the ship is at a safe anchorage will only be granted by the MCA after due consideration has been given to the overall safety of the ship and will be dealt with on a case-by-case basis as part of the stability approval process. See also MSIS 003 3.2.8.1.
B-4 Reg. 22.11	**Prevention and Control of Water Ingress, etc.** The master shall ensure, before any voyage commences, that an entry in such log-book as may be prescribed by the Administration is made of the time the doors specified in paragraph 12 are closed and the time at which particular doors are opened in accordance with paragraph 13.	Requirements for entries in the official log book are prescribed in regulation 26 of SI 1998/2514.
B-4 Reg. 22.12	**Prevention and Control of Water Ingress, etc.** Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering ports and other openings, which are required by these	Requirements for entries in the official log book are prescribed in regulation 26 of SI 1998/2514.

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	regulations to be kept closed during navigation, shall be closed before the voyage commences. The time at which such doors are opened and closed (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.	
B-4 Reg. 22.13	**Prevention and Control of Water Ingress, etc.** Where in a between-deck, the sills of any of the sidescuttles referred to in regulation 15.3.2 are below a line drawn parallel to the bulkhead deck at side of passenger ships and the freeboard deck at sides in cargo ships, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the voyage commences, all the sidescuttles in that between-deck shall be closed watertight and locked before the voyage commences, and they shall not be opened before the ship arrives at the next port. In the application of this paragraph the appropriate allowance for fresh water may be made when applicable. .1 The time at which such sidescuttles are opened in port and closed and locked before the voyage commences shall be recorded in such log-book as may be prescribed by the Administration. .2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 14 would apply when it was floating at its deepest subdivision draught, the Administration may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side of passenger ships and the freeboard deck at sides of cargo ships, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible for the voyage to commence without them being closed and locked and to be opened during navigation on the responsibility of the master. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.	Requirements for entries in the official log book are prescribed in regulation 26 of SI 1998/2514.

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B-4 Reg. 22.15	**Prevention and Control of Water Ingress, etc.** If cargo is carried in spaces referred to in regulation 15.5.2, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and the time at which such scuttles and deadlights are closed and locked shall be recorded in such log-book as may be prescribed by the Administration.	Requirements for entries in the official log book are prescribed in regulation 26 of SI 1998/2514.
B-4 Reg. 23.2	**Special Requirements for Ro-Ro Passenger Ships** Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space, shall be kept on board and posted at an appropriate place.	Requirements for entries in the official log book are prescribed in regulation 34 of SI 1998/2514.
B-4 Reg 23.6.	**Special Requirements for Ro-Ro Passenger Ships** Notwithstanding the requirements of paragraph 3, the Administration may permit some accesses to be opened during the voyage, but only for a period sufficient to permit through passage and, if required, for the essential working of the ship.	Requirements for entries in the official log book are prescribed in regulation 34 of SI 1998/2514.
B-4 Reg 23.8	**Special Requirements for Ro-Ro Passenger Ships** Notwithstanding the requirements of paragraph 7, the Administration may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.	Requirements for entries in the official log book are prescribed in regulation 34 of SI 1998/2514.
B-4 Reg 24.2	**Additional Requirements for Prevention and Control of Water Ingress, etc. in Cargo Ships** Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of	Authorization for permitting particular doors to be opened during navigation at the discretion of the master on cargo ships will only be granted by the MCA after due consideration has been given to the overall safety of the ship and will be dealt with on

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	the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.	a case-by-case basis as part of the stability approval process.
B-4 Reg. 24.3	**Additional Requirements for Prevention and Control of Water Ingress, etc. in Cargo Ships** Watertight doors or ramps fitted to internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation. The time at which such doors are opened or closed shall be recorded in such log-book as may be prescribed by the Administration.	Requirements are prescribed in regulation 34 of SI 1998/2514.
B-4 Reg 25.3	**Water Level Detectors on Single Hold Cargo Ships other than Bulk Carriers** The water level detectors required by paragraph 2 shall: .1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and .2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.	The need for fitting additional detectors will be discussed and agreed by the MCA and the operators on a case-by-case basis as part of the damage stability approval process.

Table 8 – Machinery Installations

C. Reg. 26.6	**General** Main propulsion machinery and all auxiliary machinery essential to the propulsion and the safety of the ship shall, as fitted in the ship, be designed to operate when the ship is upright and when inclined at any	The Certifying Authority may permit a reduction in these angles taking into consideration the type, size and service conditions of the ship.

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	angle of list up to and including 15^0 either way under static conditions and 22.5^0 under dynamic conditions (rolling) either way and simultaneously inclined dynamically (pitching) 7.5^0 by bow or stern. The Administration may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship.	Where it can be shown that the overall safety of the ship will not be impaired, deviation from the aforesaid angles may be permitted, taking into account the type, size and service conditions.
C. Reg. 27.5	**Machinery** Main turbine propulsion machinery and, where applicable, main internal combustion propulsion machinery and auxiliary machinery shall be provided with automatic shutoff arrangements in the case of failures such as lubricating oil supply failure which could lead rapidly to complete breakdown, serious damage or explosion. The Administration may permit provisions for overriding automatic shutoff devices.	To consider MSC.1/Circ.1345 - Unified Interpretation of SOLAS Regulation II-1/27.5. The consequences of overriding automatic shut-off arrangements should be established and documented.
C. Reg. 29.1	**Steering Gear** Unless expressly provided otherwise, every ship shall be provided with a main steering gear and an auxiliary steering gear to the satisfaction of the Administration. The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative.	See IACS UI SC242 Rev2 https://www.iacs.org.uk/publications/unified-interpretations/ui-sc/ui-sc242-rev2-cln/ For a ship fitted with multiple steering propulsion units, such as but not limited to azimuthing propulsors or water jet propulsion systems, each of the steering-propulsion units should be provided with a main steering gear and an auxiliary steering gear, or with two or more identical steering actuating systems in accordance with interpretation of SOLAS II-1/29.6.1. The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative. For a ship fitted with a single steering-propulsion unit, the requirement in SOLAS II-1/29.1 is considered satisfied if the steering gear is provided with two or more steering actuating systems and is

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		in compliance with interpretation of SOLAS II-1/29.6.1. A detailed risk assessment is to be submitted in order to demonstrate that in the case of any single failure in the steering gear, control system or power supply the ship steering is maintained.
C. Reg. 29.2.1	**Steering Gear** All the steering gear components and the rudder stock shall be of sound and reliable construction to the satisfaction of the Administration. Special consideration shall be given to the suitability of any essential component which is not duplicated. Any such essential component shall, where appropriate, utilise antifriction bearings such as ball-bearings, roller-bearings or sleeve-bearings which shall be permanently lubricated or provided with lubrication fittings.	See MSC.1/Circ.1416/Rev.1 and IACS UI SC242 Rev2 https://www.iacs.org.uk/publications/unified-interpretations/ui-sc/ui-sc242-rev2-cln/ All components used in steering arrangements for ship directional control are to be of sound reliable construction to the satisfaction of the Administration or recognized organizations acting on its behalf. Special consideration shall be given to the suitability of any essential component which is not duplicated. Any such essential component shall, where appropriate, utilize anti-friction bearings such as ball bearings, roller bearings or sleeve bearings which shall be permanently lubricated or provided with lubrication fittings.
C. Reg. 29.2.2	**Steering Gear** The design pressure for calculations to determine the scantlings of piping and other steering gear components subjected to internal hydraulic pressure shall be at least 1.25 times the maximum working pressure to be expected under the operational conditions specified in paragraph 3.2, taking into account any pressure which may exist in the low-pressure side of the system. At the discretion of the Administration, fatigue criteria shall be applied for the design of piping and components, taking into account pulsating pressures due to dynamic loads.	See IASC UR M42 Rev4: https://www.iacs.org.uk/publications/unified-requirements/ur-m/ur-m42-rev4-cln/ Where paragraph 7 states: The dynamic loading to be assumed in the fatigue and fracturing mechanics analysis considering Regulation 29.2.2 and 29.17.1 and related Guidelines, will be established at the discretion of

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		the Classification Society. Both cases of high cycle and cumulative fatigue are to be considered.
C. Reg. 29.6.3	**Steering Gear** Steering gears, other than of the hydraulic type, shall achieve standards equivalent to the requirements of this paragraph to the satisfaction of the Administration.	MCA to apply MSC.1/Circ.1416/Rev.1
C. Reg. 30.4	**Additional Requirements for Electric and Electrohydraulic Steering Gear** When in a ship of less than 1,600 gross tonnage an auxiliary steering gear which is required by regulation 29.4.3 to be operated by power is not electrically powered or is powered by an electric motor primarily intended for other services, the main steering gear may be fed by one circuit from the main switchboard. Where such an electric motor primarily intended for other services is arranged to power such an auxiliary steering gear, the requirement of paragraph 3 may be waived by the Administration if satisfied with the protection arrangement together with the requirements of regulation 29.5.1 and .2 and 29.7.3 applicable to auxiliary steering gear.	The waiver may only be granted where the MCA is satisfied with the protection arrangement, together the requirements of SOLAS Chapter II-1 regulations 29.5.1 and .2 and 29.7.3 applicable to auxiliary steering gear.
C. Reg. 32.1	**Steam Boilers and Boiler Feed Systems** Every steam boiler and every unfired steam generator shall be provided with not less than two safety valves of adequate capacity. However, having regard to the output or any other features of any boiler or unfired steam generator, the Administration may permit only one safety valve to be fitted if it is satisfied that adequate protection against overpressure is thereby provided.	See MSC.1/Circ.1286 - Unified Interpretation of SOLAS regulation II-1/32.1.
C Reg. 35-1.2.6	**Bilge Pumping Arrangements**	Proposals for dispensing with the means of draining any particular compartment will be considered by the MCA and agreed with the

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	Provision shall be made for the drainage of enclosed cargo spaces situated on the bulkhead deck of a passenger ship and on the freeboard deck of a cargo ship, provided that the Administration may permit the means of drainage to be dispensed with in any particular compartment of any ship or class of ship if it is satisfied that by reason of size or internal subdivision of those spaces the safety of the ship is not thereby impaired. For ships subject to the provisions of regulation II-1/1.1.1.1, for the special hazards associated with loss of stability when fitted with fixed pressure water-spraying fire-extinguishing systems refer to regulation II-2/20.6.1.4.	operators on a case-by-case basis as part of the damage stability approval process.
C Reg 35-1.3.1	**Bilge Pumping Arrangements** The bilge pumping system required by paragraph 2.1 shall be capable of operation under all practicable conditions after a casualty whether the ship is upright or listed. For this purpose wing suctions shall generally be fitted except in narrow compartments at the end of the ship where one suction may be sufficient. In compartments of unusual form, additional suctions may be required. Arrangements shall be made whereby water in the compartment may find its way to the suction pipes. Where, for particular compartments, the Administration is satisfied that the provision of drainage may be undesirable, it may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in regulations 7 and 8 show that the survival capability of the ship will not be impaired.	Dispensation from the need to fit arrangements to facilitate the drainage of water to the suction pipes in a given compartment will be considered by the MCA and agreed with the operators on a case-by-case basis as part of the damage stability approval process, ensuring that the survival capability of the ship is not impaired if such drainage is not fitted.
C Reg 35-1.3.6	**Bilge Pumping Arrangements** Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 m/s. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than two such suctions shall be required in any one space. Where two or more such suctions are provided, there shall be at least one on each side of the ship. The Administration may require independent power bilge pumps situated in	The bilge pumping arrangements for each ship will be considered and approved on a case-by-case basis for compliance. In particular, the provision of direct suctions for independent power bilge pumps situated in spaces other than machinery spaces will be discussed with the owners/designers and agreement reached

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	other spaces to have separate direct suctions. Direct suctions shall be suitably arranged and those in a machinery space shall be of a diameter not less than that required for the bilge main.	on a case-by-case basis as part of the approval process.
C Reg 35-1.3.9	**Bilge Pumping Arrangements** The diameter d of the bilge main shall be calculated according to the following formula. However, the actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the Administration: $d = 25 + 1.68\sqrt{L(B+D)}$ where: *d* is the internal diameter of the bilge main (millimetres); *L* and *B* are the length and the breadth of the ship (metres) as defined in regulation 2; and *D* is the moulded depth of the ship to the bulkhead deck (metres) provided that, in a ship having an enclosed cargo space on the bulkhead deck which is internally drained in accordance with the requirements of paragraph 2.6.2 and which extends for the full length of the ship, D shall be measured to the next deck above the bulkhead deck. Where the enclosed cargo spaces cover a lesser length, D shall be taken as the moulded depth to the bulkhead deck plus lh/L where l and h are the aggregate length and height respectively of the enclosed cargo spaces (metres). The diameter of the bilge branch pipes shall meet the requirements of the Administration.	In every ship the internal diameter of main and branch bilge suction pipes shall be determined to the nearest size calculated according to the following formulae – dm = 25 + [1.68 √ L(B + D)] db = 25 + [2.15 √ l(B + D)] where dm is the internal diameter of the main bilge suction pipes in millimetres. db is the internal diameter of the branch bilge suction pipes in millimetres. L is the length of ship in metres measured between perpendiculars taken at extremities of the deepest subdivision load waterline. B is the greatest moulded breadth in metres at or below the ship's deepest subdivision load waterline. D is the moulded depth of ship amidships at the bulkhead deck in metres; provided that, in a ship having an enclosed cargo space on the bulkhead deck which is internally drained in accordance with the requirements of paragraph 8 and which extends for the full length of the ship, D shall be

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		measured to the next deck above the bulkhead deck. Where the enclosed cargo spaces cover a lesser length, D shall be taken as the moulded depth to the bulkhead deck plus lh/L, where l and h are the aggregate length and height respectively of the enclosed cargo space in metres. l is the length of compartment in metres.
C Reg 35-1.4	**Bilge Pumping Arrangements** At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments.	Dispensation from the need to fit bilge pumping arrangements in a given compartment will be considered by the MCA and agreed with the operators on a case-by-case basis as part of the damage stability approval process, ensuring that the survival capability of the ship is not impaired.

Table 9 – Electrical Installations

D. Reg. 40.2	**General** The Administration shall take appropriate steps to ensure uniformity in the implementation and application of the provisions of this part in respect of electrical installations.	MCA will apply MSC.1/Circ.1464/Rev.1 and consider recommendations published by the International Electrotechnical Commission and, in particular, Publication IEC 60092 - Electrical Installations in Ships. Where special marine type equipment is required and there is no standard for it, it shall be of a type that is acceptable to the RO.
D. Reg. 41.4	**Main Source of Electrical Power and Lighting Systems** Where the total installed electrical power of the main generating sets is in excess of 3 MW, the main busbars shall be subdivided into at least two parts which shall normally be connected by removable links or other	Other approved means can be achieved by: Circuit breaker without tripping mechanism or disconnecting link or switch which bus bars can be

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	approved means; so far as is practicable, the connection of generating sets and any other duplicated equipment shall be equally divided between the parts. Equivalent arrangements may be permitted to the satisfaction of the Administration.	split easily and safely. Bolted links, for example bolted bus bar sections, should not be acceptable.
D.Reg. 42.2.3.2	**Emergency Source of Electrical Power in Passenger Ships** The shipborne navigational equipment as required by regulation V/19; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 gross tonnage.	In accordance with SOLAS Chapter II-1 regulation 42.2.3.2, in the case of a ship of less than 5,000 gross tonnage, the MCA may waive the requirement to have an emergency source of power capable, for a period of 36 hours, of supplying the shipborne navigational equipment required by SOLAS Chapter V regulation 19. Waiver may only be granted where the MCA is satisfied such provision is unreasonable or impracticable.
D. Reg. 42.2.7	**Emergency Source of Electrical Power in Passenger Ships** In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 h period specified in paragraphs 2.1 to 2.5 but not less than 12 h.	Any waver granted in accordance with SOLAS Chapter II-1 regulation 42.2.3.2 must comply this paragraph of the regulation.
D.Reg.42-1.1.1	**Supplementary Emergency Lighting for Ro-Ro Passenger Ships** All passenger public spaces and alleyways shall be provided with supplementary electric lighting that can operate for at least 3 h when all other sources of electrical power have failed and under any condition of heel. The illumination provided shall be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting shall consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting which is at least as effective may be accepted by the	Other alternative means of lighting may be subject to consideration in special cases.

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	Administration. The supplementary lighting shall be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided shall be replaced at intervals having regard to the specified service life in the ambient conditions that they are subject to in service.	
D. Reg. 43.1.2	**Emergency Source of Electrical Power in Cargo Ships** The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead, except where permitted by the Administration in exceptional circumstances.	No exceptional circumstances will be considered to allow the emergency source of electrical power to be placed forward of the collision bulkhead.
D. Reg. 43.2.4.2	**Emergency Source of Electrical Power in Cargo Ships** The shipborne navigational equipment as required by regulation V/19; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 gross tonnage.	In accordance with SOLAS Chapter II-1 regulation 42.2.4.2, in the case of a ship of less than 5,000 gross tonnage, the MCA may waive the requirement to have an emergency source of power capable, for a period of 18 hours, of supplying the shipborne navigational equipment required by SOLAS Chapter V regulation 19. Waiver may only be granted where the MCA is satisfied such provision is unreasonable or impracticable.
D. Reg. 43.2.6.2	**Emergency Source of Electrical Power in Cargo Ships** In a ship engaged regularly in voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 18 h period specified in paragraphs 2.2 to 2.5 but not less than 12 h.	Any waiver issued in accordance with SOLAS Chapter II-1 regulation 42.2.4.2 must comply this paragraph of the regulation.

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D. Reg 44.1	**Starting Arrangements for Emergency Generating Sets** Emergency generating sets shall be capable of being readily started in their cold condition at a temperature of 0°C. If this is impracticable, or if lower temperatures are likely to be encountered, provision acceptable to the Administration shall be made for the maintenance of heating arrangements, to ensure ready starting of the generating sets.	Emergency generating sets are to be capable of being readily started in their cold condition at a temperature of 0^0C. If this is impracticable, or if lower temperatures are likely to be encountered, heating is to be provided to ensure ready starting of the generating sets.
D. Reg. 44.2	**Starting Arrangements for Emergency Generating Sets** Each emergency generating set arranged to be automatically started shall be equipped with starting devices approved by the Administration with a stored energy capability of at least three consecutive starts. A second source of energy shall be provided for an additional three starts within 30 min unless manual starting can be demonstrated to be effective.	The starting arrangements for emergency generating sets where both the sources of stored energy are accumulator batteries a single common starter motor and associated switch can be accepted. The arrangements should ensure that only one battery at a time can be brought into service. Separate charging arrangements, supplied by the emergency switchboard, should be provided for each battery. A sign should be clearly displayed adjacent to the generating set warning that it is arranged for automatic starting. Where the emergency diesel engine equipped with one electric starting motor and provided with one starting battery, in which case a second starting possibility must be available, such as manual starting (if possible), inertia starter, spring loaded starter or manual-hydraulic starter. Where the emergency diesel engine equipped with a compressed air startingmotor shall be provided with its own starting air vessel inside the emergency generator room that is being kept pressurised by the main engine starting system and provided with a non-return valve located inside

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		the emergency generator room. Unless this system is provided with a manual operated compressor in the emergency generator room, one of the second starting possibilities as required by paragraph above shall be available.
D. Reg. 45.1.2	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** The Administration may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.	BS 8450:2006 Annex A to be used as guidance. When electrical lamps, welding equipment, tools or other apparatus are used in confined or damp spaces or spaces with large exposed conductive surfaces, special provision shall be made so far as is practicable, to ensure that the danger of electric shock is reduced to a minimum. Such spaces shall at least include open decks and machinery spaces. MSIS 03 Part 7 Passenger Ship Construction – Classes I, II & II(A): General guidance is given in Table 4A and Appendix 2 of the IEE Regulations 1972 and Table 4.1 and Appendix B of the IEE Regulations 1990. Attention is particularly drawn to the recommendation that 24 volts is used for hand lamps. 7.31.3 - It is recognised that the limits of voltage recommended in the relevant Appendices 2 and B of the IEE Regulations 1972 and 1990 respectively are not always practicable for portable and transportable apparatus such as submersible pumps, deck scalers, refrigerated containers etc. In these cases, where 3 phase supplies up to 500 volts may be involved, the additional precautions

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		in 7.31.3.1 and 7.31.3.2 below, or a combination are recommended:- 7.31.3.1 - circuits which monitor the continuity of the earthed connections and automatically disconnect supply on loss of earth continuity. This arrangement will not, however, be effective when Class II apparatus is used; and 7.31.3.2 - each socket outlet or group of socket outlets supplied through a high sensitivity residual current circuit breaker (RCCB) (formerly termed high sensitivity current operated earth leakage circuit breaker). For this method to be fully effective the supply must be earthed at one point. In ships with unearthed systems double wound isolating transformers with one point of the secondary winding solidly earthed should be used. Particular attention is drawn to the need to select an RCCB which is resistant to the marine environment, e.g. vibration, salt atmosphere etc.
D. Reg. 45.2	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Main and emergency switchboards shall be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to personnel. The sides and the rear and, where necessary, the front of switchboards shall be suitably guarded. Exposed live parts having voltages to earth exceeding a voltage to be specified by the Administration shall not be installed on the front of such switchboards. Where necessary, nonconducting mats or gratings shall be provided at the front and rear of the switchboard.	No exposed parts which may have a voltage between conductors or to earth exceeding 250 volts direct current or 50 volts RMS ac shall be installed on the face of any switchboard or control panel.

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D. Reg. 45.3.2	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** The requirement of paragraph 3.1 does not preclude under conditions approved by the Administration the use of: .1 impressed current cathodic protective systems; .2 limited and locally earthed systems; or .3 insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.	In cargo ships, limited and locally earthed systems are not precluded provided that, in the case of ships constructed on or after 1st October 1994, any possible resulting current does not flow directly through hazardous areas.
D. Reg. 45.3.3	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Where the hull return system is used, all final subcircuits, i.e. all circuits fitted after the last protective device, shall be two-wire and special precautions shall be taken to the satisfaction of the Administration.	UISC SC8 – IACS Interpretations of SOLAS to be used also as guidance.
D. Reg. 45.5.1	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Except as permitted by the Administration in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.	Cables shall be installed and supported in such a manner as to avoid chafing and other damage. All metal sheaths and metal armour of electric cables shall be electrically continuous and shall be earthed except that the Certifying Authority may permit such earthing to be omitted for particular purposes.
D. Reg. 45.5.2	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** All electric cables and wiring external to equipment shall be at least of a flame-retardant type and shall be so installed as not to impair their original flame-retarding properties. Where necessary for particular applications the Administration may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.	The Certifying Authority may permit installation of cables which do not comply with the foregoing for particular purposes, such as radio frequency cables, where compliance would be impracticable.

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D. Reg. 45.5.3	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall so far as practicable be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. In ro-ro passenger ships, cabling for emergency alarms and public address systems installed on or after 1 July 1998 shall be approved by the Administration having regard to the recommendations developed by the Organization. Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.	See MSC/Circ.808 - Recommendation on performance standards for public address systems on passenger ships, including cabling.
D. Reg. 45.5.4	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Where cables which are installed in hazardous areas introduce the risk of fire or explosion in the event of an electrical fault in such areas, special precautions against such risks shall be taken to the satisfaction of the Administration.	UISC SC12– IACS Interpretations of SOLAS to be used also as guidance: Cables passing through any hazardous areas or serving electrical equipment in such areas shall - (a) be appropriate having regard to the dusts, gases or vapours to which they may be subjected; and (b) unless they form part of intrinsically safe circuits be enclosed in a gas-tight steel conduit or include a metallic sheath braid or wire armour for earth leakage detection or be protected in some other satisfactory manner. Additional protection against mechanical damage shall be provided in locations where such damage may occur.

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D. Reg. 45.6.1	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Each separate circuit shall be protected against short circuit and against overload, except as permitted in regulations 29 and 30 or where the Administration may exceptionally otherwise permit.	UISC SC13 – IACS Interpretations of SOLAS to be used as guidance: Each separate electrical circuit, other than a circuit which operates the ship's steering gear shall, unless it is permitted otherwise, be protected against overload.
D. Reg. 45.9.3	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Administration.	Accumulator batteries shall not be installed in sleeping accommodation spaces.
D. Reg. 45.10	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** No electrical equipment shall be installed in any space where flammable mixtures are liable to collect, e.g. in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Administration is satisfied that such equipment is: .1 essential for operational purposes; .2 of a type which will not ignite the mixture concerned; .3 appropriate to the space concerned; and .4 appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.	PASSENGER SHIPS (i) Electrical equipment and cables shall not be installed in enclosed cargo spaces, special category spaces or open ro-ro cargo spaces intended for the carriage of dangerous goods which are flammable liquids with a flash point below 23°C (Closed Cup Test) or flammable gases unless the Secretary of State considers the location therein essential. (ii) If permitted, any electrical equipment installed in such spaces shall be certified for, and cables shall be appropriate for, use with the flammable dusts, gases or vapours to which it may be exposed. (iii) Cable penetrations of the decks and bulkheads of such spaces shall be sealed against the passage of gas or vapour.

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		(iv) Electrical equipment and cables which do not comply with the foregoing for particular applications may be installed, provided such equipment and cables are capable of being electrically isolated by the removal of links or the operation of lockable switches. CARGO SHIPS Electrical equipment shall not be installed in any hazardous area unless the Certifying Authority is satisfied that such equipment is - (a) essential for operational or safety purposes; (b) of a type that is certified for use in the flammable dusts, gases or vapours to which it may be subjected; and (c) appropriate to the space concerned.
D. Reg. 45.11	**Precautions against Shock, Fire and Other Hazards of Electrical Origin** In tankers, electrical equipment, cables and wiring shall not be installed in hazardous locations unless it conforms with standards not inferior to those acceptable to the Organization. However, for locations not covered by such standards, electrical equipment, cables and wiring which do not conform to the standards may be installed in hazardous locations based on a risk assessment to the satisfaction of the Administration, to ensure that an equivalent level of safety is assured.	UISC SC274– IACS Interpretations of SOLAS to be used as guidance. See MSC.1/Circ.1557 - Hazardous Area Classification (Application of SOLAS Regulation II-1/45.11) Refer also to the standards published by the International Electrotechnical Commission, IEC 60092-502:1999 "Electrical installations in ships - Tankers"

Table 10 – Additional requirements for periodically unattended machinery spaces

E. Reg. 46.2	**General** Measures shall be taken to the satisfaction of the Administration to ensure that the equipment is functioning in a reliable manner and that	• Class survey & maintenance requirements. • Suitable PMS: Elements relating to UMS operation (including stand-by systems) must be specifically part of PMS / ISM. Frequency of

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	satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.	inspection and test may be guided by OEM or standard vessel / industry practice. • Follow regular engine watchkeeping checks and routines.
E. Reg. 46.3	**General** Every ship shall be provided with documentary evidence, to the satisfaction of the Administration, of its fitness to operate with periodically unattended machinery spaces.	Appropriate class notation on the certificate of class or equivalent letter issued by MCA to the effect.
E. Reg. 47.1	**Fire Precautions** Means shall be provided to detect and give alarms at an early stage in case of fires: .1 in boiler air supply casings and exhausts (uptakes); and .2 in scavenging air belts of propulsion machinery, unless the Administration considers this to be unnecessary in a particular case.	Consider the requirement to be absolute on vessel fitted / operating with unmanned machinery space. Specific exemption may be considered on its merit.
E. Reg. 49.5	**Control of Propulsion Machinery from the Navigation Bridge** The design of the remote automatic control system shall be such that in case of its failure an alarm will be given. Unless the Administration considers it impracticable, the pre-set speed and direction of thrust of the propeller shall be maintained until local control is in operation.	See Reg 31.2.7 Alternative equivalent arrangement may be considered.
E. Reg. 51.1.2	**Alarm System** An alarm system shall be provided indicating any fault requiring attention and shall have a connection to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure connection	Alternative equivalent arrangement may be considered.

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	to at least one of those cabins. Administrations may permit equivalent arrangements.	
E. Reg. 53.1	**Special Requirements for Machinery, Boiler and Electrical Installations** The special requirements for the machinery, boiler and electrical installations shall be to the satisfaction of the Administration and shall include at least the requirements of this regulation.	Alternative equivalent arrangement may be considered.
E. Reg. 53.2.1	**Special Requirements for Machinery, Boiler and Electrical Installations** Where the electrical power can normally be supplied by one generator, suitable load-shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the ship. In the case of loss of the generator in operation, adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the ship with automatic restarting of the essential auxiliaries including, where necessary, sequential operations. The Administration may dispense with this requirement for a ship of less than 1,600 gross tonnage, if it is considered impracticable.	Alternative equivalent arrangement may be considered.

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