



NEWBUILDINGS
SPECIAL SERVICE AND TYPE – ADDITIONAL CLASS

Carriage of Dangerous Goods

JULY 2011

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The Rules lay down technical and procedural requirements related to obtaining and retaining a Class Certificate. It is used as a contractual document and includes both requirements and acceptance criteria.

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CHANGES

General

The present edition of the rules includes amendments and additions approved by the Executive Committee as of June 2011 and supersedes the January 2011 edition of the same chapter.

The rule changes come into force as described below.

Text affected by the main rule changes is highlighted in red colour in the electronic pdf version. However, where the changes involve a whole chapter, section or sub-section, only the title may be in red colour.

This chapter is valid until superseded by a revised chapter.

Main changes coming into force 1 July 2011

- **Sec.1 General Requirements**

- In Table B1 references to documentation type “Z030 – System arrangement plan” have been amended to read “Z030 – Arrangement plan”.

- **Sec.2 Requirements for carriage of dangerous goods in various types of cargo spaces**

- Table B1: Text in table column one made clearer
- Table B1, 3. row: (Class 3.1, 3.2, 6.1 and 8) to be replaced by: (Class 3, 6.1 and 8)
- Inserted a Guidance note before B900
- Included new footnote in Table C2
- Included new footnote in Table C3
- Included new footnote in Table C4
- In Table C5, deleted B300 from the 4. column for 4.3 liquids
- Amended the text for “iron oxide, spent” in Table D1
- Some corrections in Table B2, Table C1, Table C2, Table C3, Table C4 and Table C5.

Corrections and Clarifications

In addition to the above stated rule requirements, a number of detected errors, corrections and clarifications have been made in the existing rule text.

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SECTION 1 GENERAL REQUIREMENTS

A. Classification

A 100 Class notations and qualifiers

101 Ships complying with requirements of this chapter may be given the class notation **DG**, appended by one of the qualifiers **B** or **P** as described in Table A1.

| Table A1 Class notation and qualifiers | | | |
|--|---|------------------|--|
| <i>Class notation</i> | <i>Description</i> | <i>Qualifier</i> | <i>Description</i> |
| DG | Ship intended for carriage of dangerous goods | B | Intended for carriage of dangerous solid bulk cargoes. |
| | | P | Intended for carriage of dangerous goods in packaged form. |

A 200 Scope

201 The rules in this section are considered to satisfy the requirements of SOLAS Reg. II-2/19 in respect of carriage of dangerous goods in packaged form.

202 For potentially hazardous bulk cargoes not subject to the SOLAS requirements mentioned in 201 the rules are considered to meet the recommendation given in IMO's "International Maritime Solid Bulk Cargoes Code - IMSBC Code" with respect to ships construction and equipment.

Guidance note:

When authorised by the government of the flag state, the Society can issue a Document of Compliance, certifying that the construction and equipment are in compliance with SOLAS Reg. II-2/19 and or with the IMSBC Code, as amended.

For such certification applicable parts of this chapter are used, also when class notations are not given.

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A 300 Assumption

301 It is assumed that the operational requirements of SOLAS Chapter VII, Part A as well as those of the International Maritime Dangerous Goods Code, IMDG Code (IMO Resolution A.81(IV)) or the "International Maritime Solid Bulk Cargoes Code", as applicable, are complied with.

302 If dangerous goods in packaged form, i.e. substances for well stimulation, carried on board i.e. a supply vessel, are discharged, then other codes, resolutions, etc., shall be considered, i.e. "Guidelines for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels (Resolution A673(16) as amended)".

B. Documentation

B 100 Documentation requirements

101 Documentation shall be submitted as required by Table B1, as applicable for the types of cargoes intended to be carried.

| Table B1 Documentation requirements for class notation DG | | | |
|--|--|--|--|
| <i>Object</i> | <i>Documentation type</i> | <i>Additional description</i> | <i>For approval (AP) or For information (FI)</i> |
| Hazardous areas | G080 – Hazardous area classification drawing | | AP |
| Structural fire protection | G060 – Structural fire protection drawing | Bulkheads and decks separating cargo spaces from machinery spaces and accommodation. | AP |
| Fire water supply and distribution system | S010 – Piping diagram | | AP |
| | S030 – Capacity analysis | | AP |
| | Z030 – Arrangement plan | | AP |
| Fixed fire extinguishing system in cargo holds | G200 – Fixed fire extinguishing system documentation | | AP |

| Table B1 Documentation requirements for class notation DG (Continued) | | | |
|---|--|--|--|
| <i>Object</i> | <i>Documentation type</i> | <i>Additional description</i> | <i>For approval (AP) or For information (FI)</i> |
| Ventilation system | V010 – Ducting diagram | Cargo holds, cargo handling spaces and spaces having openings into those spaces. | AP |
| Additional requirements for qualifier B | | | |
| Inert gas system | S010 – Piping diagram | Applicable for cargoes requiring inerting of cargo holds. | AP |
| Fixed hydrocarbon gas detection and alarm system | I200 – Control and monitoring system documentation | | AP |
| | Z030 – Arrangement plan | Detectors, call points and alarm devices. | AP |
| Fixed oxygen indication system | I200 – Control and monitoring system documentation | | AP |
| Fixed toxic gas detection and alarm system | I200 – Control and monitoring system documentation | | AP |
| Cargoes | Z100 – Specification | Dangerous solid bulk cargoes intended to be carried in each cargo hold. | FI |
| Cargo temperature monitoring system | I200 – Control and monitoring system documentation | | AP |
| Additional requirements for qualifier P | | | |
| Fire detection and alarm system | Z030 – Arrangement plan | | AP |
| Fixed fire extinguishing system in vehicle, special category and ro/ro spaces | G200 – Fixed fire extinguishing system documentation | | AP |
| Cargoes | Z100 – Specification | Dangerous goods in packaged form intended to be carried in each cargo space. | FI |

102 For general requirements to documentation, see Pt.0 Ch.3 Sec.1.

103 For a full definition of the documentation types, see Pt.0 Ch.3 Sec.2.

C. Definitions

C 100 Classes of dangerous goods

101 Classes of dangerous goods according to SOLAS, Chapter VII, Part A, the IMSBC-Code and the IMDG-Code, are as follows:

Class 1: Explosives

- Division 1.1: Substances and articles which have a mass explosion hazard
- Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard
- Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
- Division 1.4: Substances and articles which present no significant hazard

Guidance note:

Substances and articles in this division are in compatibility group S if they are so packaged or designed that any hazardous effects arising from the accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity of the package.

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- Division 1.5: Very insensitive substances which have a mass explosion hazard
- Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard

Class 2: Gases

- Class 2.1: Flammable gases
- Class 2.2: Non-flammable, non-toxic gases
- Class 2.3: Toxic gases

Class 3: Flammable liquids

Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases

- Class 4.1: Flammable solids, self-reactive substances and desensitized explosives
- Class 4.2: Substances liable to spontaneous combustion
- Class 4.3: Substances which, in contact with water, emit flammable gases

Class 5: Oxidizing substances and organic peroxides

- Class 5.1: Oxidizing substances
- Class 5.2: Organic peroxides

Class 6: Toxic and infectious substances

- Class 6.1: Toxic substances
- Class 6.2: Infectious substances

Class 7: Radioactive material

Class 8: Corrosive substances

Class 9: Miscellaneous dangerous substances and articles

Class MHB: Materials hazardous only in bulk.

Guidance note:

Class 6.2 and Class 7 are neither covered by SOLAS Reg. II-2/19 nor this Part 5, Chapter 11 of the Rules for Classification of Ships.

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C 200 Terms

201 “A-60” class divisions are smoke and fire resistant divisions formed by insulated steel bulkheads and decks complying with the SOLAS standard fire test criteria for 60 minutes exposure.

They shall be insulated with non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within 60 minutes.

(SOLAS Reg. II-2/3.2.3)

202 Cargo spaces are all spaces used for cargo and trunks to such spaces.

(SOLAS Reg. II-2/3.8)

203 Ro-ro cargo spaces are spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the ship in which goods (packaged or in bulk, in or on rail or road cars, vehicles, trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.

(SOLAS Reg. II-2/3.41)

204 Open ro-ro spaces are ro-ro spaces either open at both ends or open at one end, and provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides.

(SOLAS Reg. II-2/3.35)

205 Closed ro-ro cargo spaces are ro-ro cargo spaces which are neither open ro-ro cargo spaces nor weather decks.

(SOLAS Reg. II-2/3.12)

206 Weather deck is a deck which is completely exposed to the weather from above and from at least two sides.

(SOLAS Reg. II-2/3.50)

207 An open deck extending into a ro-ro cargo space not having sufficient openings to be considered “open” does not fall under the definition weather deck in the context of dangerous goods.

208 *Hazardous area* (comparable with zone 1 as defined in IEC 60092-502) is an area in which an explosive atmosphere is likely to occur in normal operation. The explosive atmosphere may exist due to gas and or dust. (IEC 60092-506, 3.1)

209 *Extended hazardous area* (comparable with zone 2 as defined in IEC 60092-502) is an area in which an explosive atmosphere is not likely to occur in normal operation and, if it does occur, is likely to do so only infrequently and will exist for a short period only. (IEC 60092-506, 3.2)

SECTION 2

REQUIREMENTS FOR CARRIAGE OF DANGEROUS GOODS IN VARIOUS TYPES OF CARGO SPACES

A. General

A 100 Application of requirements

101 Subsection B contains all requirements relevant for carriage of dangerous goods. Subsection C gives the requirements for packaged goods carried in various types of cargo spaces. Subsection D gives the application of the requirements for solid bulk cargoes.

B. Requirements Applicable for Various Classes of Dangerous Goods

B 100 Fire water supply

101 Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurisation or by suitably placed remote starting arrangements for the fire pumps.

(SOLAS Reg. II-2/19 3.1.1)

The requirements also apply to pumps for water spray system for cargo spaces, if fitted.

If fire water supply pumps arranged for remote starting also serve other purposes, the arrangement must ensure that the pump selected is connected to the fire water system, e.g. by automatic change over of valves or visual signals for valves' correct positions at the remote starting position.

102 The capacity of the fire pumps shall be sufficient for supplying four (4) jets of water, and the number and position of hydrants shall be such that at least two (2) of the required four (4) jets of water, when supplied by single lengths of hose, may reach any part of the cargo space when empty; and all four (4) jets of water, each supplied by single lengths of hose may reach any part of ro-ro cargo spaces.

(SOLAS Reg. II-2/19 3.1.2 and IACS UI SC 168.)

Guidance note:

The length of the water jet is generally not to be taken more than 7 m.

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103 Means of effectively cooling the designated under deck cargo space by copious quantities of water, either by a fixed arrangement of spraying nozzles, or flooding the cargo spaces with water shall be provided. If spray nozzles are used their capacity shall be sufficient for supplying not less than 5 litres/m²/min. of the horizontal projected area of the cargo hold.

Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Administration. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. The drainage system shall be sized to remove no less than 125% of the combined capacity of both the water spraying system pumps and required number of fire hose nozzles.

The drainage system valves shall be operated from out side the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of the water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.

(SOLAS Reg. II-2/19 3.1.3)

B 200 Fixed fire extinguishing

201 A ship engaged in the carriage of dangerous goods in any cargo spaces shall be provided with a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or with a fire-extinguishing system which, in the opinion of the Administration, gives equivalent protection for the cargoes carried.

(SOLAS Reg. II-2/10.7.2)

Guidance note:

Ref. Table 1 in the Annex to MSC/Circ.1146: Solid bulk cargoes categorized into Group B in the IMSBC Code for which a fixed gas fire-extinguishing system may be exempted. An application for exemption from this requirement shall be addressed to DNV for forwarding to the Flag Authority.

Ref. Table 2 in the Annex to MSC/Circ.1146: Solid bulk cargoes categorized into Group B in the IMSBC Code for which a fixed gas fire-extinguishing system is ineffective and for which a fire-extinguishing system giving equivalent protection shall be available. Acc. to the Annex to MSC/Circ.1120 water supplies, as defined in B102, are considered as an acceptable system giving equivalent protection. Another system giving equivalent protection is a fixed water spray system giving at least 5 l/m² pr. min. evenly dispersed.

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202 Each open ro-ro cargo space having a deck above it and each space deemed to be a closed ro-ro cargo space not capable of being sealed, shall be fitted with an approved fixed pressure water-spray system for manual operation which is to protect all parts of any deck and vehicle platform in such space. The capacity of the system shall be sufficiently for providing at least 5 litres/m²/min. of the horizontal area of decks and platforms. The use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective, may be permitted.

(SOLAS Reg. II-2/19.3.9)

B 300 Electrical installations

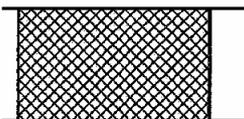
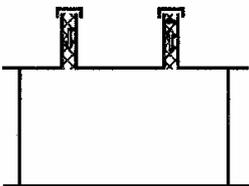
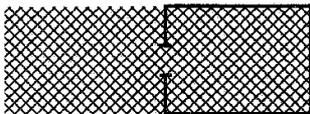
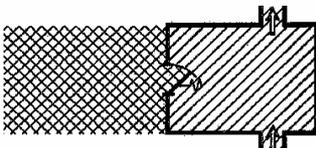
301 Electrical equipment and wiring shall not be fitted in hazardous areas and in areas where explosives are stored unless it is essential for the safety and operation of the ship.

(IEC 60092-506, 5.1)

302 The hazardous area shall be categorised in accordance with IEC 60092-506 Annex B, see Table B1:

Guidance note:

The spaces are categorised as hazardous only when dangerous goods are carried.

| Table B1 Cargo classes - description of areas | | |
|---|---|---|
| Cargo classes | Typical example | Description |
| <p>Bulk: Classes 4.1, 4.2, 4.3 and 9, and MHB Packaged: Classes 1.1-1.6 except IAS, 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C.</p> |  | <ul style="list-style-type: none"> — Closed cargo spaces — Permanently fixed magazines |
| <p>Bulk: Classes 4.1, 4.2, 4.3 and 9, and MHB Packaged: Classes 1.1-1.6 except IAS, 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C.</p> |  | <ul style="list-style-type: none"> — Pipes having open ends (e.i. ventilation and bilge pipes, etc.) in a hazardous area. |
| <p>Bulk: Classes 4.3 Packaged: Classes 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C.</p> |  | <ul style="list-style-type: none"> — Enclosed or semi-enclosed space with direct opening to closed cargo space |
| <p>Bulk: Classes 4.3 Packaged: Classes 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C.</p> |  | <ul style="list-style-type: none"> — Enclosed or semi-enclosed space with direct opening to closed cargo space with gastight door and natural ventilation. |
| |  | <ul style="list-style-type: none"> — Space protected by overpressure in accordance with 303. |

| Table B1 Cargo classes - description of areas (Continued) | | |
|---|-----------------|---|
| Cargo classes | Typical example | Description |
| Bulk: Classes 4.3 Packaged: Classes 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C. | | — Space with direct opening to closed cargo space with air lock and natural ventilation. |
| Bulk: Classes 4.3 Packaged: Classes 2.1, 3 w. FP ≤ 23° C, 6.1 w. FP ≤ 23° C and 8 w. FP ≤ 23° C. | | — Areas on open deck, or semi-enclosed spaces on open deck, in the indicated distance from ventilation outlets of hazardous areas |
| <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> Hazardous area </div> <div style="display: flex; align-items: center;"> Extended hazardous area </div> <div style="display: flex; align-items: center;"> Non-hazardous space </div> <div style="display: flex; align-items: center;"> Substantially gas-tight self-closing door </div> </div> | | |

303 Where a space has an opening into an adjacent hazardous space or area, it may be made into a non-hazardous space in accordance with the following requirements:

- A minimum overpressure of 25 Pa (0.25 mbar) with respect to the adjacent hazardous space or area is provided at all points inside the space and its associated ducts at which leaks are liable to occur, all doors and windows being closed.
- Visual and acoustic alarm is provided at a manned position in case of loss of pressure.

304 The requirements for electrical equipment in hazardous areas are specified in Table B2 for packaged goods and Table D1 for bulk cargoes. The requirements are additional to those given in Pt.4 Ch.8.

Guidance note:

Reefer containers shall be regarded as electrical equipment.

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305 The electrical equipment in extended hazardous areas shall either:

- be appropriate for use in the adjacent space in accordance with Table B2 or Table D1, or
- be suitable for zone 2, see Pt.4 Ch.8 Sec.11 C200.

306 Portable electrical equipment shall have its own self-contained electrical source of energy, except for intrinsically safe circuits, and shall comply with the requirements of 303 and 304.

307 If electrical equipment which is not approved for the use in hazardous areas as specified in 303 or 304 is installed, it must be possible to isolate the equipment completely, and to protect it against unauthorised reconnection. Disconnection shall be made outside the hazardous areas and shall be effected with isolating links or lockable switches. Equipment essential either for the safety of the ship or crew must be approved for the installation in hazardous area and shall not be disconnected.

308 Cables shall be either

- a) protected by electrically continuous metal sheathing or metallic wire armour braid or tape, or
- b) enclosed in screwed heavy gauge steel drawn or seam-welded and galvanized conduit.

309 All metallic protective coverings of power and lighting cables passing through a hazardous area or connected to equipment in such an area, shall be earthed at least at each end. The metallic covering of all other cables shall be earthed at least at one end.

310 Cable penetrations of decks and bulkheads shall be gas tight, and of a recognised make.

311 Cable joints in cargo spaces shall be avoided where possible. Where joints are unavoidable, they shall be enclosed in metal-clad or impact strength plastic junction boxes of certified safe type, or heat shrink or encapsulated crimp sleeve cable joints.

| Table B2 Requirements for electrical equipment for packaged goods | | | | |
|--|--------------------------|------------------|---------------------------|--|
| <i>Classes or types of dangerous goods</i> | <i>Temperature class</i> | <i>Gas group</i> | <i>Ingress protection</i> | <i>Ex-protection</i> |
| Explosives, Class 1 except Class 1.4 S | T 5 | | IP 64 | |
| Liquids with flashpoint below 23°C (Class 3, 6.1 and 8), flammable gases (Class 2.1) and dangerous goods listed in the IMDG Code which evolve flammable vapour (Class 9) | T 3 | II B | | Ex-ia or -ib, Ex-d, Ex-e, Ex-p, Ex-m or Ex-s |

B 400 Fire detection system and fire alarm system

401 A fire detection system and a fire alarm system shall both be in compliance with the requirements in the “DNV Statutory Interpretations”, and:

- Ro-ro cargo spaces shall be fitted with a fixed fire detection and fire alarm system.
- All other types of cargo spaces except spaces certified for solid bulk cargoes only, shall be fitted with either a fixed fire detection and fire alarm system or a sample extraction smoke detection system. If a sample extraction smoke detection system is fitted, particular attention shall be made to prevent the leakage of toxic fumes into occupied areas.

(SOLAS Reg. II-2/19 3.3)

B 500 Ventilation of cargo spaces

501 Depending on the type of cargo spaces and the cargoes intended, requirements for ventilation in 502 to 507 apply, as given in Table C2 to Table C4 and in Table D1.

502 Mechanical ventilation

The fan(s) shall be permanently fitted or of a portable type adapted for being permanently fitted prior to loading and during voyage.

The height of ventilation inlets and outlets must satisfy the requirements of the Load Line Convention for openings fitted with closing appliances. The means of closure for fire protection must be fitted in accordance with Pt.4 Ch.10.

503 Continuous ventilation

The fan(s) shall be permanently fitted or of a portable type adapted for being permanently fitted prior to loading and during voyage.

Holds intended for the carriage of cargoes for which continuous ventilation is required, shall be provided with ventilation openings which may be kept opened when required. Such openings shall comply with the requirements of the Load Line Convention as amended for openings not fitted with means of closure. The means of closure for fire protection must be fitted in accordance with the “DNV Statutory Interpretations”.

504 Fan capacity

- a) Cargo holds shall be provided with a minimum of two ventilation fans, giving a minimum of 6 air changes per hour, based on the volume of the empty hold.
- b) Cargo holds shall be provided with a minimum of one ventilation fan, giving a minimum of 6 air changes per hour, based on the volume of the empty hold.
- c) Cargo holds shall be provided with a minimum of one ventilation fan, giving a minimum of 2 air changes per hour, based on the volume of the empty hold.

505 Natural ventilation

Natural ventilation with closing appliances to be provided in enclosed cargo spaces, where there is no provision for mechanical ventilation.

(SOLAS Reg. II-2/19 3.4.3)

506 Ventilation outlets

Ventilation outlets shall be located at a minimum of 3 m away from openings into machinery and or accommodation spaces.

507 Fans

The fans shall be of a type that prevents the possibility of the ignition of flammable gas air mixtures, and shall comply with Pt.5 Ch.3 Sec.6 A200.

The exhaust fans shall be fitted with suitable wire mesh guards (maximum 13×13 mm mesh).
(SOLAS Reg. II-2/19 3.4.2 and IACS UI SC 52.)

508 Spark arresting screens

The inlet and outlet ventilation openings shall be fitted with spark-arresting screens.

Guidance note:

Suitable wire mesh will be accepted.

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B 600 Separate bilge pumping system and drainage arrangements for cargo spaces

601 The capacity and arrangement of the bilge system are to meet the requirements in Pt.4 Ch.6 Sec.4.

602 Bilge pumping and drainage system for cargo spaces shall be arranged outside machinery spaces. If bilge ejectors are used driving water may be taken from a pump in the engine room provided a non-return valve is fitted in the supply line.

(SOLAS Reg. II-2/19.3.5.1)

603 If the bilge drainage system for cargo space is additional to the system served by pumps in the machinery space, the capacity of the system shall be not less than 10 m³/h per cargo space served. If the additional system is a common system, the capacity need not exceed 25 m³/h. The additional bilge system need not be arranged with redundancy.

(SOLAS Reg. II-2/19.3.5.2)

604 Whenever flammable or toxic liquids are carried, the bilge line into the machinery space shall be isolated either by fitting a blank flange or by a closed lockable valve to be located in a readily accessible space outside cargo holds, e.g. in the engine room.

(SOLAS Reg. II-2/19.3.5.3)

605 Enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids shall be fitted with separate mechanical ventilation giving at least 6 air changes per hour. If the space has access from another enclosed space, the door shall be self-closing.

(SOLAS Reg. II-2/19 3.5.4)

606 If gravity drainage is applied the discharges to be lead directly overboard, alternatively to a closed collecting tank, located outside the machinery spaces, having a minimum volume sufficient to accumulate 1/3 of the drainage capacity per hour of the largest cargo space. The tank shall be provided with vent pipe to a safe location on the open deck.

Drainage from a cargo space to wells in a lower cargo space is only permitted if the lower cargo space satisfies the same requirements as the cargo space above.

(SOLAS Reg. II-2/19.3.5.5)

Guidance note:

For the purpose of cargo segregation according to the IMDG Code, the two spaces are considered as one cargo space.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

B 700 Personnel protection and medical equipment

701 Four sets of protective clothing according to the EmS Guide as given in the IMDG Code Supplement for packaged goods, or in the IMSBC Code for bulk cargoes, shall be provided in addition to the fire fighter's outfits required by Pt.4 Ch.10.

(SOLAS Reg II-2.19 3.6.1)

702 At least two self-contained breathing apparatuses additional to those required by Pt.4 Ch.10, shall be provided.

Two spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitable located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus.

(SOLAS Reg II-2/19 3.6.2)

703 Medical oxygen.

Guidance note:

Provided that the Administration requires that the guidelines in the MFAG in the IMDG Code supplement with respect to medical oxygen shall be met, the following shall be fulfilled:

A 40 litre/200 bar medical oxygen cylinder shall be mounted in the ship's hospital, assembled for direct use, equipped with one flow-meter unit for supplying oxygen for two persons simultaneously. A complete portable set, ready for use, with a 2 litre/200 bar medical oxygen cylinder and a spare cylinder (also 2 litre/200 bar) shall also be available on board.

The 40 litre/200 bar cylinders shall be stored in fixed supports connected directly to vessels steel structure within the ship's hospital. The cylinders shall be stored within a steel cabinet with natural ventilation to free air. Signboard warning of possible ignition caused by static electricity from clothing or open flame when medical oxygen is used (released) shall be posted on the cabinet.

Alternative arrangements, which in the opinion of the Administration are equivalent, may be accepted.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

B 800 Portable fire extinguishers

801 Two portable fire extinguishers, each having a capacity of not less than 6 kg of dry powder or equivalent, should be provided when dangerous goods are carried on the weather deck, in open ro-ro spaces and vehicle spaces, and in cargo spaces as appropriate.

(MSC.1/Circ.1275)

These extinguishers are in addition to any portable fire extinguishers required elsewhere in the rules.

Guidance note:

Equivalent to dry powder may be either CO₂ or Foam. 1 kg of dry powder is equal to either 1 kg CO₂ or 1.8 litre Foam.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

B 900 Insulation of machinery space boundaries and separation of cargo spaces

901 Bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to “A-60” standard, unless the dangerous goods are stowed at least 3 m horizontally away from such bulkheads.

(SOLAS Reg II-2/19 3.8)

Guidance note:

Machinery spaces of category A are those spaces and trunks to such spaces which contain:

- 1) internal combustion machinery used for main propulsion; or
- 2) internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of no less than 375 kW; or
- 3) any oil-fired boiler or oil fuel unit.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

902 Decks between cargo spaces and machinery spaces of category A shall be of “A-60” standard.

In the case that a closed or semi-closed cargo space is located partly above a machinery space of category A and the deck is not insulated to “A-60” standard, dangerous goods are prohibited in the whole of that cargo space. If the un-insulated deck above such machinery space is a weather deck, dangerous goods are prohibited only for the portion of the deck located above the machinery space.

903 In ship having ro-ro cargo spaces, a separation shall be provided between a closed ro-ro cargo space and an adjacent open ro-ro cargo space. The separation to be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, such separation need not be provided if the ro-ro cargo space is considered to be a closed cargo space over its entire length and shall fully comply with the relevant special requirements of the regulation.

(SOLAS Reg. II-2/19.3.10.1)

904 In ship having ro-ro cargo spaces, a separation to be provided between a closed ro-ro cargo space and the adjacent weather deck. The separation to be such as to minimize the passage of dangerous vapours and liquids between such spaces.

Alternatively, a separation need not be provided if the arrangement of the closed ro-ro cargo spaces is in accordance with those required for the dangerous goods carried on the adjacent weather deck.

(SOLAS Reg. II-2/19.3.10.2)

B 1000 Self unloading systems for solid bulk cargoes

1001 Types of self unloading systems:

Closed: The part of the system located outside the cargo hold is fully enclosed, e.g. pneumatic systems or fully enclosed chain conveyors.

Open: Open type systems, e.g. belt conveyors and bucket conveyors.

1002 For some cargoes the use of self unloading systems are not permitted due to hazards involved. For other cargoes only closed systems are permitted. Restrictions on use of self unloading systems are shown in Table D1.

1003 Enclosed spaces containing self unloading systems shall be provided with a water flushing system enabling easy cleaning/removal of dust deposits.

1004 Self unloading systems of the open type shall be arranged for emergency stop from convenient locations within the cargo handling spaces and on open deck.

1005 Spaces outside cargo holds containing self unloading systems shall be fitted with mechanical ventilation giving at least 6 air changes per hour.

1006 Conveyor belts shall be made from materials not liable to accumulate static electricity.

B 1100 Special requirements

1101 *Gas measuring instruments*

When transporting a bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, the ship shall be provided with gas measuring instruments as follows:

- a) Instruments for measuring hydrogen gas or methane gas (0-100% LEL).
- b) Instruments for measuring toxic gases that may be given off from the particular cargo.
- c) Instruments for measuring oxygen concentration (0-21% by volume).

(SOLAS Reg. VI/3.1)

The instruments may be portable or fixed.

In case portable gas measuring instruments are provided, suitable sampling connections enabling the checking of atmosphere in holds and cargo handling spaces without need of entry, shall be arranged.

(IMSBC Code, App. 6)

Guidance note:

Sampling points for cargo holds should be located as high as possible, e.g. upper part of hatch coaming. In order to ensure safe access in adverse weather conditions, two sampling points per hold should be provided, preferably one on each side. Fore and aft location may also be accepted if this is deemed more advantageous.

Sampling openings must be fitted with means of closure, e.g. threaded plug or cap, ball valve or similar. Appendix 6 of the IMSBC Code gives guidance on arrangements and procedures for gas sampling.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

1102 *Temperature detection in cargo holds*

Cargo holds shall be fitted with arrangements for detecting temperatures in the cargo.

The temperature sensors shall be either permanently fitted or of portable type. If portable sensors are used the arrangement shall enable measurement of the temperature of the cargo without entry of the hold being necessary.

1103 *Inerting of cargo holds*

Cargo holds shall be provided with arrangements for maintaining an inert atmosphere in the loaded hold. Oxygen content is not to exceed 5% by volume. The arrangement is to enable purging of the space above the cargo with inert gas.

1104 *Separation of cargo holds from oil tanks*

Cargo holds are not to have top wing tanks, deep tanks, hopper tanks and/or side tanks intended for fuel oil and/or lubricating oil located adjacently.

Guidance note:

Double bottom tanks containing fuel oil and/or lubricating oil, which do not exceed the height of the inner bottom, may be located adjacent to the cargo holds.

---e-n-d---of---G-u-i-d-a-n-c-e---n-o-t-e---

1105 *Separation of cargo from heated surfaces*

Heated oil tanks; double bottom tanks, top wing tanks, deep tanks, hopper tanks, side tanks, etc., adjacent to cargo holds, shall be fitted with permanent temperature indicators or provided with a suitable arrangement for using portable indicators. Temperature limits as specified in the IMSBC Code shall not be exceeded.

1106 *Tightness testing of oil tanks prior to loading*

Before loading oil tanks adjacent to the cargo hold shall be hydrostatically tested for tightness.

1107 *Acidity of bilge water*

Means for testing acidity of water in bilge wells of cargo holds shall be provided.

1108 *Procedures for gas monitoring of coal cargoes*

Sampling points for gas monitoring of coal cargoes shall be arranged in the hatch comings. See the IMSBC Code, App. 6.

C. Minimum Requirements for Cargo Spaces Intended for Packaged Goods

C 100 General

101 The minimum requirements are given in Tables C1 to C5, which give reference to the relevant paragraphs in sub-section B.

102 In the case of ships dedicated to transport of goods in special packaging, e.g. ship borne barges, carriage requirements may be specified upon special considerations in particular cases.

103 For packaged goods in Class 6.2 and Class 7 there are no specific requirements to ships' design or equipment in SOLAS Reg. II-2/19.

Refer to SOLAS Ch. VII, the IMDG Code and the INF Code when applicable.

| Table C1 Weather deck cargo spaces | | | | |
|---|----------------------------|---------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | |
| 1.1 – 1.6 | B101 B102 | | B703 | B902 ³⁾ |
| 1.4S | B101 B102 | | B703 | |
| 2.1 | B101 B102 | | B700 | B902 |
| 2.2 | B101 B102 | | B700 | B902 |
| 2.3 Flammable | B101 B102 | | B700 | B902 |
| 2.3 non-Flammable | B101 B102 | | B700 | B902 |
| 3 FP ¹⁾ < 23°C | B101 B102 | B800 | B700 | B902 |
| 3 FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B800 | B700 | B902 |
| 4.1 | B101 B102 | B800 | B700 | B902 |
| 4.2 | B101 B102 | B800 | B700 | B902 |
| 4.3 Liquids | B101 B102 | B800 | B700 | B902 |
| 4.3 Solids | B101 B102 | B800 | B700 | B902 |
| 5.1 | B101 B102 | B800 | B700 | B902 ³⁾ |
| 5.2 | B101 B102 | | B700 | |
| 6.1 Liquids FP ¹⁾ < 23°C | B101 B102 | B800 | B700 | B902 |

| | | | | |
|--|--------------|------|--------------------|------|
| 6.1 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B800 | B700 | B902 |
| 6.1 Liquids FP ¹⁾ > 60°C | B101 B102 | | B700 | |
| 6.1 Solids | B101 B102 | | B700 | |
| 8 Liquids FP ¹⁾ < 23°C | B101 B102 | B800 | B700 | B902 |
| 8 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B800 | B700 | B902 |
| 8 Liquids FP ¹⁾ > 60°C | B101 B102 | | B700 | |
| 8 Solids | B101 B102 | | B700 | |
| 9 | B101 | | B700 ²⁾ | |
| 1) FP means Flashpoint. 2) As appropriate to the goods being carried. 3) Refer to the International Maritime Dangerous Goods (IMDG) Code for special stowing requirements. | | | | |

| Table C2 General cargo spaces | | | | | | | | |
|--|----------------------------|---------------------------|---------------------------------|-----------------------|-------------------------------|--------------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | | | | | |
| 1.1 – 1.6 | B101 B102 B103 | B201 | B300 | B400 | | | B703 | B901 ⁸⁾ |
| 1.4S | B101 B102 | B201 | | B400 | | | B703 | |
| 2.1 | B101 B102 | B201 | B300 | B400 | B502 B504b B506 B507 | | B700 | B901 |
| 2.2 | B101 B102 | B201 | | B400 | | | B700 | B901 |
| 2.3 Flammable ²⁾ | B101 B102 | B201 | B300 | | | | B700 | B901 |
| 2.3 non-Flammable | B101 B102 | B201 | | B400 | B502 B504b | | B700 | B901 |
| 3 FP ¹⁾ < 23°C | B101 B102 | B201 B800 | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B901 |
| 3 FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 B800 | | B400 | | | B700 | B901 |
| 4.1 | B101 B102 | B201 B800 | | B400 | B502 ⁵⁾ B504b | | B700 | B901 |
| 4.2 | B101 B102 | B201 B800 | | B400 | B502 ⁵⁾ B504b | | B700 | B901 |
| 4.3 Liquids ³⁾ | B101 B102 | B201 B800 | | B400 | B502 B504b | | B700 | B901 |
| 4.3 Solids | B101 B102 | B201 B800 | | B400 | B502 B504b | | B700 | B901 |
| 5.1 | B101 B102 | B201 B800 | | B400 | B502 ⁵⁾ B504b | | B700 | B901 ⁸⁾ |
| 5.2 ⁴⁾ | | | | | | | | |
| 6.1 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 B800 | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B901 |
| 6.1 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 B800 | | B400 | B502 B504b | B600 | B700 | B901 |

| Table C2 General cargo spaces (Continued) | | | | | | | | |
|--|----------------------------|---------------------------|---------------------------------|-----------------------|---|--------------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | | | | | |
| 6.1 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 | | B400 | | B600 | B700 | |
| 6.1 Solids | B101 B102 | B201 | | B400 | B502 ⁵⁾ B504b | | B700 | |
| 8 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 B800 | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B901 |
| 8 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 B800 | | B400 | B502 B504b | B600 ⁶⁾ | B700 | B901 |
| 8 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 | | B400 | | B600 ⁶⁾ | B700 | |
| 8 Solids | B101 B102 | B201 | | B400 | | | B700 | |
| 9 | B101 | B201 | B300 ⁹⁾ | | B502 ⁵⁾ B504b B506 ⁹⁾ B507 ⁹⁾ | | B700 ⁷⁾ | |
| <p>1) FP means Flashpoint.</p> <p>2) Under the provisions of the IMDG Code, stowage of Class 2.3 having a subsidiary risk Class 2.1 under deck is prohibited.</p> <p>3) Under the provisions of the IMDG Code, stowage of Class 4.3 Liquids having a Flashpoint less than 23°C under deck is prohibited.</p> <p>4) Under the provisions of the IMDG Code, stowage of Class 5.2 under deck is prohibited.</p> <p>5) When “mechanically-ventilated spaces” are required by the IMDG Code.</p> <p>6) Only applicable to dangerous goods having a subsidiary risk Class 6.1</p> <p>7) As appropriate for the goods being carried.</p> <p>8) Refer to the International Maritime Dangerous Goods (IMDG) Code for special stowing requirements.</p> <p>9) Only applicable to dangerous goods listed in the IMDG Code which evolves flammable vapour.</p> | | | | | | | | |

| Table C3 Container cargo spaces | | | | | | | | |
|--|----------------------------|---------------------------|---------------------------------|-----------------------|--|--------------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | | | | | |
| 1.1 – 1.6 | B101 B102 B103 | B201 | B300 | B400 | | | B703 | B902 ⁸⁾ |
| 1.4S | B101 B102 | B201 | | B400 | | | B703 | |
| 2.1 | B101 B102 | B201 | B300 | B400 | B502 B504b ¹⁰⁾ B506 B507 | | B700 | B902 |
| 2.2 | B101 B102 | B201 | | B400 | | | B700 | B902 |
| 2.3 Flammable ²⁾ | B101 B102 | B201 | B300 | | | | B700 | B902 |
| 2.3 non-Flammable | B101 B102 | B201 | | B400 | B502 B504b ¹⁰⁾ | | B700 | B902 |
| 3 FP ¹⁾ < 23°C | B101 B102 | B201 | B300 | B400 | B502 B504b ¹⁰⁾ B506 B507 | B600 | B700 | B902 |
| 3 FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 | | B400 | | | B700 | B902 |
| 4.1 | B101 B102 | B201 | | B400 | B502 ⁵⁾ B504b ⁹⁾ | | B700 | B902 |
| 4.2 | B101 B102 | B201 | | B400 | B502 ⁵⁾ B504b ⁹⁾ | | B700 | B902 |
| 4.3 Liquids ³⁾ | B101 B102 | B201 | | B400 | B502 B504b ⁹⁾ | | B700 | B902 |
| 4.3 Solids | B101 B102 | B201 | | B400 | B502 B504b ⁹⁾ | | B700 | B902 |
| 5.1 | B101 B102 | B201 | | B400 | B502 ⁵⁾ B504b ⁹⁾ | | B700 | B902 ⁸⁾ |
| 5.2 ⁴⁾ | | | | | | | | |
| 6.1 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 | B300 | B400 | B502 B504b ¹⁰⁾ B506 B507 | B600 | B700 | B902 |

Table C3 Container cargo spaces (Continued)

| <i>Applicable requirements</i> <i>Class of dangerous goods</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
|---|----------------------------|---------------------------|---------------------------------|-----------------------|---|--------------------------------|----------------------------|------------------------------------|
| 6.1 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 | | B400 | B502 B504b ¹⁰⁾ | B600 | B700 | B902 |
| 6.1 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 | | B400 | | B600 | B700 | |
| 6.1 Solids | B101 B102 | B201 | | B400 | B502 ⁵⁾ B504b ¹⁰⁾ | | B700 | |
| 8 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 | B300 | B400 | B502 B504b ¹⁰⁾ B506 B507 | B600 | B700 | B902 |
| 8 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 | | B400 | B502 B504b ¹⁰⁾ | B600 ⁶⁾ | B700 | B902 |
| 8 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 | | B400 | | B600 ⁶⁾ | B700 | |
| 8 Solids | B101 B102 | B201 | | B400 | | | B700 | |
| 9 | B101 | B201 | B300 ¹¹⁾ | | B502 ⁵⁾ B504b B506 ¹¹⁾ B507 ¹¹⁾ | | B700 ⁷⁾ | |

- 1) FP means Flashpoint.
2) Under the provisions of the IMDG Code, stowage of Class 2.3 having a subsidiary risk Class 2.1 under deck is prohibited.
3) Under the provisions of the IMDG Code, stowage of Class 4.3 Liquids having a Flashpoint less than 23 degrees C under deck is prohibited.
4) Under the provisions of the IMDG Code, stowage of Class 5.2 under deck is prohibited.
5) When “mechanically-ventilated spaces” are required by the IMDG Code.
6) Only applicable to dangerous goods having a subsidiary risk Class 6.1
7) As appropriate to the goods being carried.
8) Refer to the International Maritime Dangerous Goods (IMDG) Code for special stowing requirements.
9) No ventilation required when carried in a closed freight container.
10) A ventilation rate of not less than 2 air changes per hour is sufficient when carried in a closed freight container.
11) Only applicable to dangerous goods listed in the IMDG Code which evolves flammable vapour.

| Table C4 Closed ro-ro cargo spaces | | | | | | | | |
|--|----------------------------|---------------------------|---------------------------------|-----------------------|-------------------------------|--------------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | | | | | |
| 1.1 – 1.6 | B101 B102 B103 | B201 ⁹⁾ | B300 | B400 | | | B703 | B900 ⁸⁾ |
| 1.4S | B101 B102 | B201 ⁹⁾ | | B400 | | | B703 | |
| 2.1 | B101 B102 | B201 ⁹⁾ | B300 | B400 | B502 B504b B506 B507 | | B700 | B900 |
| 2.2 | B101 B102 | B201 ⁹⁾ | | B400 | | | B700 | B900 |
| 2.3 Flammable ²⁾ | B101 B102 | B201 ⁹⁾ | B300 | | | | B700 | B900 |
| 2.3 non-Flammable | B101 B102 | B201 ⁹⁾ | | B400 | B502 B504b | | B700 | B900 |
| 3 FP ¹⁾ < 23°C | B101 B102 | B201 ⁹⁾ | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B900 |
| 3 FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 ⁹⁾ | | B400 | | | B700 | B900 |
| 4.1 | B101 B102 | B201 ⁹⁾ | | B400 | B502 ⁵⁾ B504b | | B700 | B900 |
| 4.2 | B101 B102 | B201 ⁹⁾ | | B400 | B502 ⁵⁾ B504b | | B700 | B900 |
| 4.3 Liquids ³⁾ | B101 B102 | B201 ⁹⁾ | | B400 | B502 B504b | | B700 | B900 |
| 4.3 Solids | B101 B102 | B201 ⁹⁾ | | B400 | B502 B504b | | B700 | B900 |
| 5.1 | B101 B102 | B201 ⁹⁾ | | B400 | B502 ⁵⁾ B504b | | B700 | B900 ⁸⁾ |
| 5.2 ⁴⁾ | | | | | | | | |
| 6.1 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 ⁹⁾ | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B900 |
| 6.1 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 ⁹⁾ | | B400 | B502 B504b | B600 | B700 | B900 |

Table C4 Closed ro-ro cargo spaces (Continued)

| <i>Applicable requirements</i> <i>Class of dangerous goods</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Fire detection</i> | <i>Ventilation</i> | <i>Separate bilge drainage</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
|---|----------------------------|---------------------------|---------------------------------|-----------------------|---|--------------------------------|----------------------------|------------------------------------|
| 6.1 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 ⁹⁾ | | B400 | | B600 | B700 | |
| 6.1 Solids | B101 B102 | B201 ⁹⁾ | | B400 | B502 ⁵⁾ B504b | | B700 | |
| 8 Liquids FP ¹⁾ < 23°C | B101 B102 | B201 ⁹⁾ | B300 | B400 | B502 B504b B506 B507 | B600 | B700 | B900 |
| 8 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B201 ⁹⁾ | | B400 | B502 B504b | B600 ⁶⁾ | B700 | B900 |
| 8 Liquids FP ¹⁾ > 60°C | B101 B102 | B201 ⁹⁾ | | B400 | | B600 ⁶⁾ | B700 | |
| 8 Solids | B101 B102 | B201 ⁹⁾ | | B400 | | | B700 | |
| 9 | B101 | B201 ⁹⁾ | B300 ¹⁰⁾ | | B502 ⁵⁾ B504b B506 ¹⁰⁾ B507 ¹⁰⁾ | | B700 ⁷⁾ | |

- 1) FP means Flashpoint.
- 2) Under the provisions of the IMDG Code, stowage of Class 2.3 having a subsidiary risk Class 2.1 under deck is prohibited.
- 3) Under the provisions of the IMDG Code, stowage of Class 4.3 Liquids having a Flashpoint less than 23 degrees C under deck is prohibited.
- 4) Under the provisions of the IMDG Code, stowage of Class 5.2 under deck is prohibited.
- 5) When “mechanically-ventilated spaces” are required by the IMDG Code.
- 6) Only applicable to dangerous goods having a subsidiary risk Class 6.1
- 7) As appropriate to the goods being carried.
- 8) Refer to the International Maritime Dangerous Goods (IMDG) Code for special stowing requirements.
- 9) For closed ro-ro cargo spaces not capable of being sealed, B202 applies in lieu of B201.
- 10) Only applicable to dangerous goods listed in the IMDG Code which evolves flammable vapour.

| Table C5 Open (Semi enclosed) ro-ro cargo spaces | | | | | |
|---|----------------------------|---------------------------|---------------------------------|----------------------------|------------------------------------|
| <i>Applicable requirements</i> | <i>Fire water supplies</i> | <i>Fire extinguishing</i> | <i>Electrical installations</i> | <i>Personal protection</i> | <i>Insulation of ER boundaries</i> |
| <i>Class of dangerous goods</i> | | | | | |
| 1.1 – 1.6 | B101 B102 B103 | B202 | B300 | B703 | B900 ⁶⁾ |
| 1.4S | B101 B102 | B202 | | B703 | |
| 2.1 | B101 B102 | B202 | B300 | B700 | B900 |
| 2.2 | B101 B102 | B202 | | B700 | B900 |
| 2.3 Flammable ²⁾ | B101 B102 | B202 | B300 | B700 | B900 |
| 2.3 non-Flammable | B101 B102 | B202 | | B700 | B900 |
| 3 FP ¹⁾ < 23°C | B101 B102 | B202 | B300 | B700 | B900 |
| 3 FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B202 | | B700 | B900 |
| 4.1 | B101 B102 | B202 | | B700 | B900 |
| 4.2 | B101 B102 | B202 | | B700 | B900 |
| 4.3 Liquids ³⁾ | B101 B102 | B202 | | B700 | B900 |
| 4.3 Solids | B101 B102 | B202 | | B700 | B900 |
| 5.1 | B101 B102 | B202 | | B700 | B900 ⁶⁾ |
| 5.2 ⁴⁾ | | | | | |
| 6.1 Liquids FP ¹⁾ < 23°C | B101 B102 | B202 | B300 | B700 | B900 |
| 6.1 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B202 | | B700 | B900 |
| 6.1 Liquids FP ¹⁾ > 60°C | B101 B102 | B202 | | B700 | |
| 6.1 Solids | B101 B102 | B202 | | B700 | |
| 8 Liquids FP ¹⁾ < 23°C | B101 B102 | B202 | B300 | B700 | B900 |
| 8 Liquids FP ¹⁾ ≥ 23°C and ≤ 60°C | B101 B102 | B202 | | B700 | B900 |
| 8 Liquids FP ¹⁾ > 60°C | B101 B102 | B202 | | B700 | |
| 8 Solids | B101 B102 | B202 | | B700 | |
| 9 | B101 | B202 | B300 ⁷⁾ | B700 ⁵⁾ | |
| <p>1) FP means Flashpoint. 2) Under the provisions of the IMDG Code, stowage of Class 2.3 having a subsidiary risk Class 2.1 under deck is prohibited. 3) Under the provisions of the IMDG Code, stowage of Class 4.3 Liquids having a Flashpoint less than 23 degrees C under deck is prohibited. 4) Under the provisions of the IMDG Code, stowage of Class 5.2 under deck is prohibited. 5) As appropriate to the goods being carried. 6) Refer to the International Maritime Dangerous Goods (IMDG) Code for special stowing requirements. 7) Only applicable to dangerous goods listed in the IMDG Code which evolve flammable vapour.</p> | | | | | |

D. Minimum Requirements for Cargo Spaces Intended for Solid Bulk Cargoes

D 100 General

101 The minimum requirements are given in Table D1 that gives reference to the relevant paragraphs of subsection B.

102 For solid bulk cargoes of hazard class “MHB” the requirements are not mandatory for statutory certification purposes.

| Table D1 Requirements for solid bulk cargoes | | | | | | | | | | | | | | | | |
|--|-------|-----------|-------------------|---------------------------|---|-------------|-----------|--------------------|-------------------------------|-----------------------|----------------------|--------------------------|---|-----------------------|--|----------------------------------|
| Cargo | UN no | IMO class | Fire water supply | Fire ext. in cargo spaces | Ingress protection | Temp. class | Gas group | Ex-protection Ex- | Vent. of cargo spaces | Separate bilge system | Personnel protection | Insulation of boundaries | Gas measuring equipment B1101 | Self unloading system | Fire ext. in spaces for self unloading systems | Special requirements |
| Aluminium ferrosilicon powder | 1395 | 4.3 | | B201 ³⁾ | | T2 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | | B702 B703 | B900 | Hydrogen Phosphine Arsine | | | |
| Aluminium nitrate | 1438 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Aluminium silicon powder, uncoated | 1398 | 4.3 | | B201 ³⁾ | | T2 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | | B702 B703 | B900 | Hydrogen Phosphine Arsine Silane | | | |
| Aluminium smelting by-products | 3170 | 4.3 | | B201 ³⁾ | | T2 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | B600 | B702 B703 | B900 | Hydrogen Ammonia Acetylene | | | |
| Ammonium nitrate | 1942 | 5.1 | B101 B102 | B201 ⁴⁾ | Electrical installations to be disconnected in accordance with B307 | | | | B505 B507 | | B700 | B900 | | Not permitted | | B1104 B1106 |
| Ammonium nitrate based fertilizers, Type A | 2067 | 5.1 | B101 B102 | B201 ⁴⁾ | Electrical installations to be disconnected in accordance with B307 | | | | B505 B507 | | B700 | B900 | | Not permitted | | B1105 |
| Ammonium nitrate based fertilizers, Type B | 2071 | 9 | B101 B102 | B201 ⁴⁾ | Electrical installations to be disconnected in accordance with B307 | | | | B505 B507 | | B700 | B900 | | Not permitted | | B1105 |
| Barium nitrate | 1446 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Brown coal (lignite) briquettes | | MHB | | B201 ³⁾ | IP54 | T4 | IIA | i, d, e, p, m or s | | | B703 | | Oxygen Methane CO | | B201 or B202 | B1102 B1105 B1107 B1108 |
| Calcium nitrate | 1454 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Castor beans | 2969 | 9 | B101 B102 | B201 | | | | | B505 | | B700 | | | Closed | B201 or B202 | |
| Charcoal | | MHB | | B201 | | | | | | | B703 | | Oxygen | | B201 or B202 | |
| Coal | | MHB | | B201 ³⁾ | IP54 | T4 | IIA | i, d, e, p, m or s | B505 B506 | | B703 | | Oxygen Methane CO | | B201 or B202 | B1102 B1105 B1107 B1108 |
| Copra (dry) | 1363 | 4.2 | B101 B102 | B201 | | | | | B505 | | B703 | B900 | Oxygen | | B201 or B202 | B1105 |

Table D1 Requirements for solid bulk cargoes (Continued)

| Cargo | UN no | IMO class | Fire water supply | Fire ext. in cargo spaces | Ingress protection | Temp. class | Gas group | Ex-protection Ex- | Vent. of cargo spaces | Separate bilge system | Personnel protection | Insulation of boundaries | Gas measuring equipment B1101 | Self unloading system | Fire ext. in spaces for self unloading systems | Special requirements |
|--|-------|-----------|-------------------|---------------------------|--------------------|-------------|-----------|--------------------|-------------------------------|-----------------------|----------------------|--------------------------|---|-----------------------|--|------------------------------|
| Direct reduced iron, (A) (briquettes, hot moulded) | | MHB | | B201 ³⁾ | | T2 | IIC | i, d, e, p, m or s | B505 B506 | | B703 | | Hydrogen Oxygen | | | |
| Direct reduced iron, (B) (lumps, pellets, cold moulded briquettes) | | MHB | | B201 | | T2 | IIC | i, d, e, p, m or s | | | B703 | | Hydrogen Oxygen | | | B1102 B1103 |
| Direct reduced iron, (C) (by-product, fines) | | MHB | | B201 | | T2 | IIC | i, d, e, p, m or s | | | B703 | | Hydrogen Oxygen | | | B1102 B1103 |
| Ferrophosphorus | | MHB | | B201 ³⁾ | | T1 | IIC | i, d, e, p, m or s | B502 B504b B506 B507 | | B702 B703 | | Hydrogen Phosphine | | | |
| Ferrosilicon, (30% - 90% Silicon) | 1408 | 4.3 | | B201 ³⁾ | | T1 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | B600 | B702 B703 | B900 | Hydrogen Phosphine Arsine | Closed | | |
| Ferrosilicon, (25% - 30% Silicon or > 90% Silicon) | | MHB | | B201 ³⁾ | | T1 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | B600 | B702 B703 | | Hydrogen Phosphine Arsine | Closed | | |
| Ferrous metal borings, shavings, turnings or cuttings | 2793 | 4.2 | B101 B102 | B201 | | | | | B505 | | B702 B703 | B900 | Oxygen | | | B1102 |
| Fishmeal (fish scrap), stabilized | 2216 | 9 | B101 B102 | B201 | | | | | B505 | | B702 B703 | | Oxygen | | B201 or B202 | B1102 B1105 ¹⁾ |
| Fluorspar | | MHB | | B201 ³⁾ | | | | | | | B703 | | | Closed | | |
| Iron oxide, spent or Iron sponge, spent UN 1376 | 1376 | 4.2 | B101 B102 | B201 | IP54 | T2 | IIA | i, d, e, p, m or s | B505 B506 | | B700 | B900 | Oxygen Hydrogen sulphide Sulphur dioxide Hydrogen cyanide Hydrogen | | | |
| Lead nitrate | 1469 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | Closed | | |
| Lime (unslaked) | | MHB | | B201 ³⁾ | | | | | | | B703 | | | Closed | | |
| Linted cotton seed | | MHB | | B201 | | | | | | | B702 B703 | | Oxygen | | | |

Table D1 Requirements for solid bulk cargoes (Continued)

| Cargo | UN no | IMO class | Fire water supply | Fire ext. in cargo spaces | Ingress protection | Temp. class | Gas group | Ex-protection Ex- | Vent. of cargo spaces | Separate bilge system | Personnel protection | Insulation of boundaries | Gas measuring equipment B1101 | Self unloading system | Fire ext. in spaces for self unloading systems | Special requirements |
|--|-------|-----------|-------------------|---------------------------|--------------------|-------------|-----------|-----------------------|-------------------------------------|-----------------------|----------------------|--------------------------|---------------------------------|-----------------------|--|----------------------|
| Magnesia (unslaked) | | MHB | | B201 ³⁾ | | | | | | | B703 | | | Closed | | |
| Magnesium nitrate | 1474 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Metal sulphide concentrates | | MHB | | B201 | | | | | | | B702 B703 | | Oxygen Hydrogen sulphide | Closed | | |
| Peat moss | | MHB | | B201 ³⁾ | | | | | B505 | | B703 | | Oxygen | | | |
| Petroleum coke, calcined or uncalcined | | MHB | | B201 ³⁾ | | | | | | | B700 | | | | | |
| Pitch prill | | MHB | | B201 ³⁾ | | | | | B505 | | B700 | | | Closed | | |
| Potassium nitrate | 1486 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Pyrites (calcined) | | MHB | | B201 ³⁾ | | | | | | | B703 | | | | | |
| Radioactive material, LSA-1 | 2912 | 7 | | B201 ³⁾ | | | | | | | B700 | | | Closed | | |
| Radioactive material, SCO-1 | 2913 | 7 | | B201 ³⁾ | | | | | | | B700 | | | Closed | | |
| Sawdust | | MHB | | B201 | | | | | B505 | | B703 | | Oxygen | | B201 | |
| Seed cake, cont. vegetable oils (a), mechanically expelled seeds | 1386 | 4.2 | B101 B102 | B201 | | | | | B505 | | B702 B703 | B900 | Oxygen | | B201 | B1102 B1105 |
| Seed cake, cont. vegetable oils (b), solvent extraction and expelled seeds | 1386 | 4.2 | B101 B102 | B201 | | T3 | IIA | i, d, e, p, m or s | B502 B504a B506 B508 | | B702 B703 | B900 | Oxygen | | B201 | B1102 B1105 |
| Seed cake, cont. vegetable oils (c), solvent extraction | 2217 | 4.2 | B101 B102 | B201 | | T3 | IIA | i, d, e, p, m or s | B502 B504a B506 B508 | | B702 B703 | B900 | Oxygen | | B201 | B1102 B1105 |
| Silicomanganese | | MHB | | B201 ³⁾ | | T1 | IIC | i, d, e, p, m or s | B504c ²⁾ B506 B507 | | B702 B703 | | Hydrogen Phosphine Arsine | | | |
| Sodium nitrate | 1498 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Sodium nitrate and Potassium nitrate mixture | 1499 | 5.1 | B101 B102 | B201 ⁴⁾ | | | | | B505 | | B700 | | | | | |
| Sulphur | 1350 | 4.1 | B101 B102 | B201 ³⁾ | IP54 | T4 | | | B505 B508 | | B702 B703 | B900 | | Not permitted | | |

Table D1 Requirements for solid bulk cargoes (Continued)

| <i>Cargo</i> | <i>UN no</i> | <i>IMO class</i> | <i>Fire water supply</i> | <i>Fire ext. in cargo spaces</i> | <i>Ingress protection</i> | <i>Temp. class</i> | <i>Gas group</i> | <i>Ex-protection Ex-</i> | <i>Vent. of cargo spaces</i> | <i>Separate bilge system</i> | <i>Personnel protection</i> | <i>Insulation of boundaries</i> | <i>Gas measuring equipment B1101</i> | <i>Self unloading system</i> | <i>Fire ext. in spaces for self unloading systems</i> | <i>Special requirements</i> |
|--------------|--------------|------------------|--------------------------|----------------------------------|---------------------------|--------------------|------------------|--------------------------|-------------------------------|------------------------------|-----------------------------|---------------------------------|--------------------------------------|------------------------------|---|-----------------------------|
| Tankage | | MHB | | B201 | | | | | | | B702 B703 | | | | B201 | B1102 |
| Vanadium ore | | MHB | | B201 ³⁾ | | | | | | | B702 B703 | | | Closed | | |
| Woodchips | | MHB | | B201 ³⁾ | | | | | | | B703 | | Oxygen | | | |
| Wood pellets | | MHB | | B201 | | | | | | | B703 | | Oxygen | | | |
| Zinc ashes | 1435 | 4.3 | | B201 ³⁾ | | T2 | IIC | i, d, e, p, m or s | B503 B504a B506 B507 | | B700 | B900 | Hydrogen | | | |

- 1) Maximum temperature to be 35°Celsius.
- 2) At least 1 air change per hour to be provided.
- 3) Ref. Table 1 in the Annex to MSC/Circ.1146: Solid bulk cargoes categorized into Group B in the IMSBC Code for which a fixed gas fire-extinguishing system may be exempted by the flag state.
- 4) Ref. Table 2 in the annex to MSC/Circ.1146: Solid bulk cargoes categorized into Group B in the IMSBC Code for which a fixed gas fire-extinguishing system is ineffective and for which a fire-extinguishing system giving equivalent protection shall be available. Acc. to the Annex in MSC/Circ.1120 water supplies, as defined in B 102, is considered as an acceptable system giving equivalent protection. Another system giving equivalent protection is a fixed water spray system giving at least 5 l/m² pr. min. evenly dispersed.