

**PART II RULES FOR THE CONSTRUCTION
AND CLASSIFICATION OF SHIPS ACCORDING
TO THEIR MISSION**

TITLE 104 CARRIAGE OF DANGEROUS GOODS

SECTION 3 EQUIPMENT

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CHAPTER A APPLICATION

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A1. APPLICATION

A1. APPLICATION

100. Scope

101. The rules herein are additional to those of Part II, Title 11, Section 3, and are applicable for the carriage of dangerous goods as described in Part II, Title 104, Section 1, Chapter A.

102. This Section does not cover dangerous goods in bulk, which are covered by the relevant IMO Codes: IGC Code, IBC Code and IMBSC Code for liquefied gases in bulk, chemical products in bulk and solid cargoes in bulk, respectively.

200. Purpose

201. The purpose of this Title is to provide additional safety measures related to the carriage of dangerous goods. For this purpose, the following operational requirements are to be complied with:

- a. Protection against fire systems are to be fitted to protect the vessel against the hazards associated to the carriage of dangerous goods;
- b. The dangerous goods are to be adequately distant from any fire source;
- c. Personnel and material protection is to be fitted to be on board. Adequate for the hazards associated with the carriage of dangerous goods.

CHAPTER B DOCUMENTS, REGULATIONS AND STANDARDS

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B1. DOCUMENTS TO BE SUBMITTED TO RBNA

B2. REGULATIONS

B3. TECHNICAL STANDARDS – See Title 11

B1. DOCUMENTS TO BE SUBMITTED TO RBNA

100. Documents for reference – See Title 11

200. Documents for approval

201. In all documents relating to the carriage of dangerous goods in solid form in bulk by sea, the bulk cargo shipping name of the goods shall be used (trade names alone shall not be used). Each ship carrying dangerous goods in solid form in bulk shall have a special list or manifest setting forth the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.

300. Documents for construction – See Title 11

B2. REGULATIONS

100. National Maritime Authority regulations

101. These Rules encompass the compliance with the regulations of NORMAM 01, Chapter 5, Section 1.

200. Other regulations

201. The present Rules are based on international regulations as applicable. By agreement, RBNA may certify conformity with other applicable regulations.

300. International regulations

301. The IMO conventions, codes and resolutions as applicable:

IMDG “International Maritime Code for Dangerous Goods”: - International code regulating the packaging, transportation and precautions of dangerous goods.

IMSBC Code – International Maritime Solid Bulk Cargoes Code – international code regulating the transportation of solid dangerous goods by sea

SOLAS, Chapter II-2, Regulation 19, “Carriage of dangerous goods”

SOLAS, Chapter VI, Part A, “General provisions”

SOLAS, Chapter VII, Part A, “Carriage of dangerous goods in packaged form”

IMO MSC/Circ.608/Rev.1, “Interim Guidelines for Open Top Containerships”

IACS UI SC 109, 110 and 111, “Open top container holds – Water supplies – Ventilation – Bilge pumping”

**CHAPTER E
FIRE FIGHTING PREVENTION, AND DETECTION
FOR CARRIAGE OF DANGEROUS GOODS ON
BOARD SHIPS**

CHAPTER CONTENTS

- E1. GENERAL REQUIREMENTS APPLICABLE FOR VARIOUS CLASSES OF DANGEROUS GOODS
- E2. SEPARATION OF THE RO-RO COMPARTMENTS
- E3. CARRIAGE OF DANGEROUS GOODS IN SOLID BULK FORM
- E5. REQUIREMENTS FOR ELECTRICAL EQUIPMENT APPLICABLE TO VARIOUS CLASSES OF DANGEROUS GOODS
- E7. REQUIREMENTS FOR ELECTRICAL EQUIPMENT APPLICABLE TO DANGEROUS GOODS IN PACKAGE FORM
- E8. REQUIREMENTS FOR ELECTRICAL EQUIPMENT APPLICABLE TO DANGEROUS GOODS IN SOLID BULK FORM

**E1. GENERAL REQUIREMENTS APPLICABLE FOR VARIOUS CLASSES OF DANGEROUS GOODS
[SOLAS II-2/19.3 and Table 19.1]**

100. Water supply

101. Unless otherwise specified, the following requirements shall govern the application of Table T.E1.101.1, T.E1.101.2 and T.E3.103.1 to both "on-deck" and "under-deck" stowage of dangerous goods where the

numbers of following items are indicated in the first column of the tables. Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

102. The quantity of water delivered shall be capable of supplying four nozzles simultaneously capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Society.

103. Means shall be provided for effectively cooling the designated under-deck cargo space by at least 5 l/min per square meter of the horizontal area of cargo spaces, either by a fixed arrangement of spraying nozzles or by flooding the cargo space with water. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Society. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces.

104. Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in E1.103. A high expansion foam system is acceptable unless cargoes react dangerously with water (see the IMO “International Maritime Dangerous Goods Code”).

105. The total required capacity of the water supply shall satisfy the requirements of E1.102 and E1.103, if applicable, simultaneously calculated for the largest designed cargo space. The capacity requirements of E1.102 shall be met by the total capacity of the main fire pump(s), not including the capacity of the emergency fire pump, if fitted. If a drencher system is used to satisfy the requirements of E1.103, the drencher pump shall also be taken into account in this total capacity calculation. (SOLAS Reg. II-2/19.3.1)

200. Sources of ignition

201. Electrical equipment and wiring shall not be fitted in enclosed cargo spaces or vehicle spaces unless it is essential for operational purposes in the opinion of the Society.

202. However, if electrical equipment is fitted in such spaces, it shall be of a certified safe type for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system (e.g. by removal of links in the system, other than fuses).

203. Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact.

104. Any other equipment which may constitute a source of ignition of flammable vapour shall not be permitted. (SOLAS Reg. II-2/19.3.2)

300. Detection system

301. The cargo spaces are to be equipped with an approved fixed fire detection and alarm system.

302. If a cargo space or the weather deck is intended for the carriage of class 1 goods it is recommended to monitor adjacent cargo spaces, with the exception of open ro-ro spaces, by a fixed fire detection and alarm system.

303. Ro-ro spaces shall be fitted with a fixed fire detection and fire alarm system. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of the IMO Fire Safety Systems Code.

304. If a sample extraction smoke detection system is fitted, particular attention shall be given to item 2.1.3 of Chapter 10 of IMO Fire Safety Systems Code in order to prevent the leakage of toxic fumes into occupied areas. (SOLAS Reg. II-2/19.3.3)

400. Ventilation of cargo spaces

401. Ventilation arrangements: Adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space, based on an empty cargo space, and for removal of vapours from the upper or lower parts of the cargo space, as appropriate. (SOLAS Reg. II-2/19.3.4.1) The fans are to be permanently fitted or of a portable type adapted for being permanently fitted prior to loading and unloading the cargo.

402. The fans shall be such as to avoid the possibility of ignition of flammable gas air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings. (SOLAS Reg. II-2/19.3.4.1).

Guidance

IACS Interpretation UI SC52

Exhaust fans are to be of non-sparking type in accordance with IACS Requirement F 29, as revised. The purpose of "suitable wire mesh guards" is to prevent foreign objects from entering into the fan casing. The standard wire mesh guards are to have a size of 13 mm x 13 mm. (MSC/Circ. 1120)

RBNA Rules Safety of fans

a. Electric motors of fans must be located outside the ventilation ducts.

b. Following materials or combination of materials for impeller/housing may be used:

- non-metallic materials 2 (plastic material having sufficient electric conductivity) with each other or with steel (incl. galvanized, stainless)

- non-ferrous materials having good heat conductivity (bronze, brass, copper, not aluminium) with each other or with steel (incl. galvanized, stainless)
- steel (incl. galvanized, stainless) with each other if a ring of adequate size made of above nonmetallic/non-ferrous material is fitted in way of the impeller, or if a safety clearance of at least 13 mm is provided
- aluminium or magnesium alloys with each other or with steel (incl. galvanized, stainless) only, if a non-ferrous ring having a good heat conductivity, i.e. copper, brass, of adequate size is fitted in way of the impeller

End of guideline

403. Natural ventilation shall be provided in enclosed cargo spaces intended for the carriage of solid dangerous goods in bulk, where there is no provision for mechanical ventilation. (SOLAS Reg. II-2/19.3.4.3)

404. Continuous ventilation:

- a. Ventilation means exchange of air from outside to inside a cargo space. .
- b. Continuous Ventilation means ventilation that is operating at all times. (IMSBC Code Reg. 1.7.29.1)
- c. Ventilation openings shall be provided in holds intended for the carriage of cargoes that require continuous ventilation. Such openings shall comply with the requirements of the Load Line Convention as amended for openings not fitted with means of closure. (IMSBC Code Reg. 3.5.4)

Guideline

The requirements for continuous ventilation apply to the following cargoes:

- ALUMINIUM FERROSILICON POWDER UN 1395
- ALUMINIUM SILICON POWDER, UNCOATED UN 1398
- ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BYPRODUCTS UN 3170
- FERROPHOSPHORUS (including BRIQUETTES)
- FERROSILICON (25% ≤ Silicon ≤ 30% or ≥ 90% Silicon)
- FERROSILICON UN 1408 (30% ≤ Silicon < 90%) ZINC
- ASHES UN 1435

End of guideline

405. IACS Interpretation UI SC89

- a. *If adjacent spaces are not separated from cargo spaces by gastight bulkheads or decks then they are considered as part of the enclosed cargo space and the ventilation requirements shall apply to the adjacent space as for the enclosed cargo space itself.*
- b. *Where the IMSBC Code requires:*
- *2 fans per hold, a common ventilation system with 2 fans connected is acceptable.*
 - *continuous ventilation, this does not prohibit ventilators from being fitted with a means of closure as required for fire protection purposes under SOLAS II-2/5.2.1.1 provided the minimum height to the ventilator opening is to be in accordance with ICLL/19.3 (4.5m for Position 1 and 2.3m for Position 2)*

406. Fan capacity

- a. Cargo holds are to be provided with a minimum of two ventilation fans, giving a minimum of 6 air charges per hour, based on the volume of the empty hold;
- b. Cargo holds are to be provided with a minimum of one ventilation fan, giving a minimum of 6 air charges 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 charges per hour, based on the volume of the empty hold.

407. Additional requirements for ventilation

- a. Spark arresting screens: All ventilation openings on deck are to be fitted with suitable spark arresting screens. (SOLAS Regulation II-2/19.3.4.2 and IACS UI 52)
- b. Escaping gases: The ventilation outlets shall be arranged at least 3 m away from openings in living quarters, under deck or machinery spaces.

500. Bilge pumping – additional requirements

501. Where it is intended to carry flammable or toxic liquids in enclosed cargo spaces, the bilge pumping system shall be designed to protect against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces. These means shall be to the satisfaction of the Society.

502. If the bilge drainage system 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 common,

the capacity need not exceed 25 m³/h. The additional bilge system need not be arranged with redundancy.

503. Whenever flammable liquids with flashpoint less than 23°C 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 outside the machinery space or at the point of exit from the machinery space located close to the bulkhead.

504. 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. Electrical equipment in the space is to be in accordance with Part II, Title 104, Section 7, Chapter D. If the space has access from another enclosed space, the door shall be self-closing.

505. If gravity drainage is applied to the bilge drainage of cargo spaces, the drainage shall be either led directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with a vent pipe to a safe location on the open deck. Drainage from a cargo space into bilge wells in a lower space is only permitted if that space satisfies the same requirements as the cargo space above. (SOLAS Reg. II-2/19.3.5)

600. Personnel protection

601. Four sets of full protective clothing, resistant to chemical attack, shall be provided in addition to the fire-fighter's outfits required by SOLAS, chapter II-2, regulation 10.10 and shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the Organization according to the class and physical state. The protective clothing shall cover all skin, so that no part of the body is unprotected.

602. At least two self-contained breathing apparatuses additional to those required by SOLAS, chapter II-2, regulation 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 suitably 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)

700. Portable fire extinguishers

701. Portable fire extinguishers having a capacity of at least 12 kg of dry chemical powder or equivalent are to be fitted in the cargo compartments. Such portable fire extinguishers are to be additional to those required in other places, in this Title. (SOLAS Reg. II-2/19.3.7)

800. Insulation of machinery space boundaries

801. The boundary bulkheads between the cargo compartments and machinery spaces category "A" are to

be insulated with a class “A-60” standard, except where the dangerous goods are stowed in such a way as to be 3.00 meters distant, horizontally, from those bulkheads.

802. Stowage above machinery space of category “A” is not permitted in any case.

900. Fixed fire extinguishing system

901. 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 provision of the IMO Fire Safety Systems Code or with a fire-extinguishing system which, in the opinion of the Society, gives equivalent protection for the cargoes carried. (SOLAS Reg. II-2/19.3.13)

902. 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 sufficient for providing at least 5 liters/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)

E2. SEPARATION OF THE RO-RO COMPARTMENTS

100. Separation of the ro-ro compartments

101. A separation, suitable to minimise the passage of dangerous vapours and liquids, is to be provided between a closed ro-ro space and an adjacent open ro-ro space. Where such separation is not provided the ro-ro space is considered to be a closed ro-ro space over its entire length and the special requirements for closed ro-ro spaces apply.

102. A separation, suitable to minimise the passage of dangerous vapours and liquids, is to be provided between a closed ro-ro space and an adjacent weather deck. Where such separation is not provided the arrangements of the closed ro-ro space are to be in accordance with those required for the dangerous goods carried on the adjacent weather deck. (SOLAS Reg. II-2/19.3.10)

TABLE T.E1.101.1 : APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SHIPS AND IN THE CARGO COMPARTMENTS (SOLAS Chapter 19, Table 19.1)

Requirements of Subchapter E1	Requirement A1.200.b						
	Weather decks a) to e) inclusive	a)	b)	c)		d)	e)
		Not specifically designed	Container cargo spaces	Closed ro-ro spaces (5)	Open ro-ro spaces	Solid dangerous goods in bulk	Shipborne barges
E1.101	X	X	X	X	X	For application of requirements to different classes of dangerous goods, see Table T.E3.103.1	X
E1.102	X	X	X	X	X		-
E1.103	-	X	X	X	X		X
E1.104	-	X	X	X	X		X
E1.200	-	X	X	X	X		X ⁽⁴⁾
E1.300	-	X	X	X	-		X ⁽⁴⁾
E1.401	-	X	X ⁽¹⁾	X	-		X ⁽⁴⁾
E1.402	-	X	X ⁽²⁾	X	-		X ⁽⁴⁾
E1.500	-	X	X	X	-		-
E1.601	X	X	X	X	X		-
E1.602	X	X	X	X	X		-
E1.700	X	X	-	-	X		-
E1.800	X	X	X ⁽²⁾	X	X		-
E1.900	-	-	-	X ⁽³⁾	X		-
E2.101	-	-	-	X	-		-
E2.102	-	-	-	X	-		-

x : Where “x” appears in the Table, it means that this requirement is applicable to all classes of dangerous goods as given in the appropriate line of Table T.E1.101.2 except as indicated by the following notes.

(1) For classes 4 and 5.1 solids, not applicable to closed freight containers. For classes 2, 3, 6.1 and 8 when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. For classes 4 and 5.1 liquids when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. For the purpose of this requirement, a portable tank is a closed freight container.

(2) Applicable to decks only.

(3) Applies only to closed ro-ro spaces, not capable of being sealed.

(4) In the special case where the barges are capable of containing flammable vapours or, alternatively, if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Society.

(5) Special category spaces shall be treated as closed ro-ro spaces when dangerous goods are carried.

TABLE T.E1.101.2 : APPLICATION OF THE REQUIREMENTS APPLICABLE TO DIFFERENT MODES OF CARRIAGE, EXCEPT FOR DANGEROUS GOODS IN SOLID BULK (SOLAS Chapter 19, Table 19.3)

Class/Rule	1.1 to 1.6	1.4S	2.1	2.2	2.3 flammable	2.3 non flammable 3 FP < 23 °C ¹⁵	3 FP ≤ 23 FP ≤ 60 °C	4.1	4.2	4.3 liquids	4.3 solids	5.1	5.2	6.1 liquids FP < 23°C	6.1 liquids FP ≤ 23 FP ≤ 60 °	6.1 liquids	6.1 solids	8 liquids FP < 23°C	8liquids FP ≤ 23 FP ≤ 60 °	8 liquids	8 solids	9	
See notes					20	15	15			21			16	15	15			15	15				
E1.101	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E1.102	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
E1.103	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E1.104	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E1.200	X	-	X	-	X	-	X	-	-	X ¹⁸	-	-	-	X	-	-	-	X	-	-	-	-	X ¹⁷
E1.300	X	X	X	X	-	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	-
E1.401	-	-	X	-	-	X	X	-	-	X ¹¹	X ¹¹	X	X	X ¹¹	-	X	X	-	X ¹¹	X	X	-	X ¹¹
E1.402	-	-	X	-	-	-	X	-	-	-	-	-	-	X	X	-	-	X	X	-	-	-	X ¹⁷
E1.500	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	X	-	X	-	X ¹⁹	-	-	-
E1.600	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ¹⁴
E1.700	-	-	-	-	-	-	X	X	X	X	X	-	-	X	X	-	-	X	X	-	-	-	-
E1.800	X ¹²	-	X	X	X	X	X	X	X	X	X	X ¹¹	X	X	X	-	-	X	X	-	-	-	-
E1.900	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E2.101	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E2.102	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

(11) When "mechanically-ventilated spaces" are required by the IMDG Code.
 (12) Stow 3 m horizontally away from the machinery space boundaries in all cases.
 (13) Refer to the IMDG Code.
 (14) As appropriate for the goods to be carried.
 (15) FP means flashpoint.
 (16) Under the provisions of the IMDG Code, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.
 (17) Only applicable to dangerous goods evolving flammable vapour listed in the IMDG Code.
 (18) Only applicable to dangerous goods having a flashpoint < 23°C listed in the IMDG Code.
 (19) Only applicable to dangerous goods having a subsidiary risk class 6.1.
 (20) Under the provisions of the IMDG Code, stowage of class 2.3 having subsidiary risk class 2.1 under deck or in enclosed ro-ro spaces is prohibited.
 (21) Under the provisions of the IMDG Code, stowage of class 4.3 liquids having a flashpoint < 23°C under deck or in enclosed ro-ro spaces is prohibited

E3. CARRIAGE OF DANGEROUS GOODS IN SOLID BULK FORM

100. Special requirements for the carriage of dangerous goods in solid bulk form

101. **Solid bulk cargo** - is any cargo, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition, which is covered by the IMDG Code and is loaded directly into the cargo spaces of a ship without any intermediate form of containment and includes such materials loaded on a barge-carrying ship. IMSBC Code, Chapter VII, Part A-1, Regulation 7.

102. This Subchapter E3 contains additional requirements for the carriage of dangerous cargoes in bulk form, for ships with GT > 500.

103. The carriage of dangerous goods in solid bulk form are to be in compliance with the IMO Code IMSBC, SOLAS Chapter VI parts A and B, SOLAS Chapter VII Part A-1 and the requirements of the present Title. Table T.E3.103.1 is the application of the prescription of the carriage of dangerous goods in bulk for ships and cargo compartments carrying dangerous goods in solid bulk form.

TABLE T.E3.103.1 : APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SOLID BULK FORM IN SHIPS AND IN THE CARGO COMPARTMENTS (SOLAS Chapter 19, Table 19.2)

Class	4.1	4.2	4.3 ⁽⁶⁾	5.1	6.1	8	9
E1.101	X	X	-	X	-	-	X
E1.102	X	X	-	X	-	-	X
E1.200	X	X ⁷	X	X ⁸	-	-	X ⁸
E1.401	-	X ⁷	X	-	-	-	-
E1.402	X ⁹	X ⁷	X	X ^{7,9}	-	-	X ^{7,9}
E1.403	X	X	X	X	X	X	X
E1.600	X	X	X	X	X	X	X
E1.800	X	X	X	X ⁷	-	-	X ¹⁰

6 The hazards of the substances of this class are such that the Society must give special consideration to the construction and to the equipment of the involved ship, besides complying with the requirements shown in this Table.

7 Applicable only to seed paste containing solvent extracts, for ammonia nitrate and for ammonia nitrate fertilizers

8 Only applicable to ammonia nitrate and to the ammonia nitrate fertilizers. However, a degree of protection in accordance with the 60079 Standards of the IEC is sufficient.

9 If it is adequate when wire screen meshes are required

10 The requirements of the IMO Code IMSBC – International Maritime Bulk Cargo are sufficient.

Additional note: Class MHB (Materials Hazardous only in Bulk) – materials which may possess, chemical hazards when transported in bulk other than materials classified as dangerous goods in the IMDG Code.

200. Cargo Group

201. Cargo Group:

Group A

Consists of cargoes which may liquefy if shipped at a moisture content in excess of their transportable moisture limit.

Group B

Consists of cargoes which possess a chemical hazard which could give rise to a dangerous situation on a ship.

Group C

Consists of cargoes which are neither liable to liquefy (Group A) nor to possess chemical hazards (Group B).

IMO IMSBC Code, Chapter 7, Part A-1.

300. Fire extinguishing system for solid bulk cargoes

301. All cargo holds of the following ships are to be equipped with a fixed CO₂ fire-extinguishing system complying with the provisions of Part II, Title 11, Section 6:

- a. Ships intended for the carriage of dangerous goods in solid form in compliance with SOLAS, Chapter II-2, Regulation 19
- b. Ships of 2000 GT and above intended for the carriage of cargoes of class MHB and cargoes of Group A and C

Note: For ships of less than 500 GT the requirement may be dispensed with subject to acceptance by the Society.

302. A ship may be exempted from the requirement of a fixed gas fire-extinguishing system if constructed and solely intended for the carriage of cargoes as specified in MSC.1/Circ.1395. Such exemption may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

303. For cargoes according to MSC.1/Circ.1395, Table 2 a fire-extinguishing system giving equivalent protection is to be provided.

Guidance

Abstract from IMO MSC.1/Circ. 1395

The purpose of this circular is to provide guidance to Administrations. It should not, however, be considered as

precluding Administrations from their right to grant exemptions for cargoes not included in table 1 or to impose any conditions when granting such exemptions under the provisions of SOLAS regulation II-2/10.7.1.4. This circular supersedes MSC/Circ.1146.

**ANNEX
TABLE 1**

LIST OF SOLID BULK CARGOES FOR WHICH A FIXED GAS FIRE-EXTINGUISHING SYSTEM MAY BE EXEMPTED

1 Cargoes including, but not limited to, those listed in regulation II-2/10:

- Ore
- Coal (COAL and BROWN COAL BRIQUETTES)
- Grain
- Unseasoned timber

2 Cargoes listed in the International Maritime Solid Bulk Cargoes (IMSBC) Code, which are not combustible or constitute a low fire risk, as follows:

- .1 all cargoes not categorized into Group B in the IMSBC Code; and
- .2 the following cargoes categorized into Group B in the IMSBC Code:

- ALUMINIUM SMELTING BY-PRODUCTS, UN 3170 (Both the names ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS are in use as proper shipping name)
- ALUMINIUM FERROSILICON POWDER, UN 1395
- ALUMINIUM SILICON POWDER, UNCOATED, UN 1398
- CALCINED PYRITES (Pyritic ash)
- CLINKER ASH, WET COAL TAR PITCH
- DIRECT REDUCED IRON (A) Briquettes, hot moulded
- FERROPHOSPHORUS (including briquettes)
- FERROSILICON, with more than 30% but less than 90% silicon, UN 1408
- FERROSILICON, with 25% to 30% silicon, or 90% or more silicon
- FLUORSPAR (calcium fluoride)
- GRANULATED NICKEL MATTE (LESS THAN 2% MOISTURE CONTENT)
- LIME (UNSLAKED)
- LOGS
- MAGNESIA (UNSLAKED)
- PEAT MOSS
- PETROLEUM COKE *
- * When loaded and transported under the provisions of the IMSBC Code.
- PITCH PRILL
- PULP WOOD
- RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY MATERIAL (LSA-I), UN 2912 (non fissile or fissile – excepted)
- RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECT(S) (SCO-I or SCO-II), UN 2913 (non fissile or fissile – excepted)
- ROUNDWOOD
- SAW LOGS
- SILICOMANGANESE

- SULPHUR, UN 1350
- TIMBER
- VANADIUM ORE
- WOODCHIPS, with moisture content of 15% or more
- ZINC ASHES, UN 1435

3 Solid bulk cargoes which are not listed in the IMSBC Code, provided that:

- .1 they are assessed in accordance with section 1.3 of the Code;
- .2 they do not present hazards of Group B as defined in the Code; and
- .3 a certificate has been provided by the competent authority of the port of loading to the master in accordance with 1.3.2 of the Code.

TABLE 2

LIST OF SOLID BULK CARGOES FOR WHICH A FIXED GAS FIRE-EXTINGUISHING SYSTEM IS INEFFECTIVE AND FOR WHICH A FIRE-EXTINGUISHING SYSTEM GIVING EQUIVALENT PROTECTION SHALL BE AVAILABLE

The following cargoes categorized into Group B of the IMSBC Code:

- ALUMINIUM NITRATE, UN 1438
- AMMONIUM NITRATE, UN 1942 (with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance)
- AMMONIUM NITRATE BASED FERTILIZER, UN 2067
- AMMONIUM NITRATE BASED FERTILIZER, UN 2071
- BARIUM NITRATE, UN 1446
- CALCIUM NITRATE, UN 1454
- LEAD NITRATE, UN 1469
- MAGNESIUM NITRATE, UN 1474
- POTASSIUM NITRATE, UN 1486
- SODIUM NITRATE, UN 1498
- SODIUM NITRATE AND POTASSIUM NITRATE, MIXTURE, UN 1499

End of guidance

400. Gas measuring instruments

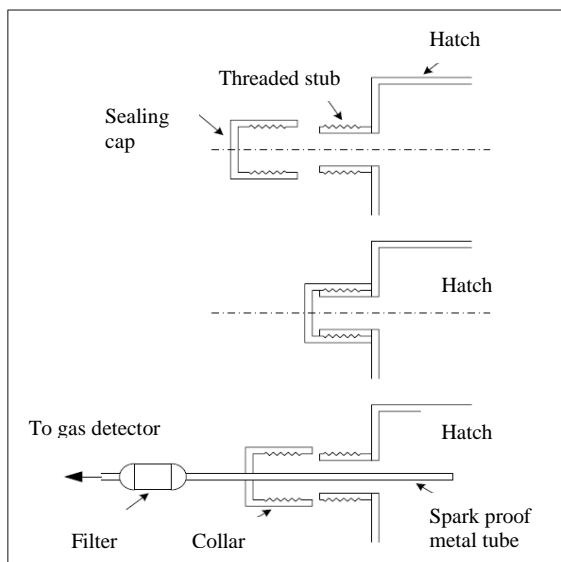
401. When transporting a bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, the ship shall be provided with gas measuring instruments as follows:

- 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)

402. 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.

403. Sampling openings are to be fitted with adequate means of closure (threaded plug, ball valve or similar).

FIGURE F.E3.403.1 – DIAGRAM OF A GAS SAMPLING POINT



500. Use of pesticides on board

501. Adequate precautions are to be taken regarding the use of pesticides on board, in particular with fumigation. SOLAS VI/4

600. Temperature measurement

601. There shall be means for measuring the temperature inside the cargo and the surface temperature of the cargo, either by means of fixed or portable sensors.

602. In case portable sensors are fitted the arrangement shall enable the measurement without entering the hold.

700. Separation of cargo holds from oil tanks

701. 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 adjacently.

702. Double bottom oil tanks where the oil level does not exceed the double bottom height may be located adjacent to the cargo holds.

800. Other special requirements

801. Additional requirements for boundaries

a. *Gas tightness:* All boundaries between the cargo hold and the machinery space are to be gastight.

Cable penetrations are not permitted. Prior to loading, the bulkheads to the engine room shall be inspected and approved by the competent Authority as gastight

b. *Other boundaries :*All boundaries of the cargo holds shall be resistant to fire and passage of water (at least A-0 standard).

802. *Gas sampling points:* Two sampling points per cargo hold shall be arranged in the hatch cover or hatch coaming, provided with threaded stubs and sealing caps. The sampling points shall be located as high as possible, e.g. upper part of hatch. Appendix 6 of the IMO IMSBC Code gives guidance on arrangements and procedures for gas sampling.

803. *Weather tightness:* Hatch covers, closures for all ventilators and other closures for openings leading to the cargo holds shall be inspected and tested (hose testing or equivalent) to ensure weather tightness.

804. *Fuel tanks: Tightness:* Prior to loading, fuel tanks adjacent to the cargo holds shall be pressure-tested for tightness.

805. *Fuel tanks: Sources of heat:*

a. Stowage adjacent to sources of heat, including fuel tanks which may require heating is not permitted.

b. Stowage adjacent to sources of heat and to fuel tanks heated to more than 55 °C is not permitted.

This requirement is considered to be met if the fuel oil temperature is controlled at less than 55 °C. This temperature shall not exceed for periods greater than 12 hours in any 24-hour period and the maximum temperature reached shall not exceed 65 °C.

c. Stowage adjacent to sources of heat and to fuel tanks heated to more than 50 °C is not permitted.

806. *Acidity of bilge water:* Means for testing acidity of water in bilge wells of cargo holds shall be provided.

807. *Procedures for monitoring of coal cargoes:* Sampling points for gas monitoring of coal cargoes shall be arranged in hatch coamings, as per IMO IMSBC Code Appendix 6.

808. *No smoking signs:* ‘NO SMOKING’ signs shall be posted in the vicinity of cargo holds and in areas adjacent to cargo holds.

900. Minimum requirements for cargo spaces intended for solid bulk cargoes

901. General

902. The minimum requirements are given in Table E1.900.1 that gives reference to the relevant paragraphs of subchapter E1.

TABLE E1.900.1 REQUIREMENTS FOR SOLID BULK CARGOES

Bulk Cargo Shipping Name (BCSN)	UN Number	Class	Fire extinguishing system E3.300	Water supplies E.1.100	Sources of ignition E1.200 Gas group and temp. class Ingress protection (IP) "Ex" protection	Temperature measurement E3.600	Gas detection E1.300	Acidity of bilge water E3.806	Ventilation E1.400	Bilge pumping E1.500	Personnel protection E1.600	No smoking signs E3.808	Machinery space boundaries E1.800	Other boundaries E3.801.b	Gas sampling points E3.802	Weather-tightness E3.803	Fuel tanks E3.804
ALLUMINIUM FERROSILICON POWDER	1395	4.3	E3.302		E1.200 IIC, T2 Ex i,d,e,p,m,q		E1.300 Hydrogen Phosphine Arsine		E1.404 E1.406a E1.407b	E1.402	E1.600	E1.908	E1.800				
ALUMINIUM NITRATE	1438	5.1	E3.303	E1.100					E1.403		E1.600		E1.800				
ALUMINIUM SILICON POWDER UNCOATED	1398	4.3	E3.302		E1.200 IIC, T2 Ex i,d,e,p,m,q		E1.300 Hydrogen Phosphine Arsine Silane		E1.404 E1.406a E1.407b	E1.402	E1.600						
ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	3170	4.3	E3.302		E1.200 IIC, T2 Ex i,d,e,p,m,q		Hydrogen Ammonia Acetylene		E1.404 E1.406a E1.407b	E1.402	E1.600	E1.908	E1.800				
AMMONIUM NITRATE	1942	5.1	E3.303	E1.100	E1.200 Section 7, D2.702	E3.600			E1.402 E1.407b		E1.600	E1.908	E1.800			E3803	E3.804
AMMONIUM NITRATE BASED FERTILIZER	2067	5.1	E3.303	E1.100	E1.200 Section 7, D2.702	E3.600			E1.402 E1.403		E1.600	E1.908	E1.800			E3.803	E3.804
AMMONIUM NITRATE BASED FERTILIZER	2071	9	E3.303	E1.100	E1.200 Section 7, D2.702	E3.600			E1.402 E1.403		E1.600	E1.908	E1.800			E3.803	E3.804
BARIUM NITRATE	1446	5.1	E3.303						E1.403		E1.600						
BROWN COAL BRIQUETTES		MHB	E3.302		E1.200 IP54 IIA, T4 Ex i,d,e,p,m,q	E3.600	Oxygen Methane CO	E3.806			E1.600						
CALCIUM NITRATE	1454	5.1	E3.303	E1.100					E1.403		E1.600						
CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or	2969	9	E3.301	E1.100	E1.200 IP54 IIA, T4				E1.403		E1.600						

Bulk Cargo Shipping Name (BCSN)	UN Number	Class	Fire extinguishing system E3.300	Water supplies E.1.100	Sources of ignition E1.200 Gas group and temp. class Ingress protection (IP) “Ex” protection	Temperature measurement E3.600	Gas detection E1.300	Acidity of bilge water E3.806	Ventilation E1.400	Bilge pumping E1.500	Personnel protection E1.600	No smoking signs E3.808	Machinery space boundaries E1.800	Other boundaries E3.801.b	Gas sampling points E3.802	Weathertightness E3.803	Fuel tanks E3.804
CASTOR FLAKE					Exi,d,e,p,m, q												
CHARCOAL		MH B	E3. 301				E1.300 Oxygen				E1.60 0						
COAL		MH B	E3. 302		E1.200 IP54 IIA, T4 Ex i,d,e,p,m,q	E3. 600	E1.300 Oxygen Methane CO	E3. 806.	E1.403 E1.407b		E1.60 0	E3.80 8		E3.80 1	E3.90 2		E3.90 4
COPRA (dry)	136 3	4.2	E3. 301	E1. 100			E1.300 Oxygen		E1.401 E1.402 E1.403		E1.60 0	E3.80 8	E1.80 0				E3.80 4
DIRECT REDUCED IRON (A) Briquettes, hot molded		MH B	E3. 302		E1.200 IIC, T2 Exi,d,e,p,m, q	E3. 600	E1.300 Hydroge n Oxygen		E1.403 E1.407b		E1.60 0	E3.80 8		E1.80 1		E3.80 3	
DIRECT REDUCED IRON (B) lumps, pellets, cold-moulded briquettes		MH B	E3. 302		E1.200 IIC, T2 Exi,d,e,p,m, q	E3. 600	E1.300 Hydroge n Oxygen				E1.60 0	E3.80 8		E1.80 1		E3.80 3	
DIRECT REDUCED IRON (C) by-products fines ⁽¹⁾			E3. 302		E1.200 IIC, T2 Exi,d,e,p,m, q	E3. 600	E1.300 Hydroge n Oxygen				E1.60 0	E3.80 8		E1.80 1		E3.80 3	
FERROPHOSPHOROUS		MH B	E3. 302		E1.200 IIC, T1 Exi,d,e,p,m, q		E1.300 Hydroge n Phosphin e		E1.401 E1.402 E1.406b E1.407b	E1.50 0	E1.60 0	E3.80 8	E1.80 0				
FERROSILICON (30%-90% Silicon)	140 8	4.3	E3. 302		E1.200 IIC, T1 Exi,d,e,p,m, q		E1.300 Hydroge n Phosphin e Arsine				E1.60 0		E1.80 0				
FERROSILICON (25%030% Silicon) or (>90% Silicon)		MH B	E3. 302		E1.200 IIC, T1 Exi,d,e,p,m, q		E1.300 Hydroge n Phosphin e Arsine		E1.404 E1.406a E1.407b E1.402		E1.60 0		E1.80 0				

Bulk Cargo Shipping Name (BCSN)	UN Number	Class	Fire extinguishing system E3.300	Water supplies E.1.100	Sources of ignition E1.200 Gas group and temp. class Ingress protection (IP) “Ex” protection	Temperature measurement E3.600	Gas detection E1.300	Acidity of bilge water E3.806	Ventilation E1.400	Bilge pumping E1.500	Personnel protection E1.600	No smoking signs E3.808	Machinery space boundaries E1.800	Other boundaries E3.801.b	Gas sampling points E3.802	Weathertightness E3.803	Fuel tanks E3.804
FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS	2973	4.2	E3.301	E1.100		E3.600	E1.300 Oxygen		E1.403		E1.600	E3.808	E1.800				
FISHMEAL (FISHSCRAP), STABILIZED	2216	9	E3.301	E1.100		E3.600	E1.300 Oxygen		E1.403		E1.600						
FLUORSPAR		MHB	E3.302								E1.600						
IRON OXIDE, SPENT or IRON SPONGE, SPENT	1376	4.2	E3.301	E1.100	E1.200 IP54 IIA, T2 Exi,d,e,p,m, q		E1.300 Oxygen Hydrogen sulphide Sulphur dioxide Hydrogen cyanide Hydrogen		E1.403 E1.407b		E1.600	E3.808	E1.800				
LEAD NITRATE	1469	5.1	E3.303	E1.100					E1.403		E1.600						
LIME (UNSLAKED)		MHB	E3.302								E1.600						
LINTED COTTON SEED		MHB	E3.301				E1.300 Oxygen				E1.600					E3.803	
MAGNESIA (UNSLAKED)		MHB	E3.302								E1.600						
MAGNESIUM NITRATE	1474	5.1	E3.303	E1.100					E1.403		E1.600						
METAL SULPHIDE CNCENTRATES		MHB	E3.301				E1.300 Oxygen Hydrogen sulphide				E1.600						
PEAT MOSS		MHB	E3.302				E1.300 Oxygen		E1.403		E1.600						
PETROLEUM COKE (calcined or uncalcined)		MHB	E3.302								E1.600						
PITCH PRILL		MHB	E3.302						E1.403		E1.600						E3.804

Bulk Cargo Shipping Name (BCSN)	UN Number	Class	Fire extinguishing system E3.300	Water supplies E.1.100	Sources of ignition E1.200 Gas group and temp. class Ingress protection (IP) “Ex” protection	Temperature measurement E3.600	Gas detection E1.300	Acidity of bilge water E3.806	Ventilation E1.400	Bilge pumping E1.500	Personnel protection E1.600	No smoking signs E3.808	Machinery space boundaries E1.800	Other boundaries E3.801.b	Gas sampling points E3.802	Weathertightness E3.803	Fuel tanks E3.804
POTASSIUM NITRATE	1486	5.1	E3.303	E1.100					E1.403		E1.600						
PYRITES, CALCINED		MH B	E3.302								E1.600						
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1)	2912	7	E3.302								E1.600						
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I)	2913	7	E3.302								E1.600						
SAWDUST		MH B	E3.301				E1.300 Oxygen		E1.403								
SEED CAKE, containing vegetable oil	1386 (a)	4.2	E3.301	E1.100		E3.600	E1.300 Oxygen		E1.403		E1.600	E3.808	E1.800				
SEED CAKE, containing vegetable oil	1386 (b)	4.2	E3.301	E1.100	E1.200 IP54 IIA, T3 Ex i,d,e,p,m,q	E3.600	E1.300 Oxygen		E1.401 E1.406a E1.407b E1.407a		E1.600	E1.808	E1.800			E3.803	
SEED CAKE	2217	4.2	E3.301	E1.100	E1.200 IIA, T3 Ex i,d,e,p,m,q	E3.600	E1.300 Oxygen		E1.401 E1.406a E1.407b E1.407a		E1.600	E1.808	E1.800				
SILICOMANGANESE		MH B	E3.302		E1.200 IIC, T1 Ex i,d,e,p,m		Hydrogen Phosphine Arsine		E1.402 E1.406c E1.407b	E1.500	E1.600	E1.808	E1.800			E3.803	
SODIUM NITRATE	1498	5.1	E3.303	E1.100					E1.403		E1.600						
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	1499	5.1	E3.303	E1.100					E1.403		E1.600						
SULPHUR	1350	4.1	E3.302	E1.100	T4 IP54				E1.403 E1.407a	E1.500	E1.600	E1.808	E1.800				
TANKAGE		MH B	E3.301			E3.600					E1.600						
VANADIUM ORE		MH B	E3.302								E1.600						
WOODCHIPS having a		MH	E3.				Oxygen				E1.600						

Bulk Cargo Shipping Name (BCSN)	UN Number	Class	Fire extinguishing system E3.300	Water supplies E.1.100	Sources of ignition E1.200 Gas group and temp. class Ingress protection (IP) “Ex” protection	Temperature measurement E3.600	Gas detection E1.300	Acidity of bilge water E3.806	Ventilation E1.400	Bilge pumping E1.500	Personnel protection E1.600	No smoking signs E3.808	Machinery space boundaries E1.800	Other boundaries E3.801.b	Gas sampling points E3.802	Weathertightness E3.803	Fuel tanks E3.804
moisture content of 15% or more		B	302								0						
WOOD PELLETS		MH B	E3. 301				Oxygen				E1.60 0						
WOOD PRODUCTS - General		MH B	E3. 302				Oxygen				E1.60 0						
ZINC ASHES	143 5	4.3	E3. 302		E1.200 IIC, T2 Ex i,d,e,p,m,q		Hydroge n		E1.402E1.40 4 E1.406a E1.407b	E1.50 0	E1.60 0	E1.80 8	E1.80 0				
(1) The additional requirements for DIRECT REDUCED IRON (B) and (C) are to be agreed upon with RBNA.																	

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