

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

TITLE 104 CARRIAGE OF DANGEROUS GOODS

SECTION 1 NAVAL ARCHITECTURE

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CHAPTER A APPLICATION

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- A2. DEFINITIONS
- A3. DANGEROUS GOODS CLASSIFICATION

A1. APPLICATION

100. Scope [SOLAS II-2/19.1 E 19.2 and IMSBC SECTION VI REGULATION 1]

101. This Title applies to the carriage of cargoes (except liquids in bulk, gases in bulk and those aspects of carriage covered by other chapters) which, owing to their particular hazards to ships or persons on board, may require special precautions in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage.

102. However, for cargo ships of less than 500 gross tonnage, the Society may take other effective measures to ensure the required safety for these ships if it considers that the sheltered nature and conditions of voyage are such as to render the application of any specific requirements of the present Title unreasonable or unnecessary. Such reduced requirements shall be recorded in the document of compliance referred to in IMO MSC/Circ. 1266.

103. It is assumed that the operational requirements of SOLAS Chapter VI, Part A, Chapter VII, Part A as well as those of the international Maritime Dangerous Goods Code, IMDG, or the ‘International Maritime Solid Bulk Cargoes Code’ IMSBC, as applicable are complied with.

104. Dangerous goods carried in packaged form on board supply vessels are subject to IMO Resolution A673(16) “Guidelines for the transport and handling of limited amounts of hazardous and noxious substances in bulk on offshore support vessels”, as amended.

105. The carriage of dangerous good in bulk for is forbidden unless where the requirements of this Title are complied with.

200. Cargoes listed in this Title

201. Typical cargoes currently shipped in bulk, together with advice on their properties and methods of handling, are given in the schedules for individual cargoes. However, these schedules are not exhaustive and the properties attributed to the cargoes are given only for guidance. Consequently, before loading, it is essential to obtain current valid information from the shipper on the physical and chemical properties of the cargoes presented for shipment.

300. Purpose

301. 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.

400. Ship types and cargo spaces for this Title

401. The following ship types and cargo spaces shall govern the application of the requirements of this Title:

- a. Ships and cargo spaces not specifically designed for the carriage of freight containers, but intended for the carriage of dangerous goods in packaged form, including goods in freight containers and portable tanks;
- b. Purpose-built containerships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;
- c. Ro-ro ships and Ro-ro spaces intended for the carriage of dangerous goods;
- d. Ships and cargo spaces intended for the carriage of solid dangerous goods in bulk, and ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

Note 1: A purpose-built container space is a cargo space fitted with cell guides for stowage and securing of containers.

Note 2: Ro-ro spaces include special category spaces and vehicle spaces.

Note 3: A Ro-ro space completely exposed to the weather from above and from at least two sides is considered as a weather deck.

500. Additional Class Notations and Certification

501. On request and after successful surveys, the vessels e in conformity with this Title will be assigned an additional class notation as follows:

DG – Ships intended for the carriage of dangerous goods

DG-P – in packaged form

DG B – in bulk form

502. The “Document of Compliance for the Carriage of Dangerous Goods” is issued according to NORMAM 06 Appendix 4.A.16 (SOLAS, Chapter II-2, Regulation 19.4) for vessels assigned the notation DB-P.

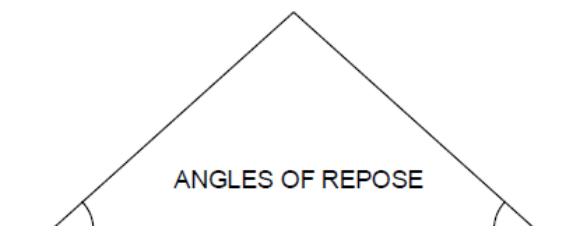
503. The “Document of Compliance for the Carriage of Solid Bulk Cargoes” is issued according to the IMSBC Code for vessels assigned the notation DB-B

A2. DEFINITIONS

100. Terms

101. The following terms are hereby employed, in addition to those employed in Title 11:

- a. *Angle of repose* means the maximum slope angle of non-cohesive (i.e., free-flowing) granular material. It is measured as the angle between a horizontal plane and the cone slope of such material.



- b. *Bulk Cargo Shipping Name (BCSN)* identifies a bulk cargo during transport by sea. When a cargo is listed in this Title, the Bulk Cargo Shipping Name of the cargo is identified by capital letters in the individual schedules or in the index. When the cargo is a dangerous good, as defined in the IMDG Code, as defined in regulation VII/1.1 of the SOLAS Convention, the Proper Shipping Name of that cargo is the Bulk Cargo Shipping Name.
- c. *Bulk density* means the weight of solids, air and water per unit volume. Bulk density is expressed in kilograms per cubic metre (kg/m³), in general. The void spaces in the cargo may be filled with air and water.
- d. *Cargo space* means any space in a ship designated for carriage of cargoes.
- e. *Cargoes which may liquefy* means cargoes which contain a certain proportion of fine particles and a certain amount of moisture. They may liquefy if shipped with a moisture content in excess of their transportable moisture limit.
- f. *Cohesive material* means materials other than non-cohesive materials.

- g. *Competent Authority* means any national regulatory body or authority designated or otherwise recognized as such for any purpose in connection with the IMO IMSBC Code.
- h. *Concentrates* means materials obtained from a natural ore by a process of enrichment or beneficiation by physical or chemical separation and removal of unwanted constituents.
- i. *Dangerous goods:* products which present flammability, corrosive and toxicity hazards as per UNO recommendations.
- j. *Dangerous goods in solid form in bulk* means any material, 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 in a barge on a barge-carrying ship.
- k. *Flow moisture point* means the percentage moisture content (wet mass basis) at which a flow state develops under the prescribed method of test in a representative sample of the material
- l. *Flow state* means a state occurring when a mass of granular material is saturated with liquid to an extent that, under the influence of prevailing external forces such as vibration, impaction or ships motion, it loses its internal shear strength and behaves as a liquid.
- m. *Group A* consists of cargoes which may liquefy if shipped at a moisture content in excess of their transportable moisture limit.
- n. *Group B* consists of cargoes which possess a chemical hazard which could give rise to a dangerous situation on a ship.
- o. *Group C* consists of cargoes which are neither liable to liquefy (Group A) nor to possess chemical hazards (Group B).
- p. *High-density solid bulk cargo* means a solid bulk cargo with a stowage factor of 0.56 m³/t or less.
- q. *IMSBC Code* - means the IMO International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.268(85), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I of the Code.

- r. *IMDG Code* means the IMO International Maritime Dangerous Goods (IMDG) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.122(75), as may be amended by the Organization.
- s. *Incompatible materials* means materials that may react dangerously when mixed. They are subject to the segregation requirements of subsection 9.3 of the IMO IMSBC Code and the schedules for individual cargoes classified in Group B.
- t. *Materials hazardous only in bulk (MHB)* means materials which may possess chemical hazards when carried in bulk other than materials classified as dangerous goods in the IMDG Code.
- u. *Moisture content* means that portion of a representative sample consisting of water, ice or other liquid expressed as a percentage of the total wet mass of that sample.
- v. *Moisture migration* means the movement of moisture contained in a cargo by settling and consolidation of the cargo due to vibration and ship's motion. Water is progressively displaced, which may result in some portions or all of the cargo developing a flow state.
- w. *Non-cohesive material* means dry materials that readily shift due to sliding during the transport, as listed in the IMO IMSBC Code appendix 3, paragraph 1, "Properties of dry bulk cargoes".
- x. *Solid bulk cargo* means any cargo, other than a liquid or a gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.
- y. *Stowage factor* means the figure which expresses the number of cubic metres which one tonne of cargo will occupy.
- z. *Transportable Moisture Limit (TML)* of a cargo which may liquefy means the maximum moisture content of the cargo which is considered safe for carriage in ships not complying with the special provisions of subsection 7.3.2 of the IMO IMSBC Code. It is determined by the test procedures, approved by a competent authority, such as those specified in the IMO IMSBC Code paragraph 1 of appendix 2.
- aa. *Trimming* means any leveling of a cargo within a cargo space, either partial or total.
- bb. *UNO identification number*: a numeric code attributed to dangerous goods according to UNO regulations.
- cc. *Ventilation* means exchange of air from outside to inside a cargo space:
- Continuous Ventilation means ventilation that is operating at all times.
- Mechanical Ventilation means power-generated ventilation.
- Natural Ventilation means ventilation that is not power-generated.
- Surface Ventilation means ventilation of the space above the cargo.

A3. DANGEROUS GOODS CLASSIFICATION

100. Dangerous goods classes

101. According to the IMO IMDG Code, the dangerous goods classes are as per table T.A1.101.1:

TABLE T.A1.101.1 - DANGEROUS GOODS AND ITS CLASSES COVERED BY THIS TITLE 104

Class	Product	General Description
1	Explosives	
1.1	Substances and articles which have a mass explosion hazard	
1.2	Substances and articles which have a projection hazard but not a mass explosion hazard	
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.	Comprises substances that: I) burn with substantial heat radiation, and II) burn sequentially, but without a projection or shock hazard..
1.4	Substances and articles which present no significant hazard. Class 1.4S - Explosives. Division 1.4, compatibility group S: Substances or articles so packaged or designed that any hazardous effects arising from 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 or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.	The effects are to be confined to the packing, without the projection of shreds to considerable distances. Any external fire must not cause any explosion.
1.5	Very insensitive substances and articles which have a mass explosion hazard.	The substances of this division have a mass explosion hazard but are so insensitive that, under normal conditions of transport, have little chance of initiating combustion or that its combustion will lead to a detonation. Note: It is likely that the combustion will initiate a detonation when the vessel is transporting large quantities of these substances. In such cases, it is considered as belonging to the Division 1.1 regarding the stowage.
1.6	Extremely insensitive articles which do not have a mass explosion hazard.	
2	Gases: compressed, dissolved under pressure or liquefied	
2.1	Flammable gases including hydrogen and hydrogen mixtures. Flammable gases with the exception of hydrogen and mixtures of hydrogen.	
2.2	Non-flammable , non-toxic gases.	
2.3	Class 2.3 flammable: toxic gases with a subsidiary risk class 2.1. Class 2.3 non-flammable: Toxic gases without a subsidiary risk class 2.1.	
3	Flammable liquids	
	Class 3 FP < 23 °C: Flammable liquids having a flashpoint below 23 °C according to the IMDG Code. Class 3 23 °C ≤ FP ≤ 60 °C: Flammable liquids having a flashpoint between 23 °C and 60 °C according to the IMDG Code.	
4	Flammable solids	
4.1	Flammable solids	The materials in this class are readily combustible solids and solids which may cause fire through friction
4.2	Substances liable to spontaneous combustion	The materials in this class are materials, other than pyrophoric materials, which, in contact with air without

Class	Product	General Description
		energy supply, are liable to self-heating
4.3	Class 4.3 liquids: liquids which, in contact with water, emit flammable gases. Class 4.3 solids: solids which, in contact with water, emit flammable gases.	The materials in this class are solids which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities
5	Oxidizing substances or organic peroxides	
5.1	Oxidizing substances (Agents)	The materials in this class are materials while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
5.2	Organic peroxides	Thermally unstable substances that can produce self-exothermic decomposition.
6	Toxic and infectious substances	
6.1	Class 6.1 liquids FP < 23 °C: toxic liquids having a flashpoint below 23 °C according to the IMDG Code. Class 6.1 liquids 23 °C ≤ FP ≤ 60 °C: toxic liquids having a flashpoint between 23 °C and 60 °C according to the IMDG Code. Class 6.1 liquids: toxic liquids having a flashpoint above 60 °C according to the IMDG Code. Class 6.1 solids: Toxic solids.	The materials in this class are materials liable either to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.
7	Radioactive material	
7	Radioactive material	The materials in this class are any materials containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.7.2.1 to 2.7.7.2.6 of the IMO IMDG Code.
8	Corrosive substances	
8	Class 8 liquids FP < 23 °C: corrosive liquids having a flashpoint below 23 °C according to the IMDG Code. Class 8 liquids 23 °C ≤ FP ≤ 60 °C: corrosive liquids having a flashpoint between 23 °C and 60 °C according to the IMDG Code. Class 8 liquids: corrosive liquids having a flashpoint above 60 °C according to the IMDG Code. Class 8 solids: corrosive solids.	The materials in this class are materials which, by chemical action, will cause severe damage when in contact with living tissue or will materially damage, or even destroy, other goods or the means of transport.
9	Miscellaneous dangerous substances	
9	Class 9 including goods evolving flammable vapour: miscellaneous dangerous substances and articles and environmentally hazardous substances including goods evolving flammable vapour. Class 9 except goods evolving flammable vapour: miscellaneous dangerous substances and articles and environmentally hazardous substances, which are not evolving flammable vapour.	The materials in this class are materials and articles which, during transport, present a danger not covered by other classes.
MHB	Materials hazardous only in bulk	Materials which possess chemical hazards when transported in bulk other than materials classified as dangerous goods in the IMDG Code.
Note The carriage of dangerous goods of classes 6.2 (infectious substances) and 7 (radioactive materials) is not covered by the Document of Compliance of Dangerous Goods. For the carriage of class 6.2 the IMDG Code and for the carriage of class 7 the IMDG Code and the INF Code are to be observed.		

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. The documents listed below are in addition to those required by Title 11, and are required for the assignment of the class notation DG:

- a. Hazardous area classification drawing
- b. Structural fire protection drawing
- c. Fire fighting plan
- d. Diagram of water fire fighting system
- e. Diagram of fixed fire fighting installations

202. For cargoes in bulk form (additional notation DG-B), the following plans are to be submitted in addition to those required by item B1.201 above:

- a. Diagram of fixed gas detection and alarm system
- b. Specification of cargoes
- c. Cargo temperature monitoring system (if required)

203. For cargoes in packaged form (additional notation DG-B), the following plans are to be submitted in addition to those required by item B1.201 above:

- a. Diagram of fixed gas detection and alarm system
- b. Diagram of fixed fire extinguishing system in vehicle (Ro-Ro-) spaces
- c. Specification of cargoes

300. Documents on board

301. 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.

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 and B, “General provisions” (deals with the carriage of solid bulk cargoes)

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

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 H LOADING CONDITIONS, BUOYANCY AND STABILITY

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- H1. LOAD LINE
– See Title 11
 - H2. SHIP LIGHT WEIGHT
– See Title 11
 - H3. LOADING CONDITIONS
– See Title 11
 - H4. BUOYANCY AND HULL SUBIVISION
– See Title 11
 - H5. STABILITY
-

H5. STABILITY

100. Loading and stowage of solid bulk cargoes

101. To avoid any undue loads on the ship's structure, the ship is to be fitted with a booklet, written in a language understood by the ship's Captain and Officers responsible for the cargo operations. In case such language is not English, the booklet is to be written also in the English language.

102. The booklet is to contain at least the following information:

- a. Stability data as prescribed in SOLAS Rule (-II-I5-1);
- b. Capacities and rates for ballasting and deballasting;
- c. Maximum allowable load per unit of area, of the upper plating of the tanks;
- d. Maximum allowable load per hold:
- e. General instructions about the loading and unloading as regards the ship's structures, including any existing restrictions present in the most unfavorable conditions met during the loading, unloading, ballasting and deballasting operations, and also during voyage;
- f. Any specific restriction, such as those present in the most unfavorable operational conditions found in the Administration or Society requirement; and.
- g. When strength calculations are required, the ship's hull maximum allowable loads and moments are to be included for the loading, unloading and voyage.