PART II RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF SHIPS IDENTIFIED BY THEIR MISSION

INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK, 2006, AS AMENDED

TITLE 34 LIQUEFIED GAS CARRIER

SECTION 1 NAVAL ARCHITECTURE

CHAPTERS

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PREAMBLE

The present Title 34 is a transcription of the **International Code for The Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, 1983, as amended 1990, 1992, 1994, 1996, 2006.**

The Code has been divided into Sections numbered according to the RBNA Rules (Part I, Title 01, Section 1, Chapter D), but the original item numbers of the Code have been maintained immediately to the side of the RBNA item numbers.

The correspondence between RBNA Chapters and Code Chapters is given below:

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	C			3.0		SHIP ARRANGEMENTS
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CHAPTER A (1)
GENERAL
For ships constructed from 1986-07-01

CHAPTER CONTENTS

Guidance

"Code" in this transcription has been substituted by "Rules".

End of guidance

A1. GENERAL

100. 1.1 Application

101. 1.1.1 The present Rules applies to ships regardless of their size, including those of less than 500 gross tonnage, engaged in carriage of liquefied gases having a vapour pressure exceeding 2.8 bar absolute at a temperature of 37.8°C, and other products as shown in Appendix 3 (chapter 19), when carried in bulk.

102. 1.1.2 Unless expressly provided otherwise, the Rules applies to ships the keels of which are laid or which are at a stage at which:

a. construction identifiable with the ship begins; and

b. assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is the less;

c. on or after 1 July 1998. Ships constructed before 1 July 1998 are to comply with resolution MSC.5(48) adopted on 17 June 1983.

103. 1.1.3 A ship, irrespective of the date of construction, which is converted to a gas carrier on or after 1 July 1998 should be treated as a gas carrier constructed on the date on which such conversion commences.

104. *Ship type required by certain products*

a. 1.1.4.1 When cargo tanks contain products for which the Code requires a type 1G ship, neither flammable liquids having a flashpoint of 60°C (closed cup test) or less nor flammable products listed in chapter 19 should be carried in tanks located within the protective zones described in 2.6.1.1.

b. 1.1.4.2 Similarly, when cargo tanks contain products for which the Code requires a type 2G/2PG ship, the above-mentioned flammable liquids should not be carried in tanks located within the protective zones described in B1.601.b (2.6.1.2).

c. 1.1.4.3 In each case the restriction applies to the protective zones within the longitudinal extent of the hold spaces for the cargo tanks loaded with products for which the Code requires a type 1G or 2G/2PG ship.

d. 1.1.4.4 The above-mentioned flammable liquids and products may be carried within these protective zones when the quantity retained in the cargo tanks of products for which the Code requires a type 1G or 2G/2PG ship is solely used for cooling, circulation or fuelling purposes.

105. 1.1.5 Except as provided in A1.107 (1.1.7.1) , when it is intended to carry products covered by this Code and products covered by the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee under the authority of the Assembly of the Organization conferred by resolution A.490(XII), as may be amended by the Organization (IBC Code), the ship should comply with the requirements of both Codes appropriate to the products carried.

106. 1.1.6 Where it is proposed to carry products which may be considered to come within the scope of the Code but are not at present designated in Annex 3 (chapter 19), the Administrations and the port Administrations involved in such carriage should establish preliminary suitable conditions of carriage based on the principles of the Code and notify the Organization of such conditions.

107. Precedence of the requirements of this Code

a. 1.1.7.1 The requirements of this Code should take precedence when a ship is designed and constructed for the carriage of the following products:

a.1. 1.1.7.1.1 those listed exclusively in Annex 3 (chapter 19) of this Code; and

a.2. 1.1.7.1.2 one or more of the products which are listed both in this Code and in the International Bulk Chemical Code. These products are marked with an asterisk (*) in column "a" in the table of Annex 3 (chapter 19).

b. 1.1.7.2 When a ship is intended exclusively to carry one or more of the products noted in A1.107.a.ii (1.1.7.1.2), the requirements of the International Bulk Chemical Code as amended should apply.

1.1.8 Compliance of the ship with the requirements of the International Gas Carrier Code should be shown in the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk provided for in A1.105 (1.5). Compliance with the amendments to the Code, as

appropriate, should also be indicated in the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk.

200. 1.2 Hazards

201. Hazards of gases considered in this Code include fire, toxicity, corrosivity, reactivity, low temperature and pressure.

300. 1.3 Definitions

Note Except where expressly provided otherwise, the following definitions apply to the Code. Additional definitions are given in Part II, Title 34, Section 6, A1 (chapter 4).

301. 1.3.1 "Accommodation spaces" are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, barber shops, pantries containing no cooking appliances and similar spaces. Public spaces are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

302. " **'A' class divisions**" means divisions as defined in SOLAS regulation II-2/3.2.

a. 1.3.3.1"**Administration**" means the Government of the State whose flag the ship is entitled to fly.

Guidance

In the RBNA transcription, the term "Administration" has been maintained when the requirement falls under the responsibility of the Government of the State whose flag the ship is entitled to fly.

Otherwise "Administration" means the RBNA.

End of guidance

b. 1.3.3.2 "**Port Administration**" means the appropriate authority of the country in the port of which the ship is loading or unloading.

c. 1.3.3.3 "**Anniversary date**" means the day and the month of each year which will correspond to the date of expiry of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk.

304. 1.3.4 "**Boiling point**" is the temperature at which a product exhibits a vapour pressure equal to the atmospheric pressure.

305. 1.3.5 "**Breadth (B)**" means the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material. The breadth (B) should be measured in metres.

306. 1.3.6 "**Cargo area**" is that part of the ship which contains the cargo containment system and cargo pump and compressor rooms and includes deck areas over the full length and breadth of the part of the ship over the above-mentioned spaces. Where fitted, the cofferdams, ballast or void spaces at the after end of the aftermost hold space or at the forward end of the forwardmost hold space are excluded from the cargo area.

307. 1.3.7 "**Cargo containment system**" is the arrangement for containment of cargo including, where fitted, a primary and secondary barrier, associated insulation and any intervening spaces, and adjacent structure if necessary for the support of these elements. If the secondary barrier is part of the hull structure it may be a boundary of the hold space.

308. 1.3.8 "**Cargo control room**" is a space used in the control of cargo handling operations and complying with the requirements of C1.400 (3.4).

309. 1.3.9 "**Cargoes**" are products listed in Annex 3 (chapter 19) carried in bulk by ships subject to the Code.

310. 1.3.10 "**Cargo service spaces**" are spaces within the cargo area used for workshops, lockers and store-rooms of more than 2 m² in area, used for cargo handling equipment.

311. 1.3.11 "**Cargo tank**" is the liquid-tight shell designed to be the primary container of the cargo and includes all such containers whether or not associated with insulation or secondary barriers or both.

312. 1.3.12 "**Cofferdam**" is the isolating space between two adjacent steel bulkheads or decks. This space may be a void space or a ballast space.

313. 1.3.13 "**Control stations**" are those spaces in which ships' radio or main navigating equipment or the emergency source of power is located or where the fire-recording or fire-control equipment is centralized. This does not include special fire-control equipment which can be most practically located in the cargo area.

314. 1.3.14 "**Flammable products**" are those identified by an "F" in column "f" in the table of Annex 3 (chapter 19).

315. 1.3.15 "**Flammability limits**" are the conditions defining the state of fuel-oxidant mixture at which application of an adequately strong external ignition source is only just capable of producing flammability in a given test apparatus.

316. 1.3.16 "**Gas carrier**" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in the table of Annex 3 (chapter 19).

317. 1.3.17 "**Gas-dangerous space or zone**" is:

a. a space in the cargo area which is not arranged or equipped in an approved manner to ensure that its atmosphere is at all times maintained in a gas-safe condition;

b. an enclosed space outside the cargo area through which any piping containing liquid or gaseous products passes, or within which such piping terminates, unless approved arrangements are installed to prevent any escape of product vapour into the atmosphere of that space;

c. a cargo containment system and cargo piping;

d. 4.1 a hold space where cargo is carried in a cargo containment system requiring a secondary barrier;

e. 4.2 a hold space where cargo is carried in a cargo containment system not requiring a secondary barrier;

f. 5 a space separated from a hold space described in .4.1 by a single gastight steel boundary;

g. 6 a cargo pump room and cargo compressor room;

h. 7 a zone on the open deck, or semi-enclosed space on the open deck, within 3 m of any cargo tank outlet, gas or vapour outlet, cargo pipe flange or cargo valve or of entrances and ventilation openings to cargo pump rooms and cargo compressor rooms;

i. 8 the open deck over the cargo area and 3 m forward and aft of the cargo area on the open deck up to a height of 2.4 m above the weather deck;

j. 9 a zone within 2.4 m of the outer surface of a cargo containment system where such surface is exposed to the weather;

k. 10 an enclosed or semi-enclosed space in which pipes containing products are located. A space which contains gas detection equipment complying with 13.6.5 and a space utilizing boil-off gas as fuel and complying with chapter 16 are not considered gas-dangerous spaces in this context;

l. 11 a compartment for cargo hoses; or .12 an enclosed or semi-enclosed space having a direct opening into any gas-dangerous space or zone.

318. 1.3.18 "**Gas-safe space**" is a space other than a gas-dangerous space.

319. 1.3.19 "**Hold space**" is the space enclosed by the ship' s structure in which a cargo containment system is situated.

320. 1.3.20 "**Independent**" means that a piping or venting system, for example, is in no way connected to another system and there are no provisions available for the potential connection to other systems.

321. 1.3.21 "**Insulation space**" is the space, which may or may not be an interbarrier space, occupied wholly or in part by insulation.

322. 1.3.22 "**Interbarrier space**" is the space between a primary and a secondary barrier, whether or not completely or partially occupied by insulation or other material.

323. 1.3.23 "**Length (L)**" means 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel, or the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with a rake of keel, the waterline on which this length is measured should be parallel to the designed waterline. The length (L) should be measured in metres.

324. 1.3.24 "**Machinery spaces of category A**" are those spaces and trunks to such spaces which contain:

a. internal combustion machinery used for main propulsion; or

b. internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

c. any oil-fired boiler or oil fuel unit.

325. 1.3.25 "**Machinery spaces**" are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces; and trunks to such spaces.

326. 1.3.26 "**MARVS**" is the maximum allowable relief valve setting of a cargo tank.

327. 1.3.27 "**Oil fuel unit**" is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 1.8 bar gauge.

328. 1.3.28 "**Organization**" is the International Maritime Organization (IMO).

329. 1.3.29 "**Permeability**" of a space means the ratio of the volume within that space which is assumed to be occupied by water to the total volume of that space.

330. 1.3.30.1 "**Primary barrier**" is the inner element designed to contain the cargo when the cargo containment system includes two boundaries.

331. 1.3.30.2 "**Secondary barrier**" is the liquid-resisting outer element of a cargo containment system designed to afford temporary containment of any envisaged leakage of liquid cargo through the primary barrier and to prevent the lowering of the temperature of the ship' s structure to an unsafe level. Types of secondary barrier are more fully defined in chapter 4.

332. 1.3.30.3 "**Recognized standards**" are applicable international or national standards acceptable to the RBNA or standards laid down and maintained by an organization which complies with the standards adopted by the Organization * and which is recognized by the Administration.

* *Refer to the Minimum Standards for Recognized Organizations Acting on Behalf of the Administration, set out in appendix 1 to the Guidelines for the Authorization of Organizations Acting on Behalf of the Administration, adopted by the Organization by resolution A.739(18).*

333. 1.3.31 "**Relative density**" is the ratio of the mass of a volume of a product to the mass of an equal volume of fresh water.

334. 1.3.32 "**Separate**" means that a cargo piping system or cargo vent system, for example, is not connected to another cargo piping or cargo vent system. This separation may be achieved by the use of design or operational methods. Operational methods should not be used within a cargo tank and should consist of one of the following types:

a. removing spool pieces or valves and blanking the pipe ends;

b. arrangement of two spectacle flanges in series with provisions for detecting leakage into the pipe between the two spectacle flanges.

335. 1.3.33 "**Service spaces**" are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces and similar spaces and trunks to such spaces.

336. 1.3.34 "**SOLAS**" means the International Convention for the Safety of Life at Sea, 1974, as amended.

337. 1.3.35 "**1983 SOLAS amendments**" means amendments to the 1974 SOLAS Convention adopted by the Maritime Safety Committee of the Organization at its forty-eighth session on 17 June 1983 by resolution MSC.6(48).

338. 1.3.36 "**Tank cover**" is the protective structure intended to protect the cargo containment system against damage where it protrudes through the weather deck or to ensure the continuity and integrity of the deck structure.

339. 1.3.37 "**Tank dome**" is the upward extension of a portion of a cargo tank. In the case of below-deck cargo containment systems the tank dome protrudes through the weather deck or through a tank cover.

340. 1.3.38 "**Toxic products**" are those identified by a "T" in column "f" in the table of Annex 3 (chapter 19).

341. 1.3.39 "**Vapour pressure**" is the equilibrium pressure of the saturated vapour above the liquid expressed in bars absolute at a specified temperature.

342. 1.3.40 "**Void space**" is an enclosed space in the cargo area external to a cargo containment system, other than a hold space, ballast space, fuel oil tank, cargo pump or compressor room, or any space in normal use by personnel.

400. 1.4 Equivalents

401. 1.4.1 Where the Rules requires that a particular fitting, material, appliance, apparatus, item of equipment or type thereof should be fitted or carried in a ship, or that any particular provision should be made, or any procedure or arrangement should be complied with, the RBNA may allow any other fitting, material, appliance, apparatus, item of equipment or type thereof to be fitted or carried, or any other provision, procedure or arrangement to be made in that ship, if it is satisfied by trial thereof or otherwise that such fitting, material, appliance, apparatus, item of equipment or type thereof or that any particular provision, procedure or arrangement is at least as effective as that required by the Rules. However, the RBNA may not allow operational methods or procedures to be made an alternative to a particular fitting, material, appliance, apparatus, item of equipment, or type thereof which is prescribed by the Code.

402. 1.4.2 When the RBNA so allows any fitting, material, appliance, apparatus, item of equipment, or type thereof, or provision, procedure or arrangement to be substituted, it should communicate to the Organization the particulars thereof together with a report on the evidence submitted, so that the Organization may circulate the same to other Contracting Governments to the 1974 SOLAS Convention for the information of their officers.

500. 1.5 Surveys and certification

501. 1.5.1 Survey procedure

a. 1.5.1.1 The survey of ships, so far as regards the enforcement of the provisions of the regulations and granting of exemptions therefrom, should be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

b. 1.5.1.2 The Administration nominating surveyors or recognizing organizations to conduct surveys should, as a minimum, empower any nominated surveyor or recognized organization to:

a.1. require repairs to a ship; and

a.2. carry out surveys if requested by the appropriate authorities of a port State. The Administration should notify the Organization of the specific responsibilities and conditions of the authority delegated to nominated surveyors or recognized organizations for circulation to the Contracting Governments.

c. 1.5.1.3 When a nominated surveyor or recognized organization determines that the condition of the ship or its equipment does not correspond substantially with the particulars of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk or is such that the ship is not fit to proceed to sea without danger to the ship, or persons on board, or without presenting unreasonable threat of harm to the marine environment, such surveyor or organization should immediately ensure that corrective action is taken and should in due course, notify the Administration. If such corrective action is not taken, the Certificate should be withdrawn and the Administration should be notified immediately; and, if the ship is in a port of another Contracting Government, the appropriate authorities of the port State should also be notified immediately. When an officer of the Administration, a nominated surveyor or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned should give such officer, surveyor or organization any necessary assistance to carry out their obligations under this paragraph. When applicable, the Government of the port State concerned should take such steps as will ensure that the ship does not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without danger to the ship or persons on board or without presenting an unreasonable threat of harm to the marine environment.

d. 1.5.1.4 In every case, the RBNA should guarantee the completeness and efficiency of the survey, and should undertake to ensure the necessary arrangements to satisfy this obligation.

502. 1.5.2 Survey requirements

a. 1.5.2.1 The structure, equipment, fittings, arrangements and material (other than items in respect of which a Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate or Cargo Ship Safety Certificate are issued) of a gas carrier should be subjected to the following surveys:

a.1. .1 an initial survey before the ship is put in service or before the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk is issued for the first time, which should include a complete examination of its structure, equipment, fittings, arrangements and material in so far as the ship is covered by the Code. This survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code;

a.2. a renewal survey at intervals specified by the Administration, but not exceeding 5 years, except where regulation A1.506.a.ii, A1.506.d, A1.506.e or A1.506.f (1.5.6.2.2, 1.5.6.5, 1.5.6.6 or 1.5.6.7) is applicable. The renewal survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Rule;

a.3. an intermediate survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Certificate which should take the place of one of the annual surveys specified in A1.502.a.iv (1.5.2.1.4). The intermediate survey should be such as to ensure that the safety equipment, and other equipment, and associated pump and piping systems fully comply with the applicable provisions of the Code and are in good working order. Such intermediate surveys should be endorsed on the Certificate issued under A1.504 (1.5.4) or A1.505 (1.5.5);

a.4. an annual survey within 3 months before or after each anniversary date of the Certificate, including a general inspection of the structure, equipment, fittings, arrangements and material referred to in A1.502.a.i (1.5.2.1.1) to ensure that they have been maintained in accordance with A1.503

(1.5.3) and that they remain satisfactory for the service for which the ship is intended. Such annual surveys should be endorsed on the Certificate issued under A1.504 (1.5.4) or A1.505 (1.5.5);

a.5. an additional survey, either general or partial according to the circumstances, should be made when required after an investigation prescribed in A1.503.c (1.5.3.3), or whenever any important repairs or renewals are made. Such a survey should ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are satisfactory, and that the ship is fit to proceed to sea without danger to the ship or persons on board or without presenting unreasonable threat of harm to the marine environment.

503. 1.5.3 Maintenance of conditions after survey

a. 1.5.3.1 The condition of the ship and its equipment should be maintained to conform with the provisions of the Rule to ensure that the ship will remain fit to proceed to sea without danger to the ship or persons on board or without presenting unreasonable threat of harm to the marine environment.

b. 1.5.3.2 After any survey of the ship under A1.502 (1.5.2) has been completed, no change should be made in the structure, equipment, fittings, arrangements and material covered by the survey, without the sanction of the Administration, except by direct replacement.

c. 1.5.3.3 Whenever an accident occurs to a ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its life-saving appliances or other equipment covered by the Rule, the master or owner of the ship should report at the earliest opportunity to the RBNA, the nominated surveyor or recognized organization responsible for issuing the Certificate, who should cause investigations to be initiated to determine whether a survey, as required by A1.502.a.v (1.5.2.1.5), is necessary. If the ship is in a port of another Contracting Government, the master or owner should also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization should ascertain that such a report has been made.

504. 1.5.4 Issue of certificate

a. 1.5.4.1 A Certificate called an International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, should be issued after an initial or renewal survey to a gas carrier engaged in international voyages which complies with the relevant provisions of the Rule.

b. 1.5.4.2 An International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk should be drawn up in the form corresponding to the model given in the Appendix of the IMO IGC Code. If the language used is neither English nor French, the text should include the translation into one of these languages.

c. 1.5.4.3 The Certificate issued under provisions of this section should be available on board for examination at all times.

d. 1.5.4.4 Notwithstanding any other provisions of the amendments to this Code, adopted by the Maritime Safety Committee (MSC) by resolution MSC.17(58), any International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, which is current when these amendments enter into force, should remain valid until it expires under the terms of this Code prior to the amendments entering into force.

505. 1.5.5 Issue or endorsement of certificate by another Government

a. 1.5.5.1 A Contracting Government to the 1974 SOLAS Convention may, at the request of another Contracting Government, cause a ship entitled to fly the flag of the other State to be surveyed and, if satisfied that the requirements of the Code are complied with, issue or authorize the issue of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk to the ship, and, where appropriate, endorse or authorize the endorsement of the Certificate on board the ship in accordance with the Code. Any Certificate so issued should contain a statement to the effect that it has been issued at the request of the Government of the State whose flag the ship is entitled to fly.

506. 1.5.6 Duration and validity of International Certificate of Fitness

a. 1.5.6.1 An International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk should be issued for a period specified by the Administration which should not exceed 5 years.

a.1. 1.5.6.2.1 Notwithstanding the provisions of A1.506.a (1.5.6.1) of this regulation, when the renewal survey is completed within 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

a.2. 1.5.6.2.2 When the renewal survey is completed after the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

a.3. 1.5.6.2.3 When the renewal survey is completed more than 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of completion of the renewal survey.

b. 1.5.6.3 If a Certificate is issued for a period of less than 5 years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in A1.506.a (1.5.6.1), provided that the surveys referred to in regulation A1.502.a.iii and A1.502.a.iv (1.5.2.1.3 and 1.5.2.14)., applicable when a Certificate is issued for a period of 5 years, are carried out as appropriate.

c. 1.5.6.4 If a renewal survey has been completed and a new Certificate cannot be issued or placed on board the ship before the expiry date of the existing Certificate, the person or organization authorized by the Administration may endorse the existing Certificate and such a Certificate should be accepted as valid for a further period which should not exceed 5 months from the expiry date.

d. 1.5.6.5 If a ship, at the time when a Certificate expires, is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the Certificate but this extension should be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No Certificate should be extended for a period longer than 3 months, and a ship to which an extension is granted should not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new Certificate. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

e. 1.5.6.6 A Certificate issued to a ship engaged on short voyages, which has not been extended under the foregoing provisions of this section, may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

f. 1.5.6.7 In special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificate as required by A1.506.b.ii, A1.506.e or A1.506.f (1.5.6.2.2, 1.5.6.5 or 1.5.6.6). In these special circumstances, the new Certificate should be valid to a date not exceeding 5 years from the date of completion of the renewal survey.

g. 1.5.6.8 If an annual or intermediate survey is completed before the period specified in A1.502 (1.5.2), then:

g.1. the anniversary date shown on the Certificate should be amended by endorsement to a date which should not be more than 3 months later than the date on which the survey was completed;

g.2. the subsequent annual or intermediate survey required by A1.502 (1.5.2) should be completed at the intervals prescribed by that section using the new anniversary date;

g.3. the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by A1.502 (1.5.2) are not exceeded.

507 1.5.6.9 A Certificate issued under A!.504 or A1.505 (1.5.4 or 1.5.5) should cease to be valid in any of the following cases:

a. if the relevant surveys are not completed within the periods specified under 1.5.2;

b. if the Certificate is not endorsed in accordance with A1.502.a.iii or A1.502.a.iv (1.5.2.1.3 or 1.5.2.1.4);

c. 3 upon transfer of the ship to the flag of another State. A new Certificate should only be issued when the Government issuing the new Certificate is fully satisfied that the ship is in compliance with the provisions of A1.503.a and A1.503.b (1.5.3.1 and 1.5.3.2). In the case of a transfer between Contracting Governments, if requested within 3 months after the transfer has taken place, the Government of the State whose flag the ship was formerly entitled to fly should, as soon as possible, transmit to the Administration copies of the Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

CHAPTER B (2)
SHIP SURVIVAL CAPABILITY* AND LOCATION OF CARGO TANKS

CHAPTER CONTENTS

** Reference is made to the Guidelines for Uniform Application of the Survival Requirements of the Bulk Chemical Code and the Gas Carrier Code*

B1. GENERAL

100. 2.1.General

101. 2.1.1 Ships subject to the Code should survive the normal effects of flooding following assumed hull damage caused by some external force. In addition, to safeguard the ship and the environment, the cargo tanks should be protected from penetration in the case of minor damage to the ship resulting, for example, from contact with a jetty or tug, and given a measure of protection from damage in the case of collision or stranding, by locating them at specified minimum distances inboard from the ship' s shell plating. Both the damage to be assumed and the proximity of the tanks to the ship' s shell should be dependent upon the degree of hazard presented by the product to be carried.

102. 2.1.2 Ships subject to the Code should be designed to one of the following standards:

a. **1 A type 1G** ship is a gas carrier intended to transport products indicated in Annex 3 (chapter 19) which require maximum preventive measures to preclude the escape of such cargo.

b. 2 A **type 2G** ship is a gas carrier intended to transport products indicated in Annex 3 (chapter 19) which require significant preventive measures to preclude the escape of such cargo.

c. 3 A type **2PG** ship is a gas carrier of 150 m in length or less intended to transport products indicated in Annex 3 (chapter 19) which require significant preventive measures to preclude escape of such cargo, and where the products are carried in independent type C tanks designed (see 4.2.4.4) for a MARVS of at least 7 bar gauge and a cargo containment system design temperature of -55°C or above. Note that a ship of this description but over 150 m in length is to be considered a type 2G ship.

d. 4 A **type 3G** ship' is a gas carrier intended to carry products indicated in chapter 19 which require moderate preventive measures to preclude the escape of such cargo.

RBNA comment: *Thus a type 1G ship is a gas carrier intended for the transportation of products considered to present the greatest overall hazard and types 2G/2PG and type 3G for products of progressively lesser hazards. Accordingly, a type 1G ship should survive the most severe standard of damage and its cargo tanks should be located at the maximum prescribed distance inboard from the shell plating.*

103. 2.1.3 The ship type required for individual products is indicated in column "c" in the table of Annex 3 (chapter 19).

104. 2.1.4 If a ship is intended to carry more than one product listed in chapter 19, the standard of damage should correspond to that product having the most stringent ship type requirement. The requirements for the location of individual cargo tanks, however, are those for ship types related to the respective products intended to be carried.

RBNA Guidance

IACS UI SC224 LL74 MPC95
(Aug 2008)
Measurement of Distances
Several IMO instruments (e.g., ICLL, SOLAS and MARPOL Conventions, the IBC Code and the IGC Code, etc.) require distances to be measured such as tank length, height, width, ship (or subdivision or waterline) length, etc.
Interpretation
Unless explicitly stipulated otherwise in the text of the regulations in SOLAS, Load Line and MARPOL Conventions and any of their mandatory Codes, distances are to be measured by using moulded dimensions.

End of guidance

200. 2.2 Freeboard and intact stability

201. 2.2.1 Ships subject to the Code may be assigned the minimum freeboard permitted by the International Convention on Load Lines in force. However, the draught associated with the assignment should not be greater than the maximum draught otherwise permitted by this Code.

202. 2.2.2 The stability of the ship in all seagoing conditions and during loading and unloading cargo should be to a standard which is acceptable to the RBNA.

203. 2.2.3 When calculating the effect of free surfaces of consumable liquids for loading conditions it should be assumed that, for each type of liquid, at least one transverse pair or a single centre tank has a free surface and the tank or combination of tanks to be taken into account should be those where the effect of free surfaces is the greatest. The free surface effect in undamaged compartments should be calculated by a method acceptable to the Administration.

204. 2.2.4 Solid ballast should not normally be used in double bottom spaces in the cargo area. Where, however, because of stability considerations, the fitting of solid ballast in such spaces becomes unavoidable, then its disposition should be governed by the need to ensure that the impact loads resulting from bottom damage are not directly transmitted to the cargo tank structure.

205. 2.2.5 The master of the ship should be supplied with a Loading and Stability Information booklet. This booklet should contain details of typical service conditions, loading, unloading and ballasting operations, provisions for evaluating other conditions of loading and a summary of the ship' s survival capabilities. In addition, the booklet should contain sufficient information to enable the master to load and operate the ship in a safe and seaworthy manner.

300. 2.3 Shipside discharges below the freeboard deck

301. 2.3.1 The provision and control of valves fitted to discharges led through the shell from spaces below the freeboard deck or from within the superstructures and deck-houses on the freeboard deck fitted with weathertight doors should comply with the requirements of the relevant reg. of the International Convention on Load Lines in force, except that the choice of valves should be limited to:

a. 1 one automatic non-return valve with a positive means of closing from above the freeboard deck; or

b. 2 where the vertical distance from the summer load waterline to the inboard end of the discharge pipe exceeds 0.01 L, two automatic non-return valves without positive means of closing, provided that the inboard valve is always accessible for examination under service conditions.

302. 2.3.2 For the purpose of this chapter "summer load waterline" and "freeboard deck", have the meanings defined in the International Convention on Load Lines in force.

303. 2.3.3 The automatic non-return valves referred to in B1.301.1 and B1.301.b (2.3.1.1 and 2.3.1.2) should be fully effective in preventing admission of water into the ship, taking into account the sinkage, trim and heel in survival requirements in B1.900 (2.9) and should comply with recognized standards.

400. 2.4 Conditions of loading

401. Damage survival capability should be investigated on the basis of loading information submitted to the RBNA for all anticipated conditions of loading and variations in draught and trim. The survival requirements need not be applied to the ship when in the ballast condition *, provided that any cargo retained on board is solely used for cooling, circulation or fuelling purposes.

** The cargo content of small independent purge tanks on deck need not be taken into account when assessing the ballast condition.*

500. 2.5 Damage assumptions

501. See Table T.B1.501.1 below.

TABLE T.B1.501.1 – DAMAGE ASSUMPTIONS

1 ***Side damage****:*

.1.1	Longitudinal extent:	1/3 L2/3 or 14.5 m, whichever is less.	
.1.2	Transverse extent: measured inboard from the ship's side at right angles to the centreline at the level of the summer load line	B/5 or 11.5 m, whichever is less	
.1.3	Vertical extent: from the moulded line of the bottom shell plating at centreline	upwards without limit	
2 ***Bottom damage****:*		For 0.3 L from the forward perpendicular of the ship	Any other part of the ship
.2.1	Longitudinal extent:	1/3 L2/3 or 14.5 m, whichever is less	1/3 L2/3 or 5 m, whichever is less
.2.2	Transverse extent:	B/6 or 10 m, whichever is less	B/6 or 5 m, whichever is less
.2.3	Vertical extent:	B/15 or 2 m, whichever is less measured from the moulded line of the bottom shell plating at centerline (see 2.6.3).	B/15 or 2 m, whichever is less measured from the moulded line of the bottom at shell plating at centerline (see 2.6.3)

502. 2.5.2 **Other damage**:

1 If any damage of a lesser extent than the maximum damage specified in 2.5.1 would result in a more severe condition, such damage should be assumed.

2 Local side damage anywhere in the cargo area extending inboard 760 mm measured normal to the hull shell should be considered and transverse bulkheads should be assumed damaged when also required by the applicable subparagraphs of 2.8.1

600. 2.6 Location of cargo tanks

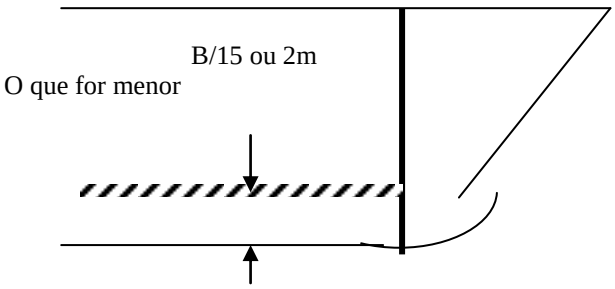
601. 2.6.1 Cargo tanks should be located at the following distances inboard:

a. *Type 1G ships*: from the side shell plating not less than the transverse extent of damage specified in 2.5.1.1.2 and from the moulded line of the bottom shell plating at centreline not less than the vertical extent of damage specified in 2.5.1.2.3 and nowhere less than 760 mm from the shell plating.

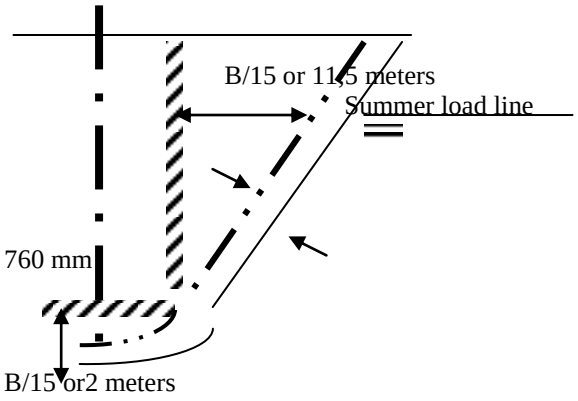
b. *Types 2G/2PG and 3G ships*: from the moulded line of the bottom shell plating at centreline not less than the vertical extent of damage specified in 2.5.1.2.3 and nowhere less than 760 mm from the shell plating.

602. 2.6.2 For the purpose of tank location, the vertical extent of bottom damage should be measured to the inner bottom when membrane or semi-membrane tanks are used, otherwise to the bottom of the cargo tanks. The transverse extent of side damage should be measured to the longitudinal bulkhead when membrane or semi-membrane tanks are used, otherwise to the side of the cargo tanks (see figure F.B1.602.1). For internal insulation tanks the extent of damage should be measured to the supporting tank plating.

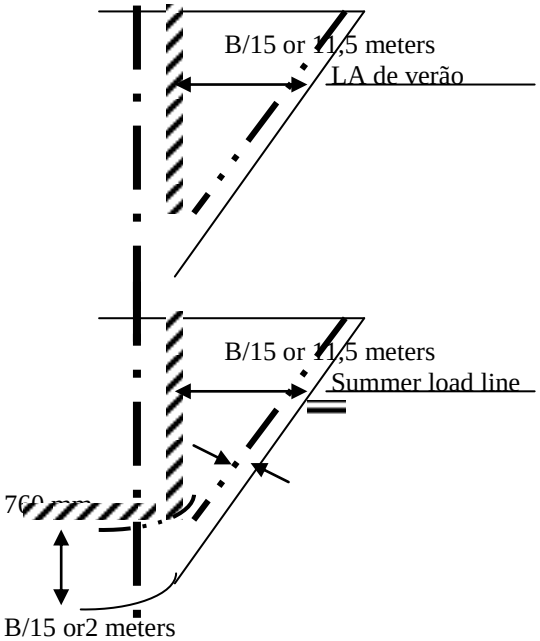
FIGURE F.B1.602.1 - TANK LOCATION REQUIREMENTS



PROFILE



TRANSVERSE SECTIONS



603. 2.6.3 Except for type 1G ships, suction wells installed in cargo tanks may protrude into the vertical extent of bottom damage specified in 2.5.1.2.3 provided that such wells are as small as practicable and the protrusion below the inner bottom plating does not exceed 25% of the depth of the double bottom or 350 mm, whichever is less. Where there is no double bottom, the protrusion below the upper limit of bottom damage should not exceed 350 mm. Suction wells installed in accordance

with this paragraph may be ignored in determining the compartments affected by damage.

700. 2.7 Flooding assumptions

701. 2.7.1 The requirements of B1.900 (2.9) should be confirmed by calculations which take into consideration the design characteristics of the ship; the arrangements, configuration and contents of the damaged compartments; the distribution, relative densities and the free surface effects of liquids; and the draught and trim for all conditions of loading.

702. 2.7.2 The permeabilities of spaces assumed to be damaged should be as follows:

TABLE T.B1.702.1 - PERMEABILITIES

Spaces	*Permeabilities*
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Voids	0.95
Intended for consumable liquids	0 to 0.95*
Intended for other liquids	0 to 0.95*

* *The permeability of partially filled compartments should be consistent with the amount of liquid carried in the compartment.*

703. 2.7.3 Wherever damage penetrates a tank containing liquids, it should be assumed that the contents are completely lost from that compartment and replaced by salt water up to the level of the final plane of equilibrium.

704. 2.7.4. Where the damage between transverse watertight bulkheads is envisaged as specified in Part II, Title 34, Section 1, Chapter B1, 801.d,e,f (2.8.1.4, .5, and .6), transverse bulkheads should be spaced at least at a distance equal to the longitudinal extent of damage specified in Table T.B1.501.1 item 1.1 (2.5.1.1.1) in order to be considered effective. Where transverse bulkheads are spaced at a lesser distance, one or more of these bulkheads within such extent of damage should be assumed as non-existent for the purpose of determining flooded compartments. Further, any portion of a transverse bulkhead bounding side compartments or double bottom compartments should be assumed damaged if the watertight bulkhead boundaries are within the extent of vertical or horizontal penetration required by B1.500 (2.5). Also, any transverse bulkhead should be assumed damaged if it contains a step or recess of more than 3 m in length located within the extent of penetration of assumed damage. The step formed by the after peak bulkhead and after peak tank top should not be regarded as a step for the purpose of this paragraph.

705. 2.7.5 The ship should be so designed as to keep unsymmetrical flooding to the minimum consistent with efficient arrangements.

706. 2.7.6 Equalization arrangements requiring mechanical aids such as valves or cross-leveling pipes, if fitted, should not be considered for the purpose of reducing an angle of heel or attaining the minimum range of residual stability to meet the requirements of B1.901 (2.9.1) and sufficient residual stability should be maintained during all stages where equalization is used. Spaces which are linked by ducts of large cross-sectional area may be considered to be common.

707. 2.7.7 If pipes, ducts, trunks or tunnels are situated within the assumed extent of damage penetration, as defined in 2.5, arrangements should be such that progressive flooding cannot thereby extend to compartments other than those assumed to be flooded for each case of damage.

708. 2.7.8 The buoyancy of any superstructure directly above the side damage should be disregarded. The unflooded parts of superstructures beyond the extent of damage, however, may be taken into consideration provided that:

a. they are separated from the damaged space by watertight divisions and the requirements of B1.901.a (2.9.1.1) in respect of these intact spaces are complied with; and

b. openings in such divisions are capable of being closed by remotely operated sliding watertight doors and unprotected openings are not immersed within the minimum range of residual stability required inB1.902.a (2.9.2.1); however the immersion of any other openings capable of being closed weathertight may be permitted.

800. 2.8 Standard of damage

801. 2.8.1 Ships should be capable of surviving the damage indicated in B1.500 (2.5) with the flooding assumptions in B1.700 (2.7) to the extent determined by the ship' s type according to the following standards:

a. A type 1G ship should be assumed to sustain damage anywhere in its length;

b. A type 2G ship of more than 150 m in length should be assumed to sustain damage anywhere in its length,

c. A type 2G ship of 150 m in length or less should be assumed to sustain damage anywhere in its length except involving either of the bulkheads bounding a machinery space located aft;

d. A type 2PG ship should be assumed to sustain damage anywhere in its length except involving transverse bulkheads spaced further apart than the longitudinal extent of damage as specified in Table T.B1.501.1 item 1.1 (2.5.1.1.1);

e. A type 3G ship of 125 m in length or more should be assumed to sustain damage anywhere in its length except involving transverse bulkheads spaced further apart than the longitudinal extent of damage specified in Table T.B1.501.1 item 1.1 (2.5.1.1.1);

f. A type 3G ship less than 125 m in length should be assumed to sustain damage anywhere in its length except involving transverse bulkheads spaced further apart than the longitudinal extent of damage specified in Table T.B1.501.1 item 1.1 (2.5.1.1.1)and except damage involving the machinery space when located aft. However, the ability to survive the flooding of the machinery space should be considered by the Administration.

2.8.2 In the case of small type 2G/2PG and 3G ships which do not comply in all respects with the appropriate requirements of B1.801.c,d,and f (2.8.1.3, .4, and .6), special dispensations may only be considered by the RBNA provided that alternative measures can be taken which maintain the same degree of safety. The nature of the alternative measures should be approved and clearly stated and be available to the port Administration. Any such dispensation should be duly noted on the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk referred to in A1.504 (1.5.4).

900. 2.9 Survival requirements

Ships subject to the Code should be capable of surviving the assumed damage specified in B1.500 (2.5) to the standard provided in 2.8 in a condition of stable equilibrium and should satisfy the following criteria.

901. 2.9.1 In any stage of flooding:

a. 1 the waterline, taking into account sinkage, heel and trim, should be below the lower edge of any opening through which progressive flooding or down-flooding may take place. Such openings should include air pipes and openings which are closed by means of weather-tight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers which maintain the high integrity of the deck, remotely operated watertight sliding doors, and side-scuttles of the non-opening type;

b. 2 the maximum angle of heel due to unsymmetrical flooding should not exceed 30 degrees; and

c. 3. the residual stability during intermediate stages of flooding should be to the satisfaction of the Administration. However, it should never be significantly less than that required by BG1.902.a (2.9.2.1).

902. 2.9.2 At final equilibrium after flooding:

a. 1 the righting lever curve should have a minimum range of 20 degrees beyond the position of equilibrium in association with a maximum residual righting lever of at least 0.1 m within the 20 degrees range; the area under the curve within this range should not be less than 0.0175 m·rad. Unprotected openings should not be immersed within this range unless the space concerned is assumed to be flooded. Within this range, the immersion of any of the openings listed in B1.901.a (2.9.1.1) and other openings capable of being closed weathertight may be permitted; and

b. 2 the emergency source of power should be capable of operating.

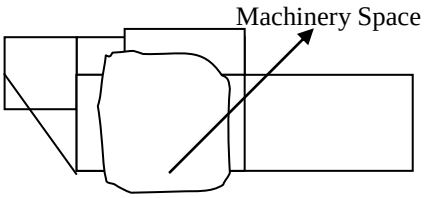
See GUIDELINES FOR THE UNIFORM APPLICATION OF THE SURVIVAL REQUIREMENTS OF THE BULK CHEMICAL CODE AND THE GAS CARRIER CODE, Introduction, paragraphs 1, 2, 3, 4. (approved by the Maritime Safety Committee at its forty-second session, 1980).

903. ***IMO's interpretation (MSC/Circ.406/Rev.1) items B1.708 (***2.7.8) ***and B1.801 (2.8.1)):***
Longitudinal extent of damage to superstructure. The longitudinal extent of damage to superstructure in the instance of side damage to a machinery space aft under paragraph B1.801 (2.8.1) should be the same as the longitudinal extent of the side damage to the machinery space (see figure F.B1.903.1).

904. ***IMO's interpretation on item 2.9.2.1 (MSC/Circ.406/Rev.1):***
The range of positive stability where the residual stability should be evaluated. The 20 degrees range may be measured from any angle commencing between the position of equilibrium and the angle of 25 degrees (or 30 degrees if no deck immersion occurs).

International Code for The Construction and Equipment of Ships Carrying Liquefied Gases in Bulk 1983, as amended 1992, 1996, 2000, 2004, 2006

FIGURE F.B1.903.1. MACHINERY SPACE



B2. DOORS IN WATERTIGHT BULKHEADS OF CARGO SHIPS AND PASSENGER SHIPS IACS UNIFIED INTERPRETATION SC156

(June 2002)

100. General

101. This unified interpretation pertains to doors located in way of the internal watertight subdivision boundaries and the external watertight boundaries necessary to ensure compliance with the relevant subdivision and damage stability regulations.*

** Doors in watertight bulkheads of small cargo ships, not subject to any statutory subdivision and damage stability requirements, may be hinged quick acting doors arranged to open out of the major space protected. They shall be constructed in accordance with the requirements of the classing society and have notices affixed to each side stating, "To be kept closed at sea". This UI shall not apply to HSCs pending completion of revision of the HSC Code by IMO and consideration of same by the applicable IACS WPs.*

102. This unified interpretation does not apply to doors located in external boundaries above equilibrium or intermediate waterplanes.

103. The design and testing requirements for watertight doors vary according to their location relative to the equilibrium waterplane or intermediate waterplane at any stage of assumed flooding.

104. The scope of an IACS interpretation in this context shall not be limited to watertight doors covered by SOLAS. Watertight doors required by other statutory damage stability requirements, e.g. MARPOL,the IBC and IGC Codes are covered as well. Small cargo vessels not subject to damage stability requirements are not required to comply with the full scheme.

200 Definitions

201. .For the purpose of this UI the following definitions apply:

202. "Watertight": Capable of preventing the passage of water in any direction under a design head. The design head for any part of a structure shall be determined by reference to its location relative to the bulkhead deck or freeboard deck, as applicable, or to the most unfavourable equilibrium/intermediate waterplane, in accordance with the applicable subdivision and damage stability regulations, whichever is the greater. A watertight door is thus one that will maintain the watertight integrity of the subdivision bulkhead in which it is located.

203. Equilibrium Waterplane": The waterplane in still water when, taking account of flooding due to an assumed damage,the weight and buoyancy forces acting on a vessel are in balance. This relates to the final condition when no further flooding takes place or after cross flooding is completed.

204. Intermediate Waterplane": The waterplane in still water,which represents the instantaneous floating position of a vessel at some intermediate stage between commencement and completion of flooding when, taking account of the assumed instantaneous state of flooding, the weight and buoyancy forces acting on a vessel are in balance.

205. Sliding Door or Rolling Door": A door having a horizontal or vertical motion generally parallel to the plane of the door.

206. Hinged Door": A door having a pivoting motion about one vertical or horizontal edge

300. Structural Design

301. Doors shall be of approved design and substantial construction in accordance with the requirements of the classing society and shall be of a strength equivalent to that of the subdivision bulkheads in which they are fitted

400. Operation Mode, Location and Outfitting

401. Doors shall be fitted in accordance with all requirements regarding their operation mode, location and outfitting, i.e. provision of controls, means of indication, etc., as shown in Table T.B2.401.1 below. This table is to be read in conjunction with the following general notes:

For passenger ships the watertight doors and their controls are to be located in compliance with SOLAS II-1/15.6.3 and II-1/15.7.1.2.2.

*402. **Frequency of Use whilst at sea***

Normally Closed
Kept closed at sea but may be used if authorised. To be closed again after use.

Permanently Closed

The time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book. Should such doors be accessible during the voyage, they shall be fitted with a device to prevent unauthorised opening.

Normally Open
May be left open provided it is always ready to be immediately closed.

Used
In regular use, may be left open provided it is ready to be immediately closed.

403. ***Type***

TABLE T.B2.403.1 – TYPES OF DOORS

*Power operated, sliding or rolling**	*POS*
Power operated, hinged	*POH*
Sliding or Rolling	*S*
Hinged	*H*

** Rolling doors are technically identical to sliding doors.*

404. ***Control***

a. Local

All doors, except those which are to be permanently closed at sea, are to be capable of being opened and closed by hand, (and by power, where applicable locally, from both sides of the doors, with the ship listed to either side.*

** Arrangements for passenger ships shall be in accordance with SOLAS II-I/15.7.1.4*

For passenger ships, the angle of list at which operation by hand is to be possible is 15 degrees or 20 degrees if the ship is allowed to heel up to 20 degrees during intermediate stages of flooding.

For cargo ships,the angle of list at which operation by hand is to be possible is 30 degrees.

405. ***Remote***
Where indicated in Table 1, doors are to be capable of being remotely closed by power from the bridge. Where it is necessary to start the power unit for operation of the watertight door, means to start the power unit is also to be provided at remote control stations. The operation of such remote control is to be in accordance with SOLAS II-1/15.8.1 to 15.8.3.*

** Arrangements for passenger ships shall be in accordance with SOLAS II-1/15.7.1.5*

406. ***Indication***

Where shown in Table 1, position indicators are to be provided at all remote operating positions as well as locally, on both sides of the doors**, to show whether the doors are open or closed and, if applicable, with all dogs/cleats fully and properly engaged.*

** Indication at all remote control positions (SOLAS II-I/15.6.4)*

*** Refer to SOLAS II-1/25-9.3*

The door position indicating system is to be of self-monitoring type and the means for testing of the indicating system are to be provided at the position where the indicators are fitted.

An indication (i.e.red light) should be placed locally showing that the door is in remote control mode ("doors closed mode"). Ref. also SOLAS Reg. 15.8.1.Special care should be taken in order to avoid potential danger when passing through the door. Signboard/instructions should be placed in way of the door advising how to act when the door is in "doors closed" mode.

407. ***Alarms***

Doors which are to be capable of being remotely closed are to be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever such a door is remotely closed. For passenger ships the alarm shall sound for at least 5 s but not more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote closure by hand operation, an alarm is required to sound only while the door is actually moving.

In passenger areas and areas of high ambient noise, the audible alarms are to be supplemented by visual signals at both sides of the doors.

408. ***Notices***

As shown in Table 1, doors which are normally closed at sea but not provided with means of remote closure, are to have notices fixed to both sides of the doors stating, "To be kept closed at sea". Doors which are to be permanently closed at sea are to have notices fixed to both sides stating, "Not to be opened at sea"

500. Fire Doors

501. Watertight doors may also serve as fire doors but need not be fire-tested when intended for use below the bulkhead deck. Where such doors are used at locations above the bulkhead deck they shall, in addition to complying with the provisions applicable to fire doors at the same locations, also comply with means of escape provisions of SOLAS II-2/13 (2000 Amendments, Res. MSC.99(73).

502. Where a watertight door is located adjacent to a fire door, both doors shall be capable of independent

operation, remotely if required by SOLAS II-1/15.8.1 to 15.8.3 and from both sides of the each door.

600. Testing

601. Doors which become immersed by an equilibrium or intermediate waterplane, are to be subjected to a hydrostatic pressure test.

a. For large doors intended for use in the watertight subdivision boundaries of cargo spaces, structural analysis may be accepted in lieu of pressure testing. Where such doors utilise gasket seals, a prototype pressure test to confirm that the compression of the gasket material is capable of accommodating any deflection, revealed by the structural analysis, is to be carried out.

*602. Doors which are not immersed by an equilibrium or intermediate waterplane but become intermittently immersed at angles of heel in the required range of positive stability beyond the equilibrium position are to be hose tested.**

** Additionally, such doors may need to be pressure tested to a head as specified by a National standard or regional agreement*

603. For clarification purposes it shall be noted that even though these doors are covered by the text in this UI ,in accordance with the practice of LL, SOLAS and MARPOL Conventions such hose testing usually is related to weathertight doors rather than to watertight doors.

*604. **Pressure Testing***

a. The head of water used for the pressure test shall correspond at least to the head measured from the lower edge of the door opening, at the location in which the door is to be fitted in the vessel, to the bulkhead deck or freeboard deck, as applicable, or to the most unfavourable damage waterplane, if that be greater. Testing may be carried out at the factory or other shore based testing facility prior to installation in the ship.

b. Leakage Criteria

b.1. 5The following acceptable leakage criteria should apply to Doors with gaskets No leakage Doors with metallic sealing Max leakage 1 liter/min.

b.2. 5 Limited leakage may be accepted for pressure tests on large doors located in cargo spaces employing gasket seals or guillotine doors located in conveyor tunnels, in accordance with the following:*

Leakage rate (liter/min) = (1/6568) x (P + 4.572) x h³

where:

P = perimeter of door opening (metres)

h = test head of water (metres)

** Published in the ATM F 1196, Standard Specification for Sliding Watertight Door Assemblies and referenced in the Title 46 US Code of Federal Regulations 170.270 Door design, operation installation and testing*

b.3. 5.3.2.3 However, in the case of doors where the water head taken for the determination of the scantling does not exceed 6.10 m, the leakage rate may be taken equal to 0.375 liter/min if this value is greater than that calculated by the above-mentioned formula.

c. For doors on passenger ships which are normally open and used at sea or which become submerged by the equilibrium or intermediate waterplane, a prototype test shall be conducted, on each side of the door, to check the satisfactory closing of the door against a force equivalent to a water height of at least 1m above the sill on the centre line of the door.*

** Arrangements for passenger ships shall be in accordance with SOLAS Reg.II-1/15.6.2*

700. Hose Testing

701. All watertight doors shall be subject to a hose test in accordance with UR S14.2.3 after installation in a ship. Hose testing is to be carried out from each side of a door unless, for a specific application, exposure to floodwater is anticipated only from one side. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by means such as an ultrasonic leak test or an equivalent test.

TABLE T.B2701.1 - INTERNAL DOORS IN WATERTIGHT BULKHEADS IN CARGO SHIPS AND PASSENGER SHIPS

Position relative to equilibrium or intermediate waterplane	1. Frequency of use whilst at sea	2. Type	3. Remote Control*6	4. Indication locally and on Bridge *6	5. Audible Alarm *6
I. Passenger Ships					
A. At or below	Norm. Closed	POS	Yes	Yes	Yes
	Perm. Closed	S, H	No	No	No
B. Above	Norm.Open	POS, POH	Yes	Yes	Yes
	Norm. Closed	S, H	No	Yes	No
		S, H	No	Yes	No
II. Cargo Ships					
A. At or below	Used	POS	Yes	Yes	Yes
	Norm. Closed	S, H	No	Yes	No
	Perm. Closed	S, H	No	No	No
B. Above	Used	POS	Yes	Yes	Yes
	Norm. Closed	S, H	No	Yes	No

Position relative to equilibrium or intermediate waterplane	6. Notice	7. Comments	8. Regulation
I. Passenger Ships			
A. At or below	No	Certain doors may be left open, see SOLAS II-1/15.9.3	SOLAS II-1/15.9.1, 2 & 3
	Yes	See Notes 1 + 4	SOLAS II-1/15.10.1 & 2
B. Above	No		SOLAS II-1/15.9.3 SOLAS II-1/20.1 MSC/Circ.541 B. Above
	Yes	See Note 2	
	Yes	Doors giving access to Ro-Ro Deck	SOLAS II-1/20-2
II. Cargo Ships			
A. At or below	No		SOLAS II-1/25-9.2
	Yes	See Notes 2 + 3 + 5	SOLAS II-1/25-9.3
	Yes	See Notes 1 + 4	SOLAS II-1/25-9.4 SOLAS II-1/25-10
B. Above	No		SOLAS II-1/25-9.2
	Yes	See Notes 2 + 5	SOLAS II-1/25-9.3 SOLAS II-1/25-10

Notes:

1. Doors in watertight bulkheads subdividing cargo spaces.
2. If hinged, this door shall be of quick acting or single action type
3. "ICLL66 + A.320" or "1988 Protocol to ICLL66", MARPOL, IGC and IBC-Codes require remotely operated watertight doors to be sliding doors
4. The time of opening such doors in port and closing them before the ship leaves port shall be entered in the logbook.
5. The use of such doors shall be authorised by the officer of the watch.
6. Cables for control and power systems to power operated watertight doors and their status indication should comply with the requirements of Part II, Title 11, Section 7, Chapter E, E5.400.

CHAPTER C(3)
SHIP ARRANGEMENTS
For ships constructed from 1986-07-01

CHAPTER CONTENTS

C1. SHIP ARRANGEMENT

100. 3.1 Segregation of the cargo area

101. 3.1.1 Hold spaces should be segregated from machinery and boiler spaces, accommodation spaces, service spaces and control stations, chain lockers, drinking and domestic water tanks and from stores. Hold spaces should be located forward of machinery spaces of category A, other than those deemed necessary by the Administration for the safety or navigation of the ship.

102. 3.1.2 Where cargo is carried in a cargo containment system not requiring a secondary barrier, segregation of hold spaces from spaces referred to in C1.101 (3.1.1) or spaces either below or outboard of the hold spaces may be effected by cofferdams, fuel oil tanks or a single gastight bulkhead of all-welded construction forming an A-60 class division. A gastight A-0 class division is satisfactory if there is no source of ignition or fire hazard in the adjoining spaces.

3.1.3 Where cargo is carried in a cargo containment system requiring a secondary barrier, segregation of hold spaces from spaces referred to in C1.101 (3.1.1) or spaces either below or outboard of the hold spaces which contain a source of ignition or fire hazard should be effected by cofferdams or fuel oil tanks. If there is no source of ignition or fire hazard in the adjoining space, segregation may be by a single A-0 class division which is gastight.

104. 3.1.4 When cargo is carried in a cargo containment system requiring a secondary barrier:

a. at temperatures below -10°C, hold spaces should be segregated from the sea by a double bottom; and

b. at temperatures below -55°C, the ship should also have a longitudinal bulkhead forming side tanks.

105. 3.1.5 Any piping system which may contain cargo or cargo vapour should:

a. be segregated from other piping systems, except where inter-connections are required for cargo-related operations such as purging, gas-freeing or inerting. In such cases, precautions should be taken to ensure that cargo or cargo vapour cannot enter such other piping systems through the inter-connections;

b. except as provided in chapter 16, not pass through any accommodation space, service space or control station or through a machinery space other than a cargo pump room or cargo compressor space;

c. be connected into the cargo containment system directly from the open deck except that pipes installed in a vertical trunkway or equivalent may be used to traverse void spaces above a cargo containment system and except that pipes for drainage, venting or purging may traverse cofferdams;

d. except for bow or stern loading and unloading arrangements in accordance with C1.800 (3.8) and emergency cargo jettisoning piping systems in accordance with C1.106 (3.1.6), and except in accordance with chapter 16, be located in the cargo area above the open deck; and

e. except for thwartship shore connection piping not subject to internal pressure at sea or emergency cargo jettisoning piping systems, be located inboard of the transverse tank location requirements of C1.106 (2.6.1).

106. 3.1.6 Any emergency cargo jettisoning piping system should comply withC1.105 (3.1.5) as appropriate and may be led aft externally to accommodation spaces, service spaces or control stations or machinery spaces, but should not pass through them. If an emergency cargo jettisoning piping system is permanently installed a suitable means of isolation from the cargo piping should be provided within the cargo area.

107. 3.1.7 Arrangements should be made for sealing the weather decks in way of openings for cargo containment systems.

200. 3.2 Accommodation, service and machinery spaces and control stations

201. 3.2.1 No accommodation space, service space or control station should be located within the cargo area. The bulkhead of accommodation spaces, service spaces or control stations which face the cargo area should be so located as to avoid the entry of gas from the hold space to such spaces through a single failure of a deck or bulkhead on a ship having a containment system requiring a secondary barrier.

202. 3.2.2 In order to guard against the danger of hazardous vapours, due consideration should be given to the location of air intakes and openings into accommodation, service and machinery spaces and control stations in relation to cargo piping, cargo vent systems and machinery space exhausts from gas burning arrangements.

a. ***IMO's interpretation (MSC/Circ.406/Rev.1):***

Location of air intakes and openings.

Compliance with other relevant paragraphs of the Code and in particular with paragraphs C1.204, C1.800 and 12.1.6 (3.2.4, 3.8, 8.2.10 and 12.1.6(where applicable would also ensure compliance with this paragraph.

203. 3.2.3 Access through doors, gastight or otherwise, should not be permitted from a gas-safe space to a gas-dangerous space, except for access to service spaces forward of the cargo area through air-locks as permitted by C1.601 (3.6.1) when accommodation spaces are aft.

204. 3.2.4 Entrances, air inlets and openings to accommodation spaces, service spaces, machinery spaces and control stations should not face the cargo area. They should be located on the end bulkhead not facing the cargo area or on the outboard side of the house or on both at a distance of at least 4% of the length (L) of the ship but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area. This distance, however, need not exceed 5 m. Windows and sidescuttles facing the cargo area and on the sides of the superstructures or deckhouses within the distance mentioned above should be of the fixed (non-opening) type. Wheelhouse windows may be non-fixed and wheelhouse doors may be located within the above limits so long as they are so designed that a rapid and efficient gas and vapour tightening of the wheelhouse can be ensured. For ships dedicated to the carriage of cargoes which have neither flammable nor toxic hazards, the RBNA may approve relaxations from the above requirements.

a. ***IMO's interpretation (MSC/Circ.406/Rev.1):***

Openings into accommodation spaces, etc.

Air outlets are subject to the same requirements as air inlets and air intakes. This interpretation also applies to paragraphs C1.202, C1.804 and Part II, Title 34, Section 6, Chapter F, F1.200 (3.2.2, 3.8.4, and 8.2.10).

b. ***IACS unified interpretation SC120***

Access to forecastle spaces on tankers

- SOLAS regulations II-2/4.5.2.1 and 4.5.2.2, IBC Code paragraph 3.2.3 and IGC Code paragraph C1.204 (3.2.4. Access to forecastle spaces containing sources of ignition may be permitted through doors facing cargo area provided the doors are located outside hazardous areas as defined in IEC Publication 60092-502.

205. 3.2.5 Sidescuttles in the shell below the uppermost continuous deck and in the first tier of the superstructure or deckhouse should be of the fixed (non-opening) type.

206. 3.2.6 All air intakes and openings into the accommodation spaces, service spaces and control stations should be fitted with closing devices. For toxic gases they should be operated from inside the space.

a. ***IACS CG5 Equipment of Ships Carrying Liquefied Gases in Bulk (MSC.5(48))***

Paragraph C1.206 (3.2.6) may be interpreted as follows:

a.1. The requirement for fitting air intakes and openings with closing devices operable from inside the space in ships intended to carry toxic products should apply to spaces which are used for the ships' radio and main navigating equipment, cabins, mess rooms, toilets, hospitals, galleys, etc., but should not apply to ***spaces not normally manned*** *such as deck stores, forecastle stores, engine room casings, steering gear compartments, workshops. The requirement does also not apply to cargo control rooms located within the cargo area.*

a.2. 2. When internal closing is required, this should include both ventilation intakes and outlets.

a.3. 3. The closing devices should give a reasonable degree of gas tightness. Ordinary steel fire-flaps without gaskets/seals should normally not be considered satisfactory.

300. 3.3 Cargo pump rooms and cargo compressor rooms

301. Cargo pump rooms and cargo compressor rooms

a. 3.3.1.1 Cargo pump rooms and cargo compressor rooms should be situated above the weather deck and located within the cargo area unless specially approved by the Administration. Cargo compressor rooms should be treated as cargo pump rooms for the purpose of fire protection according to SOLAS regulation II-2/9.2.4.

b. 3.3.1.2 When cargo pump rooms and cargo compressor rooms are permitted to be fitted above or below the weather deck at the after end of the aftermost hold space or at the forward end of the forwardmost hold space, the limits of the cargo area as defined in 1.3.6 should be extended to include the cargo pump rooms and cargo compressor rooms for the full breadth and depth of the ship and deck areas above those spaces.

c. 3.3.1.3 Where the limits of the cargo area are extended by C1.301.b (3.3.1.2), the bulkhead which

separates the cargo pump rooms and cargo compressor rooms from accommodation and service spaces, control stations and machinery spaces of category A should be so located as to avoid the entry of gas to these spaces through a single failure of a deck or bulkhead.

d. IMO's interpretation (MSC/Circ.406/Rev.1) for items .3.1.2 and .3:

Location of the bulkhead separating cargo pump-room and cargo compressor rooms from accommodation and service spaces, etc.. When cargo pump-room and compressor rooms are permitted to be fitted at the after end of the aftermost hold space the bulkhead which separates the cargo pump-rooms and compressor rooms from accommodation and service spaces, control stations and machinery spaces of category A should be so located as to avoid the entry of gas to these spaces through a single failure of a deck or bulkhead. The same condition should also be satisfied when cargo pump-rooms and compressor rooms, fitted within the cargo area, have a bulkhead in common with accommodation and service spaces, control stations and machinery spaces of category A.

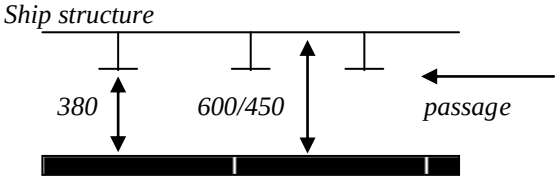
e. 3.5IACS' unified interpretation GC6

(1986)
Cargo tank clearances:
1. Designated passage ways below and above cargo tanks should have at least the cross sections as required by 3.5.3.1.3.

2. For the purpose of 3.5.1 or 3.5.2 the following should apply:

.1 Where the surveyor requires to pass between the surface to be inspected, flat or curved, and structural elements such as deck beams, stiffeners, frames, girders etc., the distance between that surface and the free edge of the structural elements should be at least 380 mm. The distance between the surface to be inspected and the surface to which the above structural elements are fitted, e.g. deck, bulkhead or shell, should be at least 450 mm in case of a curved tank surface (e.g. in case of type C-tank) or 600 mm in case of a flat tank surface (e.g. in case of type A-tank). (See figure 1).

Fig's 1, 2 & 3
FIGURE F.3.5.01



Cargo tank

FIGURE F.3.5.02

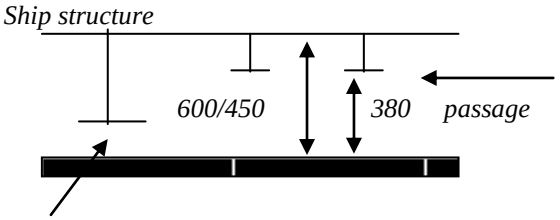
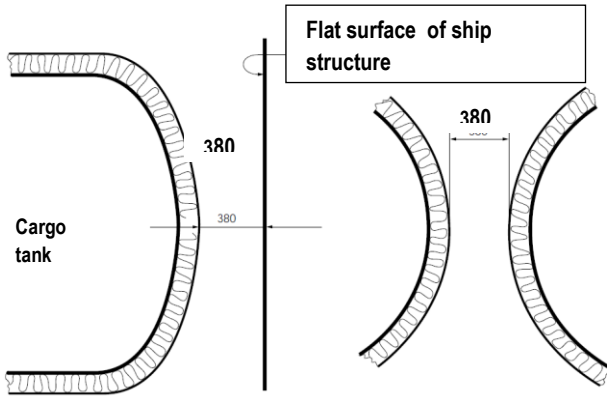


FIGURE F.3.5.03



.2 Where the surveyor does not require to pass between the surface to be inspected and any part of the structure, for visibility reasons the distance between the free edge of that structural element and the surface to be inspected should be at least 50 mm or half the breadth of the structure's face plate, whichever is the larger. (See figure 2).

.3 If for inspection of a curved surface the surveyor requires to pass between that surface and another surface, flat or curved, to which no structural elements are fitted, the distance between both surfaces should be at least 380 mm. (See figure 3). Where the surveyor does not require to pass between that curved surface and another surface, a smaller distance than 380 mm may be accepted taking into account the shape of the curved surface.

.4 If for inspection of an approximately flat surface the surveyor requires to pass between two approximately flat and approximately parallel surfaces, to which no structural elements are fitted, the distance between those surfaces should be at least 600 mm. (See figure 4).

Fig's 4, 5 & 6

FIGURE F.3.5.04

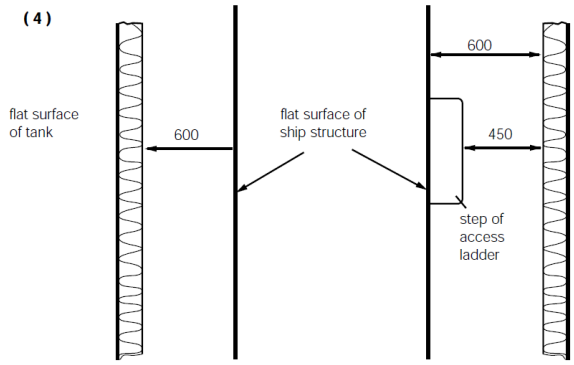


FIGURE F.3.5.05

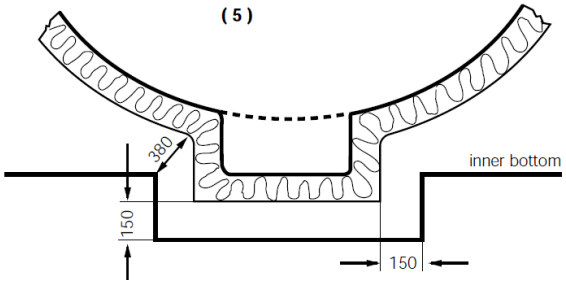
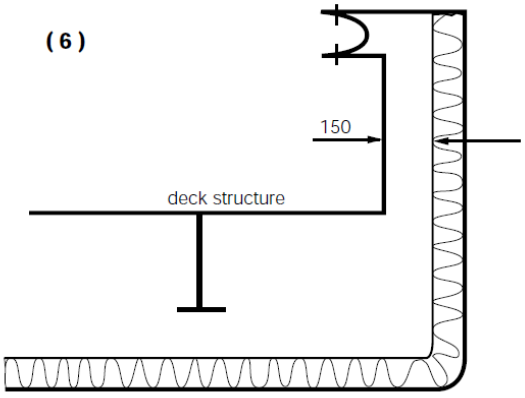


FIGURE F.3.5.06



.5 The minimum distances between a cargo tank sump and adjacent double bottom structure in way of a suction well should not be less than shown in figure 5. (Fig. 5 shows that the distances between the plane surfaces of the sump and well is minimum 150 mm and that the clearance between the edge between the inner bottom plate and the vertical side of the well and the knuckle point between the spherical or circular surface and sump of the tank is at least 380 mm). If there is no suction well, the distance between the cargo tank sump and the inner bottom should not be less than 50 mm.

.6 The distance between a cargo tank dome and deck structures should not be less than 150 mm. (See figure 6).

.7 If necessary for inspection fixed or portable staging should be installed. This staging should not impair the distances required under .1 to .4.

.8 If fixed of portable ventilation ducting has to be fitted in compliance with 12.2 such ducting shall not impair the distances required under .1 to .4.

3. For the purpose of subparagraph 3.5.3.1.2 and .1.3 the following should apply:

.1 The term 'minimum clear opening of not less than 600 x 600 mm' means that such openings may have corner radii up to 100 mm.

.2 The term 'minimum clear opening of not less than 600 x 800 mm' includes also an opening consisting of two half circles each with radius 300 mm spaced 200 mm apart.

.3 The term "minimum clear opening of not less than 600 x 800 mm" includes also an opening of the following size:

FIGURA F.3.5.07

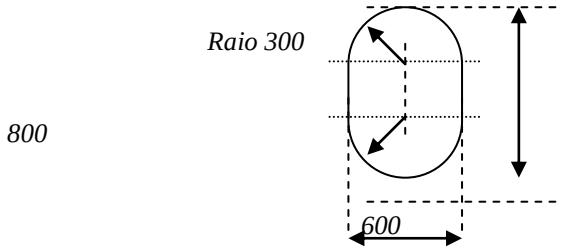
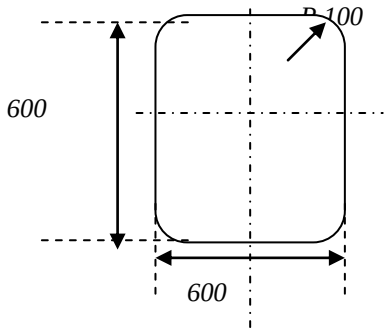


FIGURA F.3.5.08



302. 3.3.2 Where pumps and compressors are driven by shafting passing through a bulkhead or deck, gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal should be fitted in way of the bulkhead or deck.

303. 3.3.3 Arrangements of cargo pump rooms and cargo compressor rooms should be such as to ensure safe unrestricted access for personnel wearing protective clothing and breathing apparatus, and in the event of injury

to allow unconscious personnel to be removed. All valves necessary for cargo handling should be readily accessible to personnel wearing protective clothing. Suitable arrangements should be made to deal with drainage of pump and compressor rooms.

400. 3.4 Cargo control rooms

401. 3.4.1 Any cargo control room should be above the weather deck and may be located in the cargo area. The cargo control room may be located within the accommodation spaces, service spaces or control stations provided the following conditions are complied with:

a. the cargo control room is a gas-safe space; and

b. 1if the entrance complies with C1.204 (3.2.4), the control room may have access to the spaces described above;

c. 2.2 if the entrance does not comply with C1.204 (3.2.4), the control room should have no access to the spaces described above and the boundaries to such spaces should be insulated to "A-60" class integrity.

402. 3.4.2 If the cargo control room is designed to be a gas-safe space, instrumentation should, as far as possible, be by indirect reading systems and should in any case be designed to prevent any escape of gas into the atmosphere of that space. Location of the gas detector within the cargo control room will not violate the gas-safe space if installed in accordance with 13.6.5.

403. 3.4.3 If the cargo control room for ships carrying flammable cargoes is a gas-dangerous space, sources of ignition should be excluded. Consideration should be paid to the safety characteristics of any electrical installations.

500. 3.5 Access to spaces in the cargo area

501. 3.5.1 Visual inspection should be possible of at least one side of the inner hull structure without the removal of any fixed structure or fitting. If such a visual inspection, whether combined with those inspections required in Part II, Title 34, Section 1, 502, Section 6, A2.107, or Section 6, B1.100 (3.5.2, 4.7.7 or 4.10.16) or not, is only possible at the outer face of the inner hull, the inner hull should not be a fuel-oil tank boundary wall.

502. 3.5.2 Inspection of one side of any insulation in hold spaces should be possible. If the integrity of the insulation system can be verified by inspection of the outside of the hold space boundary when tanks are at service temperature, inspection of one side of the insulation in the hold space need not be required.

503. 3.5.3 Arrangements for hold spaces, void spaces and other spaces that could be considered gas-dangerous and cargo tanks should be such as to allow entry and inspection of any such space by personnel wearing protective clothing and breathing apparatus and in the event of injury to allow unconscious personnel to be removed from the space and should comply with the following:

a. Access should be provided:

a.1. to cargo tanks direct from the open deck;

a.2. through horizontal openings, hatches or manholes, the dimensions of which should be sufficient to allow a person wearing a breathing apparatus to ascend or descend any ladder without obstruction and also to provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space; the minimum clear opening should be not less than 600 mm by 600 mm; and

a.3. through vertical openings, or manholes providing passage through the length and breadth of the space, the minimum clear opening of which should be not less than 600 mm by 800 mm at a height of not more than 600 mm from the bottom plating unless gratings or other foot-holds are provided.

b. The dimensions referred to in 3.5.3.1.2 and .1.3 may be decreased if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

c. The requirements of C1.503.a.ii and .C1.503.a.iii. (3.5.3.1.2 and .3) do not apply to spaces described in A1.501.f (1.3.17.5). Such spaces should be provided only with direct or indirect access from the open weather deck, not including an enclosed gas-safe space.

504. 3.5.4 Access from the open weather deck to gas-safe spaces should be located in a gas-safe zone at least 2.4 m above the weather deck unless the access is by means of an air-lock in accordance with C1.600 (3.6).

600. 3.6 Air-locks

601. 3.6.1 An air-lock should only be permitted between a gas-dangerous zone on the open weather deck and a gas-safe space and should consist of two steel doors substantially gastight spaced at least 1.5 m but not more than 2.5 m apart.

602. 3.6.2The doors should be self-closing and without any holding back arrangements.

603. 3.6.3 An audible and visual alarm system to give a warning on both sides of the air-lock should be provided to indicate if more than one door is moved from the closed position.

604. 3.6.4 In ships carrying flammable products, electrical equipment which is not of the certified safe type in spaces protected by air-locks should be de-energized upon loss of overpressure in the space (see also 10.1.4). Electrical equipment which is not of the certified safe type for manoeuvring, anchoring and mooring equipment as well as the emergency fire pumps should not be located in spaces to be protected by air-locks.

a. IMO's interpretation (MSC/Circ.406/Rev.1):

Monitoring of overpressure in spaces protected by air-locks.
The following means are considered acceptable alternatives to differential pressure sensing devices in spaces having a ventilation rate not less than 30 air changes per hour:

1 monitoring of current or power in the electrical supply to the ventilation motors; or

2 air flow sensors in the ventilation ducts.

In spaces where the ventilation rate is less than 30 air changes per hour and where one of the above alternatives is fitted, in addition to the alarms required by paragraph 3.6.3, the arrangements should be made to de-energize electrical equipment which is not of the certified safe type, if more than one air lock door is moved from the closed position.

605. 3.6.5 The air-lock space should be mechanically ventilated from a gas-safe space and maintained at an overpressure to the gas-dangerous zone on the open weather deck.

606. 3.6.6 The air-lock space should be monitored for cargo vapour.

607. 3.6.7 Subject to the requirements of the International Convention on Load Lines in force, the door sill should not be less than 300 mm in height.

700. 3.7 Bilge, ballast and fuel oil arrangements

(Paragraph 3.7.2.2 applies to ships constructed on or after 1 July 2002)

701. 3.7.1.1 Where cargo is carried in a cargo containment system not requiring a secondary barrier, hold spaces should be provided with suitable drainage arrangements not connected with the machinery space. Means of detecting any leakage should be provided.

a. 3.7.1.2 Where there is a secondary barrier, suitable drainage arrangements for dealing with any leakage into the hold or insulation spaces through adjacent ship structure should be provided. The suction should not be led to pumps inside the machinery space. Means of detecting such leakage should be provided.

702. 3.7.2.1 The hold or interbarrier spaces of Type A independent tank ships should be provided with a drainage system suitable for handling liquid cargo in the event of cargo tank leakage or rupture. Such arrangements should provide for the return of any cargo leakage to the liquid cargo piping.

a. 3.7.2.2 Arrangements referred to in 3.7.2.1 should be provided with a removable spool piece.

703. 3.7.3 In case of internal insulation tanks, means of detecting leakage and drainage arrangements are not required for interbarrier spaces and spaces between the secondary barrier and the inner hull or independent tank structure which are completely filled by insulation material complying with 4.9.7.2.

704. 3.7.4 Ballast spaces, including wet duct keels used as ballast piping, fuel-oil tanks and gas-safe spaces may be connected to pumps in the machinery spaces. Dry duct keels with ballast piping passing through, may be connected to pumps in the machinery spaces, provided the connections are led directly to the pumps and the discharge from the pumps lead directly overboard with no valves or manifolds in either line which could connect the line from the duct keel to lines serving gas-safe spaces. Pump vents should not be open to machinery spaces.

800. 3.8 Bow or stern loading and unloading arrangements.

801. 3.8.1 Subject to the requirements of this section, cargo piping may be arranged to permit bow or stern loading and unloading.

a. 3.8.1.1 Bow or stern loading and unloading lines which are led past accommodation spaces, service spaces or control stations should not be used for the transfer of products requiring a type 1G ship. Bow or stern loading and unloading lines should not be used for the transfer of toxic products as specified in 1.3.38 unless specifically approved by the Administration.

802. 3.8.2 Portable arrangements should not be permitted.

803. 3.8.3 In addition to the requirements of chapter 5 the following provisions apply to cargo piping and related piping equipment:

a. .1 Cargo piping and related piping equipment outside the cargo area should have only welded connections. The piping outside the cargo area should run on the open deck and should be at least 760 mm inboard except for thwartships shore connection piping. Such piping should be clearly identified and fitted with a shut-off valve at its connection to the cargo piping system within the cargo area. At this location, it should also be capable of being separated by means of a

removable spool piece and blank flanges when not in use.

b. .2 The piping is to be full penetration butt welded, and fully radiographed regardless of pipe diameter and design temperature. Flange connections in the piping are only permitted within the cargo area and at the shore connection.

c. .3 Arrangements should be made to allow such piping to be purged and gas-freed after use. When not in use, the spool pieces should be removed and the pipe ends be blank-flanged. The vent pipes connected with the purge should be located in the cargo area.

804. 3.8.4 Entrances, air inlets and openings to accommodation spaces, service spaces, machinery spaces and control stations should not face the cargo shore connection location of bow or stern loading and unloading arrangements. They should be located on the outboard side of the superstructure or deckhouse at a distance of at least 4% of the length of the ship but not less than 3 m from the end of the superstructure or deckhouse facing the cargo shore connection location of the bow or stern loading and unloading arrangements. This distance, however, need not exceed 5 m. Sidescuttles facing the shore connection location and on the sides of the superstructure or deckhouse within the distance mentioned above should be of the fixed (non-opening) type. In addition, during the use of the bow or stern loading and unloading arrangements, all doors, ports and other openings on the corresponding superstructure or deckhouse side should be kept closed. Where, in the case of small ships, compliance with C1.204 (3.2.4) and this paragraph is not possible, the Administration may approve relaxations from the above requirements.

3.8.5 Deck openings and air inlets to spaces within distances of 10 m from the cargo shore connection location should be kept closed during the use of bow or stern loading or unloading arrangements.

806. 3.8.6 Electrical equipment within a zone of 3 m from the cargo shore connection location should be in accordance with Part II, Section 7, Chapter A (chapter 10).

807. 3.8.7 Fire-fighting arrangements for the bow or stern loading and unloading areas should be in accordance with Part II, Title 34, Section 3, Chapter A, A1301.c and A1.407.11.3.1.3 and 11.4.7.

808. 3.8.8 Means of communication between the cargo control station and the shore connection location should be provided and if necessary certified safe.