CCS Rule Change Notice For:

RULES FOR CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK

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Contents

PART ONE GENERAL

Chapter A1 GENERAL PROVISIONS

A1.2 In addition to general requirements, applicable chapters or indications for different cargo tanks ~~and~~, cargo containment systems and liquefied carbon dioxide carriers are as follows:

(1) Appendix 1 to PART TWO of the Rules — Additional Requirements for Type A and Type B Prismatic Independent Tank Liquefied Gas Carriers;

(2) Appendix 2 to PART TWO of the Rules — Additional Requirements for Type C Independent Tank Liquefied Gas Carriers;

(3) Appendix 3 to PART TWO of the Rules — Additional Requirements for Independent Tank Liquefied Gas Carriers with regard to fatigue strength of the hull structures, cargo tanks and their support structures;

(4) Appendix 4 to PART TWO of the Rules —Applicable Requirements for Ships Dedicated to Carry Liquefied Carbon Dioxide in Bulk;

~~(4)~~(5) For relevant requirements for hull structures and pump towers of membrane tank LNG carriers, see CCS Rules for Classification of Sea-going Steel Ships, PART TWO, Chapter 20 “Membrane Tank LNG Carriers”.

PART TWO CLASSIFICATION SURVEY AND ADDITIONAL REQUIREMENTS FOR HULL STRUCTURE

Chapter A2 CLASSIFICATION AND SURVEYS

Section 2 CHARACTERS OF CLASSIFICATION AND CLASS NOTATIONS

A2.2.2 Class Notations

A2.2.2.4 Type of ship notation, cargo and loading characteristics notation of ships carrying liquefied gases in bulk are as follows, which are to be assigned in accordance with principles for identification in Appendix 1, Chapter 2, PART ONE of CCS Rules for Classification of Sea-going Steel Ships:

(1) Type of ship notation is assigned in the order of ship type, protection against cargo leakage and tank type, which are separated by comma:

① Ship type

(a) Liquefied Gas Carrier

For ships mainly carrying one or more of the products listed in Chapter 19 of PART THREE of the Rules, the words "for+ product name" may be appended after notation "Liquefied Gas Carrier". The product name is to be in accordance with column "a" of the table of minimum requirements in Chapter 19 of PART THREE of the Rules, e.g.:

Class notation of ships carrying liquefied ethane: Liquefied Gas Carrier for Ethane

Class notation of ships carrying liquefied butane, butane/propane mixture: Liquefied Gas Carrier for Butane, Butane-propane mixture

Class notation of ships carrying liquefied carbon dioxide: Liquefied Gas Carrier for Carbon Dioxide

(b) For liquefied gas carriers dedicated to carry liquefied natural gas, the following class notation may be assigned:

LNG Carrier

② Protection against cargo leakage

(a) In accordance with the degree of protection against cargo leakage and the requirement for the distance between cargo tanks and shell plating, the following class notations will be appended to the ship type respectively:

Type 1G

Type 2G

Type 2PG

Type 3G

(b) For the ships carrying liquefied gases in bulk which were built before 1 July 1986, and complying with IMO resolution A.328(IX) Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (hereinafter referred to as GC code), in accordance with the degree of protection against cargo leakage and the requirement for the distance between cargo tanks and shell plating, the following class notations will be appended to the ship type respectively:

Type IG

Type IIG

Type IIPG

Type IIIG

③ Tank type

In accordance with the type of cargo containment system, the following class notations will be appended to protection against cargo leakage respectively:

Type A Independent Tank

Type B Independent Tank

Type C Independent Tank

Integral Tank

Membrane Tank

Semi-membrane Tank

(2) Cargo and loading characteristics notation

① Where the scantlings of structural members of cargo tanks are determined according to the designed maximum vapour pressure, the class notation for the maximum vapour pressure is to be appended, e.g.:

Max. Vapour Pressure XXXMPa

② Where the scantlings of structural members of cargo tanks are determined according to the designed maximum permissible full tank cargo density, the class notation for the maximum permissible cargo density is to be appended, e.g.:

Max. Cargo Density XXX t/m^3

Note: For liquefied natural gas carriers, the maximum design cargo density is normally taken as $0.5t/m^3$, and the maximum cargo density may not be indicated.

③ For cargo tanks carrying cargo at the certified design temperature, the class notation for the minimum cargo temperature is to be appended:

Min. Cargo Temperature XXX℃

A2.2.2.6 For technical requirements for ships dedicated to carry liquefied carbon dioxide in bulk, see Appendix 4 to PART TWO of the Rules.

Appendix 4 is added as follows:

Appendix 4 APPLICABLE REQUIREMENTS FOR SHIPS DEDICATED TO CARRY LIQUEFIED CARBON DIOXIDE IN BULK

Section 1 GENERAL PROVISIONS

1.1 General requirements

1.1.1 This Appendix does not apply to integral tanks, membrane tanks/semi-membrane tanks and independent type A/type B prismatic tanks.

1.1.2 Special requirements for carbon dioxide cargo are to comply with the requirements of 17.21 and 17.22 of Chapter 17 of PART THREE of the Rules.

1.2 Plans and documents

1.2.1 The requirements for submitting plans and documents are to comply with the following provisions of Chapter A3 of PART TWO of the Rules:

(1) A3.1.1;

(2) A3.1.2.1(1) and (2);

(3) A3.1.2.2(1), (3), (4), (5), (7), (8), (9), (16), (19), (20), (27), (28), (29), (30), (31), (32), (33), (34), (35), (36), (37), (38), (39),(43), (44), (48) and (49);

(4) A3.1.3.1(1) and (2);

(5) A3.1.3.2(1), (2), (4), (6), (8), (15), (16), (18), (19), (22) and (29);

(6) A3.2.

1.2.2 Other plans and documents as deemed necessary by CCS.

Section 2 SURVEYS

2.1 Surveys during construction

2.1.1 The surveys during construction are to be carried out in compliance with the requirements of A2.3.1 of Section 3 of Chapter A2 of PART TWO of the Rules.

2.2 Surveys after construction

2.2.1 General requirements

2.2.1.1 The requirements of A2.3.2.1 of Section 3 of Chapter A2 of PART TWO of the Rules are to be complied with.

2.2.2 Annual surveys

2.2.2.1 Other requirements other than (5), (8), (24), (25), (28), (35), (36), (41), (42), (43) and (45) in A2.3.2.2 of Section 3 of Chapter A2 of PART TWO of the Rules are to be complied with, except that:

(1) “devices to prevent the passage of flame” in A2.3.2.2(4) does not apply;

(2) “water curtain protection” in A2.3.2.2(30) does not apply;

(3) “thermal oxidation systems” in A2.3.2.2(33) does not apply;

(4) “inert gas system” in A2.3.2.2(37) does not apply;

(5) “flame screen” in A2.3.2.2(52) does not apply;

(6) “inert gas installations”and “cargo containment system of membrane type tanks” in A2.3.2.2(54) do not apply;

(7) in A2.3.2.2 (55), only ③ applies.

2.2.3 Intermediate surveys

2.2.3.1 2.2.2 of this Appendix and requirements other than (2), (3), (7), and (8) in A2.3.2.3 of Section 3 of Chapter A2 of PART TWO of the Rules are to be complied with, except that:

(1) "dangerous zones" in A2.3.2.3(4) does not apply;

(2) "inerted hold spaces"and "inspection and verification of the piping of the gas detection system" in A2.3.2.3(6) do not apply.

2.2.4 Special surveys

2.2.4.1 2.2.3 of this Appendix and other requirements other than (2) and (9) in A2.3.2.4 of Section 3 of Chapter A2 of PART TWO of the Rules are to be complied with, except that:

(1) "integral tanks" in A2.3.2.4(6) does not apply;

(2) "liquid nitrogen piping" in A2.3.2.4(12) does not apply;

(3) "methane boil-off burning"and "liquid nitrogen vessels" in A2.3.2.4(13) do not apply.

(4) "inert gas"and "electrically bonded" in A2.3.2.4(14) do not apply.

2.3 Surveys on fitness certificate or compliance document

2.3.1 Surveys on fitness certificate or compliance document are to be carried out in compliance with the requirements of A2.3.3 of Section 3 of Chapter A2 of PART TWO of the Rules.

Section 3 SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

3.1 Ship survival capability and location of cargo tanks

3.1.1 Ship survival capability and location of cargo tanks are to comply with the applicable requirements for type 3G ships in Chapter 2 of PART THREE of the Rules.

Section 4 SHIP ARRANGEMENTS, FIRE PROTECTION AND EXTINCTION, VENTILATION AND PERSONNEL PROTECTION

4.1 Ship arrangements

4.1.1 Segregation of hold spaces in 3.1.2 of 3.1 of Chapter 3 of PART THREE of the Rules from spaces referred to in 3.1.1 is to be effected by "A-0" class bulkheads.

4.1.2 Windows and sidescuttles in 3.2.5 of Chapter 3 of PART THREE of the Rules are to be reasonably gastight and "A-60" class fire protection is not required.

4.1.3 Fire protection in 3.3.1 of Chapter 3 of PART THREE of the Rules is to comply with SOLAS regulation II-2/9.2.3.

4.1.4 Ship arrangements are also to comply with the following requirements of Chapter 3 of PART THREE of the Rules:

(1) the requirements of 3.1.1, 3.1.3, 3.1.6.1 and 3.1.7 of 3.1;

(2) the requirements of 3.2.1, 3.2.2, 3.2.4.1, 3.2.4.2 and 3.2.6 of 3.2;

(3) the requirements of 3.3.5 and 3.3.6 of 3.3;

(4) the requirements of 3.4.2 of 3.4;

(5) the requirements of 3.5 other than 3.5.4, 3.5.5 and 3.5.6;

(6) the requirements of 3.6;

(7) the requirements of 3.7;

(8) the requirements of 3.8 other than 3.8.2, 3.8.6 and 3.8.7.

4.2 Fire protection and extinction

4.2.1 The requirements for fire protection and extinction in Chapter 11 of PART THREE of the Rules do not apply.

4.2.2 Fire protection and extinction of ships carrying liquefied carbon dioxide is to comply with the requirements for cargo ships other than tankers in SOLAS chapter ll-2, which apply to ships covered by this Appendix, irrespective of tonnage including ships of less than 500 gross tonnage,

4.3 Artificial ventilation in the cargo area

4.3.1 The ventilation in the cargo area is to comply with the requirements of Chapter 12 of PART THREE of the Rules except for the following:

(1) the requirements of 12.1.4, 12.1.5, 12.1.6, 12.1.7, 12.1.9 and 12.1.10 of 12.1;

(2) the requirements of 12.2.3 of 12.2.

4.4 Personnel protection

4.4.1 Ships carrying liquefied carbon dioxide are to be provided with firefighter's outfits in accordance with the requirements for cargo ships other than tankers in SOLAS regulation II-2/10.10.

4.4.2 Personnel protection is to comply with the following requirements of Chapter 14 of PART THREE of the Rules:

(1) 14.1;

(2) 14.2;

(3) the requirements of 14.3 other than 14.3.2.4.

4.4.3 EEBD for emergency escape purposes is to be provided for every person on board.

Section 5 HULL STRUCTURE, CARGO TANK STRUCTRE AND FILLING LIMITS

5.1 Hull structure and cargo tank structure

5.1.1 Hull structures and cargo tank structures are to comply with the requirements of applicable tank types in Chapter A4 of PART TWO of the Rules.

5.2 Filling limits of cargo tanks

5.2.1 The Filling limits of liquefied carbon dioxide cargo tanks are to comply with the relevant requirements of Chapter 15 of PART THREE of the Rules.

Section 6 CARGO CONTAINMENT SYSTEM

6.1 Cargo containment

6.1.1 A tank complying with the criteria of type C tank minimum design pressure may be allocated to a type A or type B, dependent on the configuration of the tank and the arrangement of its supports and attachments.

6.1.2 Cargo containment is to comply with the requirements of Chapter 4 of PART THREE of the Rules except for the following:

(1) the requirements of 4.4.5 of 4.4 of Part A;

(2) the requirements of 4.13.4.1 of 4.13 of Part B.

6.2 Materials of construction and quality control

6.2.1 Materials, welding, and nondestructive testing for cargo containment systems, piping, and adjacent hull structures are to comply with the requirements of Chapter 6 of PART THREE of the Rules. All materials used in cargo tanks and cargo piping system are to be suitable for the lowest temperature that may occur in service. The materials of construction used in the cargo system are also to take account of the possibility of corrosion and one of the following measures may be taken:

(1) controlling impurities in carbon dioxide cargo;

(2) using corrosion resistant materials;

(3) taking effective anti-corrosion measures.

6.3 Cargo pressure and temperature control

6.3.1 Cargo pressure and temperature control are to comply with the requirements of Chapter 7 of PART THREE of the Rules except for the following:

(1) the requirements of 7.1.1.2 and 7.1.2 of 7.1;

(2) the requirements of 7.3.1.4 of 7.3;

(3) the requirements of 7.4;

(4) the requirements of 7.7;

(5) the requirements of CCS7.8.1.a, CCS7.8.1.b and 7.8.4 of 7.8.

6.4 Vent systems for cargo containment

6.4.1 There is a potential for the cargo to solidify in the event that a cargo tank relief valve fails in the open position. To avoid this, a means of isolating the cargo tank safety valves is to be provided. Discharge piping from safety relief valves is to be designed so they remain free from obstructions that could cause clogging. Protective screens are not to be fitted to the outlets of relief valve discharge piping.

6.4.2 The vent systems for cargo containment are also to comply with the requirements of Chapter 8 of PART THREE of the Rules except for the following:

(1) The requirements of 8.2.5.1.2, 8.2.9.2, 8.2.10, CCS8.2.11, 8.2.13 and 8.2.15 of 8.2.

6.5 Cargo containment system atmosphere control

6.5.1 Atmosphere control within the cargo containment system

6.5.1.1 Dry air may be used for atmosphere control of cargo containment systems and piping systems and may be supplied from shore or ship.

6.5.1.2 Cargo containment system atmosphere control is also to comply with the requirements of 9.1.1 and 9.1.4 of Chapter 9 of PART THREE of the Rules.

6.5.2 Atmosphere control within the hold spaces

6.5.2.1 Interbarrier and hold spaces associated with cargo containment systems and spaces surrounding cargo tanks that do not have secondary barriers are to be filled with suitable dry air. Equipment for the provision of sufficient dry air of suitable quality to maintain the environment of such spaces is to be provided on board. If the cargo is carried at ambient temperature, the requirement for dry air is not applicable.

6.5.3 Dry air system

6.5.3.1 If dry air systems are used for atmosphere control on board, the following requirements for inert

gas in Chapter 9 of PART THREE of the Rules are to be complied with:

(1) the requirements of CCS9.4.1, 9.4.4 and 9.4.5 of 9.4;

(2) the requirements of 9.5.2 of 9.5.

Section 7 PROCESS PRESSURE VESSELS AND LIQUID, VAPOUR AND PRESSURE PIPING SYSTEMS

7.1 The requirements of this Section apply to products and process piping, including vapour piping and vent lines of safety valves or similar piping. Auxiliary piping systems not containing cargo are exempt from the requirements of this Section.

7.2 Piping design, fabrication and joining details, and testing requirements are to apply to liquefied carbon dioxide cargo.

7.3 The cargo handling and cargo control systems are to be designed taking into account the following:

(1) prevention of an abnormal condition escalating to a release of liquid or vapour cargo;

(2) the safe collection and disposal of cargo fluids released;

(3) limiting the exposure of personnel to asphyxiant hazard.

7.4 Piping is also to comply with the requirements of Chapter 5 of PART THREE of the Rules except for the following:

(1) the requirements of 5.1.1 of 5.1;

(2) the requirements of 5.2.1 of 5.2;

(3) the requirements of 5.3.3 and 5.3.4 of 5.3;

(4) the requirements of 5.4.4 of 5.4;

(5) the requirements of 5.7.3 and 5.7.4 of 5.7;

(6) the requirements of 5.10.2 and 5.10.3 of 5.10;

(7) the requirements of 5.11.4 of 5.11;

(8) the requirements of 5.13.1.1 and 5.13.2.4 of 5.13.

Section 8 ELECTRICAL INSTALLATIONS, INSTRUMENTATION AND AUTOMATION SYSTEMS

8.1 Electrical installations

8.1.1 Electrical installations are to comply with the requirements of 10.2.6 of Chapter 10 of PART THREE of the Rules.

8.2 Instrumentation and automation systems

8.2.1 Monitoring, display and alarm

8.2.1.1 Monitoring and alarm are to comply with the requirements of 17.21.4 of Chapter 17 of PART THREE of the Rules.

8.2.2 Gas detection

8.2.2.1 Gas detection is to comply with the requirements of 13.6.12, CCS13.6.12, 13.6.13 and 13.6.18 of Chapter 13 and 17.21.6 of Chapter 17 of PART THREE of the Rules.

8.2.3 Other requirements

8.2.3.1 Instrumentation and automation systems are to comply with the requirements of Chapter 13 of PART THREE of the Rules except for the following:

(1) “automatic shutoff alarms for submerged pump motors” and “alarms for automatic shutoff of cargo compressor due to high pressure or high temperature” in CCS13.1.a.

(2) “alarms for automatic shutoff of cargo compressor due to high pressure or high temperature” in CCS13.1.b.

(3) 13.6;

(4) the requirements of 13.7.2.2 and 13.7.2.3 of 13.7.

PART THREE THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK

CHAPTER 18 OPERATING REQUIREMENTS

The new contents are added as follows:

CCS18.0.b The operating requirements for carrying liquefied carbon dioxide cargo in bulk shall comply with the requirements of Chapter 18 of PART THREE of the Rules except for the following:

(1) the requirements of 18.2.2.4, 18.2.2.5 and 18.2.2.6 of 18.2;

(2) the requirements of 18.3.1.5 and 18.3.1.6 of 18.3;

(3) the requirements of 18.4;

(4) the requirements of 18.8.2 and 18.8.3 of 18.8;

(5) the requirements of 18.10.3.2 of 18.10;

(6) the requirements of "fire detection on deck or in compressor house" in the second line of Table 18.1 ESD functional arrangements and footnote * “fusible plugs, electronic point temperature monitoring or area fire detection may be used for this purpose on deck";

(7) 18.12 Additional operating requirements will be found in the following paragraphs of the Code: 5.3.3.3, 5.7.3, 7.1.1.2, 7.1.2, 8.2.9.2, 9.2, 9.3, 9.4.4, 13.1.3, 13.3.6, 13.6.18, 16.6.3, 17.4.2, 17.6, 17.7, 17.9, 17.10, 17.11, 17.12, 17.13, 17.14, 17.16, 17.18 and 17.19.

~~CCS Appendix 1 Applicable requirements for Dedicated CO_2 carriers~~

~~1. Chapter 19 "Summary of Minimum Requirements" covers the minimum requirements for carriage of CO_2 and this Appendix applies to ships dedicated to the carriage of CO_2 in bulk (referred to as CO_2 carrier).~~

~~2. Where the Rules apply to CO_2 carriers, the requirements of the paragraphs listed in the left column may be implemented in accordance with the interpretations as listed in the right column:~~

~~Chapter~~	~~Interpretation/applicability~~
~~3.1.2~~	~~Segregation by a single A-0 class division may meet the requirements for division in 3.1.2~~
~~5.7.4~~	~~Electrically bonding is not required for piping and tanks~~
~~18.10.3.2~~	~~Fusible elements are not required to be used for emergency shutdown system~~
~~Chapter 10~~	~~Certified safe type equipment is not required~~
~~Chapter 11~~	~~This chapter is not applicable~~
~~12.1.7~~	~~No requirements for the location and explosion-proof level of electric motors driving fans~~
~~12.1.9~~	~~Protection screens are not needed to be fitted in way of outside openings of ventilation ducts~~
~~13.6~~	~~Only the requirements of 13.6.19 and 13.6.20 are applicable~~