



2017

**Guidance for
LNG Fuel Ready Ships**

KR

APPLICATION OF "GUIDANCE FOR LNG FUEL READY SHIPS"

1. Unless expressly specified otherwise, the requirements in the Guidance apply to LNG Fuel Ready Ships for which contracts for construction are signed on or after 1 April 2017.
2. The amendments to the Rules for 2015 edition and their effective date are as follows;

Effective Date 1 April 2017

CHAPTER 1 GENERAL

Section 2 Class Notation

- 203. 2 (9), (10) and (11) have been newly added.

CHAPTER 2 REQUIREMENTS FOR LEVELS OF LNG FUEL READY

Section 2 Level of Preparing Generic Design

- 202. 1 (9) has been newly added.

Section 3 Level of Installing Parts of Systems

- 301. 3 (9), (10) and (11) have been newly added.
- 310., 311. and 312. have been newly added.

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CHAPTER 1 GENERAL

Section 1 General

101. Application

1. This Guidance applies to ships which are prepared for conversion with the design or the partial installation related with liquefied natural gas fuel during the new building phase(hereafter referred to as "LNG fuel ready ships" in the Guidance) for the purpose of a conversion from a ship using conventional marine fuels to liquefied natural gas fuel after delivery.
2. This Guidance contains levels of readiness for use of LNG as fuel(hereafter referred to as "LNG fuel ready levels" in the Guidance) and requirements applicable thereto, and the scope of preparation is defined by the agreement between the shipowner and the shipbuilder.
3. This Guidance is not to apply to where ships carrying natural gas in bulk intend to use their cargo as fuel.
4. The design and the installation of LNG fuel systems of LNG fuel ready ships are to apply **Guidance for Gas-fuelled Ships** in force at the time of contract for construction for the new-building. However, where a LNG fuel ready ship in accordance with this Guidance is converted to a gas fuelled ship after delivery, the ship shall comply with **Guidance for Gas-fuelled Ships** in force at the time of the ship conversion.
5. This Guidance applicable to ships which intend to use LNG as fuel. Where this Guidance is apply to ships which intend to use other gas fuels, special consideration is to be given.

102. Definitions

The definitions of terms in this Guidance are to be followed to **Guidance for Gas-fuelled Ships**

103. LNG fuel ready levels

1. LNG fuel ready levels are defined in 2 steps as follows:
 - (1) The level of preparing the generic design
 - (2) The level of installing parts of the systems with the detailed design in addition to above (1)
2. The class notations defined in **Sec 2** may be assigned where the ready level in **Para 1** is in compliance with this Guidance.

Section 2 Class Notation

201. General

1. The class notations specified in **201.** and **202.** may be assigned according to the LNG fuel ready level
2. The requirements for the class notations in this Section are to comply with **Ch 2.**

202. LNG Ready D

1. LNG Ready D as an additional special feature notation may be assigned to ships for which the generic design is prepared.
2. LNG Ready D is not to be assign to ships having LNG Ready I.

203. LNG Ready I

1. LNG Ready I as an additional special feature notation may be assigned to ships for which parts of the systems are installed with the detailed design in addition to the generic design.
2. In assignment of the LNG Ready I, the characters corresponding to the installed items may be assigned in the bracket one or a combination of them in addition to LNG Ready I. The characters corresponding to the installed items are as follows:
 - (1) Hull structural reinforcement for LNG fuel tank - SR
 - (2) LNG fuel tank - FT
 - (3) LNG fuel tank venting systems - TV
 - (4) Gas fuel supply systems - FS
 - (5) Gas fuel bunkering systems - BS
 - (6) Gas fired main engines - ME
 - (7) Gas fired auxiliary engines - AE
 - (8) Gas fired boilers - B
 - (9) Main engines that can be converted to gas fuel operation - ME-C (2017)
 - (10) Auxiliary engines that can be converted to gas fuel operation - AE-C (2017)
 - (11) Boilers that can be converted to gas fuel operation - B-C (2017)

For example, LNG Ready I(SR, FT) may be assigned to the ship on which structural reinforcement for LNG fuel tank and LNG fuel tank are installed, and LNG Ready I(FS, ME) may be assigned to the ship on which gas fuel supply systems and gas fired main engines are installed. ↓

CHAPTER 2 REQUIREMENTS FOR LEVELS OF LNG FUEL READY

Section 1 General

101. General

1. This Guidance prescribes plans to be submitted and systems to be installed. The design and installation of structures and systems are to be in accordance with applicable requirements in **Guidance for Gas-fuelled Ships**.
2. Drawing approval and survey for LNG fuel ready are not accepted as Drawing approval and survey for conversion to gas fuel ship. When the ship is converted, drawing approval and survey are to be carried out in accordance with **Guidance for Gas-fuelled Ships** in force at the time of the ship conversion. Approved Drawings and certifications from new building stage may be used as reference for conversion.

Section 2 Level of Preparing Generic Design

201. General

1. This Section prescribes plans and documents to be submitted for LNG Ready D. The detail requirements for designs are to be in accordance with applicable requirements in **Guidance for Gas-fuelled Ships**.
2. The plans and documents required in this Section is to be marked "LNG Ready" to separate them from the normal plans and documents of new building.

202. Plans and documents to be submitted

1. The following plans and documents are to be submitted to the Society for review
 - (1) Arrangement plans showing location of:
 - (A) Machinery spaces, accommodation, service and control station spaces
 - (B) LNG fuel tanks and gas containment systems
 - (C) Gas pump room and compressor rooms
 - (D) Gas piping with shore connections
 - (E) Tank hatches, ventilation pipes and any other openings to the LNG fuel tanks
 - (F) Ventilating pipes, doors and openings to gas pump rooms, compressor rooms and other hazardous areas
 - (G) Entrances, air inlets and openings to accommodation, service and control station spaces
 - (H) Hazardous areas of zone 0, 1 and 2
 - (2) Following plans and data of the LNG fuel containment system:
 - (A) LNG fuel tank type, dimension and volume
 - (B) Drawings of support and staying of LNG fuel tanks
 - (C) LNG fuel tank arrangement including tank connection space
 - (D) Specification of design loads and structural analysis for the LNG fuel tank supporting structure
 - (E) Drawing and specification of LNG fuel tank thermal insulation with heat transfer calculation
 - (3) Following plans and data of gas fuel supply systems:
 - (A) Arrangement of engine room, gas pump, gas compressor room and other spaces containing gas equipment
 - (B) Gas fuel supply piping diagram
 - (C) Ventilation system arrangement of engine room, gas pump, gas compressor room and other spaces containing gas equipment
 - (4) Following plans and data of gas fuel bunkering systems:
 - (A) Arrangement of gas fuel bunkering systems

- (B) Gas fuel bunkering piping diagram
- (C) Ventilation system arrangement of gas fuel bunkering station
- (5) Following plans and particulars for the safety relief valves
 - (A) Arrangement for LNG fuel tank relief valves and associated ventilation piping
 - (B) Calculation of required LNG fuel tank relief valve capacity
- (6) Following plans and data for equipment and systems regarding fire protection :
 - (A) Arrangement of construction for fire protection in relation to LNG fuel tank and other spaces containing gas equipment
 - (B) Arrangement and specification of water spray system
 - (C) Arrangement and specification of dry chemical powder installation
- (7) Data for a risk analysis according to **Ch 1, 302.** of **Guidance for Gas-fuelled Ships**
- (8) Stability calculations with LNG fuel tanks included
- (9) Longitudinal strength calculations with LNG fuel tanks included (2017)

Section 3 Level of Installing Parts of Systems

301. General

1. This Section prescribes parts of the systems to be installed and plans and documents to be submitted for LNG Ready I. The detail requirements for designs and installation of installed systems are to be in accordance with applicable requirements in **Guidance for Gas-fuelled Ships**.
2. The plans and documents for generic design required in **Sec 2** are to be submitted and reviewed by the Society except those required for approval in **302.** to **306.**
3. Parts of the systems are categorized in the follows:
 - (1) Hull structural reinforcement for LNG fuel tank
 - (2) LNG fuel tank
 - (3) LNG fuel tank venting systems
 - (4) Gas fuel supply systems
 - (5) Gas fuel bunkering systems
 - (6) Gas fired main engines
 - (7) Gas fired auxiliary engines
 - (8) Gas fired boilers
 - (9) Main engines that can be converted to gas fuel operation (2017)
 - (10) Auxiliary engines that can be converted to gas fuel operation (2017)
 - (11) Boilers that can be converted to gas fuel operation (2017)
4. The parts which are installed on board are to be reflected in the normal plans of new building and "LNG Ready" is not to be marked on those plans.

302. Hull structural reinforcement for LNG fuel tank

1. The structures below the LNG fuel tanks are to be reinforced in accordance with **Ch 3, 102.** and **108.** of **Guidance for Gas-fuelled Ships**.
2. The following plans and documents are to be submitted to the Society for approval.
 - (1) Detail drawing of LNG fuel tanks and support of LNG fuel tanks
 - (2) Material specification for tank support and steel grade selection for the hull in way of the tank
 - (3) Welding procedures, stress relieving procedures and non-destructive testing plans
 - (4) Specification of design loads and structural analysis for the LNG fuel tank supporting structure
 - (5) Drawing and specification of LNG fuel tank thermal insulation with heat transfer calculation

303. LNG fuel tank

1. LNG fuel tanks are to be installed in accordance with **Ch 3, Sec 2** and **Ch 4** of **Guidance for Gas-fuelled Ships**.
2. The plans and documents in **Ch 1, 402. 2** of **Guidance for Gas-fuelled Ships** and LNG fuel tank arrangement including tank connection space are to be submitted to the Society for approval.

304. LNG fuel tank venting systems

1. LNG fuel tank venting systems are to be installed in accordance with **Ch 4, 218.** of **Guidance for Gas-fuelled Ships.**
2. The plans and documents in **Ch 1, 402. 4** of **Guidance for Gas-fuelled Ships** are to be submitted to the Society for approval.

305. Gas fuel supply systems

1. Gas fuel supply systems are to be installed in accordance with **Ch 5** and **Ch 6, Sec 2** of **Guidance for Gas-fuelled Ships.**
2. The following plans and documents are to be submitted to the Society for approval.
 - (1) Arrangement of engine room, gas pump, gas compressor room and other spaces containing gas equipment
 - (2) Ventilation system arrangement of engine room, gas pump, gas compressor room and other spaces containing gas equipment
 - (3) Drawings and specifications of gas supply piping
 - (4) Drawings and specifications of offsets, loops, bends and mechanical expansion joints, such as bellows, slip joints(only inside tank) or similar means in the gas piping
 - (5) Drawings and specifications of flanges, valves and other fittings in the gas piping system. For valves intended for piping systems with a design temperature below - 55 °C, documentation for leak test and functional test at design temperature (type test) is required
 - (6) Complete stress analysis of piping system when design temperature is below - 110 °C
 - (7) Documentation of type tests for expansion components in the gas piping system.
 - (8) Specification of materials, welding, post-weld heat treatment and non-destructive testing of gas piping
 - (9) Specification of pressure tests (structural and tightness tests) of gas piping
 - (10) Program for functional tests of all piping systems including valves, fittings and associated equipment for handling gas (liquid or vapour)
 - (11) Drawings and specifications of insulation for low temperature piping where such insulation is installed
 - (12) Specification of electrical bonding of piping
 - (13) Cooling or heating water system in connection with gas fuel system, if fitted.

306. Gas fuel bunkering systems

1. Gas fuel bunkering systems are to be installed in accordance with **Ch 5** and **Ch 6, Sec 1** of **Guidance for Gas-fuelled Ships.**
2. The following plans and documents are to be submitted to the Society for approval.
 - (1) Arrangement of gas fuel bunkering systems
 - (2) Ventilation system arrangement of gas fuel bunkering station
 - (3) Drawings and specifications of gas supply piping
 - (4) Drawings and specifications of offsets, loops, bends and mechanical expansion joints, such as bellows, slip joints(only inside tank) or similar means in the gas piping
 - (5) Drawings and specifications of flanges, valves and other fittings in the gas piping system. For valves intended for piping systems with a design temperature below - 55 °C, documentation for leak test and functional test at design temperature (type test) is required
 - (6) Complete stress analysis of piping system when design temperature is below - 110 °C
 - (7) Documentation of type tests for expansion components in the gas piping system.
 - (8) Specification of materials, welding, post-weld heat treatment and non-destructive testing of gas piping
 - (9) Specification of pressure tests (structural and tightness tests) of gas piping
 - (10) Program for functional tests of all piping systems including valves, fittings and associated equipment for handling gas (liquid or vapour)
 - (11) Drawings and specifications of insulation for low temperature piping where such insulation is installed
 - (12) Specification of electrical bonding of piping

(13) Specification of means for removal of liquid contents from bunkering pipes prior to disconnecting the shore connection

307. Gas fired main engines

Main engines are to be installed in accordance with **Ch 7, Sec 1** and **Sec 2** of **Guidance for Gas-fuelled Ships**.

308. Gas fired auxiliary engines

Auxiliary engines are to be installed in accordance with **Ch 7, Sec 1** and **Sec 2** of **Guidance for Gas-fuelled Ships**.

309. Gas fired boilers

Boilers are to be installed in accordance with **Ch 7, Sec 1** and **Sec 3** of **Guidance for Gas-fuelled Ships**.

310. Main engines that can be converted to gas fuel operation (2017)

1. Main engines of gas-convertible types are to be installed.
2. Following plans are to be submitted for reference:
 - (1) details of the gas conversion
 - (2) list of the components that need to be replaced
 - (3) list of new components

311. Auxiliary engines that can be converted to gas fuel operation (2017)

1. Auxiliary engines of gas-convertible types are to be installed.
2. Following plans are to be submitted for reference:
 - (1) details of the gas conversion
 - (2) list of the components that need to be replaced
 - (3) list of new components

312. Boilers that can be converted to gas fuel operation (2017)

1. Boilers of gas-convertible types are to be installed.
2. Following plans are to be submitted for reference:
 - (1) details of the gas conversion
 - (2) list of the components that need to be replaced
 - (3) list of new components

Section 4 Survey

401. Classification survey during construction

Systems are to be tested at the shops of manufacturer and after installation on board in accordance with **Guidance for Gas-fuelled Ships**.

402. Periodical surveys

In application of this Guidance, the general condition of the relevant systems installed on board is to be examined visually at periodical surveys for the vessels having LNG Ready I notation. The systems are to be surveyed and evaluated for the condition at time of conversion, and the scope of test will be defined depending on time elapsed from new building and maintenance level of the systems. ↓

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