
**Ships and marine technology —
Performance test procedures for LNG
fuel gas supply systems (FGSS) for
ships**

*Navires et technologie maritime — Procédures d'essais de
performance des systèmes d'alimentation en gaz combustible GNL
(FGSS) pour navires*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In response to an increased number of ships using LNG fuel, the International Maritime Organization (IMO) adopted the IGF code that specifies mandatory requirements of the LNG fuel tank, LNG fuel engine, fuel gas supply system (FGSS), bunkering, control of safety system, monitoring, and fire extinguishing systems, etc. to ensure the safety of gas-fuelled ships.

The requirements of the IGF and IGC Codes apply to the design and manufacture of LNG FGSS. However, no widely recognized standards in terms of the performance testing of FGSS has yet been established; thus, FGSS is tested according to a case-by-case agreement between the buyer and the supplier. For this reason, there have been needs to develop a standard for performance test methods of FGSS commonly acceptable to all stakeholders (e.g. shipowners, classification societies, engine makers, shipyards, etc.).

In this context, this document sets up a performance test procedure for the LNG FGSS, which consists of equipment such as pumps, heat exchangers, valves, piping, etc. With this document, it is expected that i) the performance of LNG FGSS be identified from an objective point of view, ii) useful information be provided to all stakeholders, and iii) development of more reliable LNG FGSS be facilitated, thus contributing to the growth of relevant industries and benefiting all stakeholders.

In addition, as specific requirements from classification societies and/or administrations can apply to the LNG FGSS concerned, the buyer is expected to identify those before placing a purchase order. The supplier and the buyer are further expected to agree on any additional applicable requirements.

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1 Scope

This document specifies evaluation methods of characteristics such as pressure, flow rate, temperature and system stability of fuel gas supply systems (FGSS), which are manufactured to use vaporized liquefied natural gas (LNG) or boil-off gas as fuel gas supply to the vessel's gas consumers. It is applicable to evaluate the performance of the LNG FGSS: (1) prior to delivery or after installation on board a ship, and (2) to assure the system characteristics are taken into account for the entire gas consumers during ship's gas trial or sea trial.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IMO, *International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk (IGC Code)*

IMO, *International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code)*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

LNG fuel gas supply system

LNG FGSS

system that supplies gas fuel at the temperature, pressure and flow conditions required by the gas consumer, from the fuel tank(s) to the gas consumer, excluding the fuel tank(s), in-tank pump(s), tank ESD valve(s) and the master gas fuel valve(s) used to control the gas supply

3.2

maximum pressure

maximum operating pressure (MPa) measured during the test period

3.3

minimum pressure

minimum operating pressure (MPa) measured during the test period

3.4

pressure pulsation

pressure variation (MPa) during the test period, defined as the difference between the *maximum pressure* (3.2) and the *minimum pressure* (3.3)