

**TR 56-3:2020+A1:2023**

(ICS 01.140.30; 47.020; 47.040)

**TECHNICAL REFERENCE**

# **LNG bunkering**

– Part 3 : Procedures and safety distances

Incorporating Amendment No. 1

**TR 56-3:2020+A1:2023**  
(ICS 01.140.30; 47.020; 47.040)

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**LNG bunkering**

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**Contents**

	<b>Page</b>
Foreword _____	3
0 Introduction _____	5
1 Scope _____	5
2 Normative references _____	5
3 Terms and definitions _____	5
4 Properties of LNG _____	5
5 Safety requirements _____	6
6 Bunkering procedure _____	11
7 Simultaneous operations _____	15
8 Cassette bunkering _____	16
9 Shore-to-ship bunkering _____	16
 <b>Annexes</b>	
A LNG bunkering checklists (informative) _____	17
B RACI matrix for bunkering stakeholders (informative) _____	52
C Examples of hand signals for bunkering communication (informative) _____	53
D Determination of controlled zones (informative) _____	54
E Emergency scenarios (informative) _____	59
F Examples of SIMOPS (informative) _____	61
 <b>Tables</b>	
A.1 Representatives for LNG transfer modes _____	17
D.1 Examples of risk acceptance criteria _____	57
 <b>Figures</b>	
D.1 Example of hazardous area, safety zone and monitoring zone for truck-to-ship LNG bunkering _____	54
D.2 Example of hazardous area, safety zone and monitoring zone for ship-to-ship LNG bunkering _____	55
D.3 Distance to LFL as a function of the release volume _____	56
D.4 Distance to LFL as a function of the system pressure (25 mm hole) _____	57
Bibliography _____	62

## Foreword

This Technical Reference was prepared by the Working Group on LNG bunkering procedures and safety distances set up by the Technical Committee on LNG bunkering under the purview of CSC.

TR 56 consists of the following parts under the generic title “LNG bunkering”:

- Part 1 : General introduction
- Part 2 : Requirements for custody transfer
- Part 3 : Procedures and safety distances
- Part 4 : Competency requirements for personnel

In this revision, the following changes were made:

- Enhancement of SIMOPS requirements under Clause 7 and SIMOPS examples listed in new Annex F;
- Inclusion of responsibility matrix for bunkering stakeholders in new Annex B;
- Better clarity on controlled zones under Clause 5.6;
- Amendments to LNG bunkering checklists with experience gained from truck-to-ship mode.

This standard incorporates Amendment No. 1, October 2023 denoted by A1 A1.

In preparing this TR, reference was made to the following documents:

1. BV Guidelines on LNG Bunkering (NI 618 – July 2014)
2. DNVGL-RP-G105 Development and operation of liquefied natural gas bunkering facilities (2015)
- A1 3. IAPH LNG bunker checklist – Truck-to-ship bunker operations – A, Version 4.0
4. IAPH LNG bunker checklist – Ship-to-ship bunker operations – A, Version 4.0 A1
5. ISO 17776 : 2000 – Petroleum and natural gas industries – Offshore production installations – Guidelines on tools and techniques for hazard identification and risk assessment
6. ISO 31010 : 2009 – Risk Management - Risk assessment techniques
7. ISO/TS 16901 : 2015 – Guidance on performing risk assessment in the design of onshore LNG installations including the ship/shore interface
8. ISO/TS 18683 : 2015 - Guidelines for systems and installations for supply of LNG as fuel to ships
9. OCIMF Mooring equipment guidelines, 4<sup>th</sup> edition 2018, MEG4
10. SGMF LNG Bunkering Safety Guidelines (2015)
11. SIGTTO ESD Arrangements & Linked Ship/Shore Systems for Liquefied Gas Carriers (2009)
12. SIGTTO LNG Transfer Arms and Manifold Draining, Purging and Disconnection Procedure (2012)

A1 Annex B of ISO 20519 was adapted and Table D.1 of ISO/TS 18683 was reproduced in Annex D of this TR with the permission of the International Organization for Standardization. Annex A of this TR was developed with reference to IAPH LNG bunker checklists. A1

Acknowledgement is made for the use of information from the following publications.

Acknowledgement is also made to The Society for Gas as a Marine Fuel (SGMF) for their kind assistance in the development of this Technical Reference and for their permission to reproduce/adapt the works from the following SGMF Guidelines:

- SGMF Quality and Quantity – Contractual Guidelines (definitions into TR 56 : Part 1 : 2020 and clause 5.4 into TR 56 : Part 2 : 2020)
- SGMF LNG Bunkering Safety Guidelines (clauses 4.1.1 and 4.2 into TR 56 : Part 3 : 2020)
- SGMF Training and Competency Guidelines (definitions into TR 56 : Part 1 : 2020 and clauses 4.1 to 4.8 and clause 5 into TR 56 : Part 4 : 2020)
- SGMF Recommendation of Controlled Zones during LNG Bunkering (clause 4 controlled zones definitions into TR 56 : Part 1 : 2020)

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This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

This TR is expected to be used by all stakeholders involved in the LNG bunker supply chain including LNG bunker suppliers, bunker tanker owners / operators, LNG fuel receiving vessels, ship owners / operators, training institutions, third-party agencies and relevant authorities.

Attention is drawn to the possibility that some of the elements of this TR may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

**NOTE**

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.*
2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*
3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

# Technical Reference – LNG bunkering – Part 3 : Procedures and safety distances

## 0 Introduction

This Technical Reference (TR) was developed for the benefit of the LNG bunker industry in Singapore. This TR is intended to provide guidance to parties involved in LNG bunkering, thereby ensuring that an LNG fuelled vessel can refuel with a high level of safety, integrity and reliability regardless of the type of bunkering facility.

This TR does not alter the contractual obligations of parties involved in the LNG bunker delivery.

Truck-to-ship and ship-to-ship bunkering transfers are expected to be the predominant modes in the near future in Singapore and as such, this edition pays more attention to these modes of transfers. However, refer to Clause 8 and Clause 9 below which relate to cassette bunkering and shore-to-ship bunkering respectively. Safety procedures and other requirements via the other transfer modes will be gradually added in subsequent editions when such modes become more prevalent.

## 1 Scope

This TR covers the principles, requirements and procedures for LNG bunkering operations (shore-to-ship, truck-to-ship, ship-to-ship and cassette bunkering) in Singapore. Recommendations for procedures, responsibilities and equipment required are provided in this TR.

## 2 Normative references

The following referenced documents are indispensable for the application of this TR. The latest edition of the referenced document (including any amendments) applies.

IEC 60079-10-1	Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres
ISO 20519	Specification for bunkering of liquefied natural gas fueled vessels
ISO 21593	Technical requirements for dry-disconnect/connect couplings for bunkering liquefied natural gas