



**SIGTTO**

Society of International Gas Tanker & Terminal Operators Ltd

# PUBLICATIONS

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# CATALOGUE



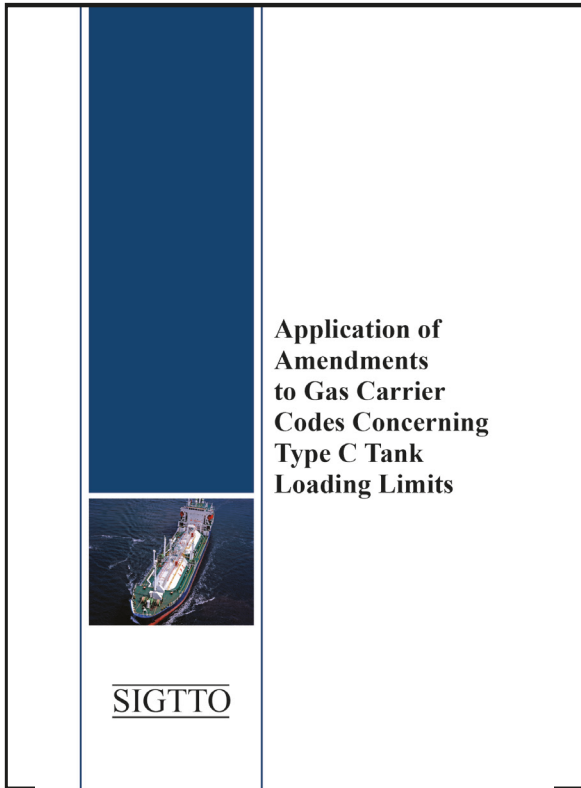
JULY 2023



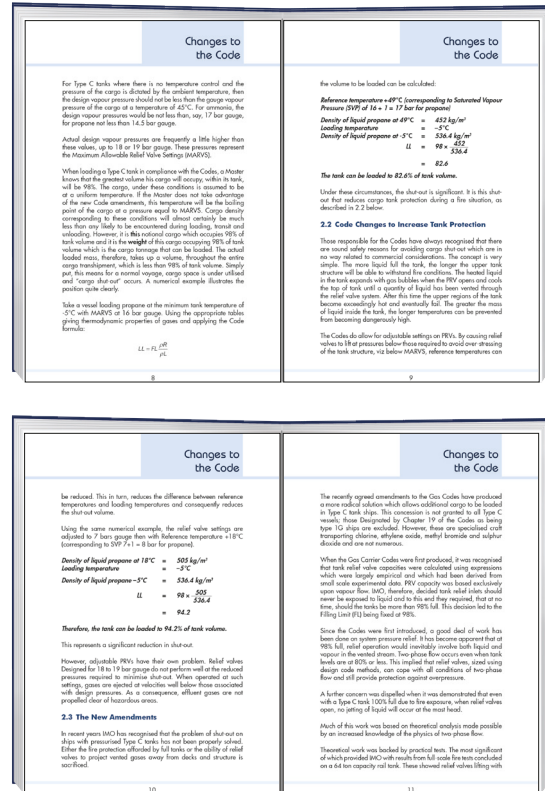
- Application of Amendments to Gas Carrier Codes Concerning Type C Tank Loading Limits	1
- Best Management Practices to Deter Piracy – BMP5	2
- Detection and Reporting of Fugitive Methane Emissions from LNG Carriers	3
- ESD Systems, Second Edition	4
- Fire Prevention in the Cargo Containment Systems of Liquefied Gas Carriers in Shipyards	5
- Floating LNG Installations, First Edition	6
- Gas Concentrations in the Insulation Spaces of Membrane LNG Carriers	7
- Guidance for Gas Trials on LNG Carriers, Second Edition	8
- Guidance for the Prevention of Rollover in LNG Ships	9
- Guidance on Gas Carrier and Terminal Gangway Interface, First Edition	10
- A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk, Second Edition	11
- Guidelines for the Alleviation of Excessive Surge Pressures on ESD for Liquefied Gas Transfer Systems	12
- Guidelines on the Ship-Board Odourisation of LPG	13
- Hydrates in LPG Cargoes	14
- Jetty Maintenance and Inspection Guide	15
- A Justification into the Use of Insulation Flanges (and Electricity Discontinuous Hoses) at the Ship/Shore and Ship/Ship Interface	16
- Liquefied Gas Cargo Resource Management Course, First Edition	17
- Liquefied Gas Carriers: Your Personal Safety Guide, Second Edition	18
- Liquefied Gas Fire Hazard Management	19
- Liquefied Gas Handling Principles on Ships and in Terminals, Fourth Edition	20
- Liquefied Petroleum Gas Sampling Procedures	21
- LNG and LPG Experience Matrix Guidelines for Use	22
- LNG Emergency Release Systems – Recommendations, Guidelines and Best Practices	23
- LNG Marine Loading Arms and Manifold Draining, Purging and Disconnection Procedure	24
- LNG Operations in Port Areas: Essential Best Practices for the Industry	25
- LNG Shipping Suggested Competency Standards, Third Edition	26
- LNG Steamship Suggested Competency Standards for Engineers	27
- LPG Shipping Suggested Competency Standards, Second Edition	28
- Measurement and Reporting of CO <sub>2</sub> Emissions from Gas Carriers	29
- Recommendations for Cargo Control Room HMI, First Edition	30
- Recommendations for Designing Cargo Control Rooms, First Edition	31
- Recommendations for Liquefied Gas Carrier Manifolds	32
- Recommendations for Management of Cargo Alarm Systems	33
- Recommendations for Relief Valves on Gas Carriers, Third Edition	34
- Recommendations for Valves on Liquefied Gas Carriers, Second Edition	35
- Report on the Effects of Fire on LNG Carrier Containment Systems	36
- Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases	37
- Ship/Shore Interface for LPG/Chemical Gas Carriers and Terminals	38
- SIGTTO Information Papers (Consolidated Edition 2022)	39
- Simulation Information Paper: The Use of Computer Simulation in LNG Shipping and Terminal Applications	40
- Site Selection and Design for LNG Ports and Jetties (IP No. 14)	41
- Suggested Quality Standards for LNG Training Providers	42
- Support Craft at Liquefied Gas Facilities. Principles of Emergency Response and Protection – Offshore	43
- Support Craft at Liquefied Gas Facilities. Principles of Emergency Response and Protection – Onshore	44
- Thermowells in LNG Carrier Liquid Lines	45



# Application of Amendments to Gas Carrier Codes Concerning Type C Tank Loading Limits



## Application of Amendments to Gas Carrier Codes Concerning Type C Tank Loading Limits



## OVERVIEW

This booklet is designed to serve as a reminder to ship owners and terminal operators of the improvements in safety codes for cargo tank loading limits provided by the 1998 amendments.

Changes to the IGC Code have made compliance less precise than conforming to the original code because the criteria for determining the lowest cargo density anticipated becomes the highest operational cargo temperature encountered. Predicting this temperature requires judgement on the part of the shipowner and the ability to convince Administrations that the selection is reasonable.

At its 14th session in December 1984, the IMO Bulk Chemicals Sub-Committee expressed its willingness to consider amending the codes governing cargo tank loading limits.

SIGTTO and IACS believed that for Type C tanks the codes reduced protective measures available under fire conditions or increased the risk of unwanted venting of cargo. By updating the codes, protection could be improved.

The IMO's Marine Safety Committee, at its 61st session (MSC61), agreed to change the IGC Code and made that protection available.

These new amendments mean that Type C tanks, under fire conditions, can become filled with liquid. In this situation, the Code requires that the tank's internal pressure does not exceed 20% above the Maximum Allowable Relief Valve Setting (MARVS). IACS/SIGTTO were able to demonstrate that Pressure Relief Valves (PRVs) could prevent the tank pressure exceeding 1.2 x MARVS.

To be certain that PRVs will perform as designed, inlet pressure losses and built-up back pressures must be within the PRV manufacturer's limits.

IMO delegated the production of these guidelines to IACS/SIGTTO who submitted the document to the 65th session of the Marine Safety Committee (MSC65). MSC65 recommended that the guidelines should be accepted, and they came into force on 1st July 1998.

## CONTENTS

- Introduction
- Changes to the Codes – What they are and what they mean
- Advantages Realised – A Guide to Administration Recognition
- Recommendations
- Summary
- Appendices

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Published Date: January 2012

Number of Pages: 52

Product Code: BP101524

ISBN: 978-1-85609-125-1

# Best Management Practices to Deter Piracy – BMP5

**BMP5**  
Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea, Gulf of Aden, Indian Ocean and Arabian Sea

Produced and supported by:

- BIMCO
- CDI
- CLIR
- International Chamber of Shipping
- IGP&I
- International Group of Piracy
- IMCA
- INTERCARGO
- InterManager
- IMEC
- INTERTANKO
- IPTA
- Joint Hull
- Joint War Committee
- OCIMF
- SIGTTO
- CONTACT GROUP
- WORLD MARITIME FORUM
- WORLD TRADE ORGANIZATION
- WORLD BANK
- WORLD HEALTH ORGANIZATION
- WORLD METEOROLOGICAL ORGANIZATION
- WORLD TOURISM ORGANIZATION
- WORLD VETERINARY ORGANIZATION
- WORLD ZOOLOGICAL ORGANIZATION
- WORLD POSTAL UNION
- WORLD TELECOMMUNICATIONS UNION
- WORLD TRADE ORGANIZATION
- WORLD METEOROLOGICAL ORGANIZATION
- WORLD HEALTH ORGANIZATION
- WORLD VETERINARY ORGANIZATION
- WORLD ZOOLOGICAL ORGANIZATION
- WORLD POSTAL UNION
- WORLD TELECOMMUNICATIONS UNION

## OVERVIEW

This publication will help ship operators, Masters and mariners prepare for external threats to safety in the Red Sea, Gulf of Aden, Indian Ocean and Arabian Sea. It is jointly authored by shipping industry organisations and supported by military organisations. It complements guidance on piracy in the latest IMO MSC circulars, but also addresses threats specific to the region.

This edition of BMP is written primarily for oil tankers and gas carriers, but much of the guidance will be applicable to other types of ship. Its contents have been reordered to reflect the latest risk assessment, planning, reporting and mitigation process. Transit corridors and reporting procedures have been reviewed and emphasis is placed on the role of the mariner in reporting suspicious activity to the UKMTO.

**Other considerations**

- Review and test an emergency communication plan. Masters are advised to prepare an emergency communication plan to include all essential emergency contact numbers (on shore, at and on board), and prepared messages, which should be at hand or permanently displayed near all external communication systems including satellite mobile phone and/or the Global Communication Device and the Ship Security Alert System (SSAS) should be tested.
- Define the ship's Automatic Identification System (AIS) policy. It is recommended that this should remain visible for the length of passage through congested areas through the VRS and AIS, to ensure mariners can track the ship. The watchstander should monitor position, course, speed, navigational status and safety-related information.
- Ensure that planned maintenance on voyage critical equipment for transit of an area.

**On entering the High Risk Area**

- Adhere to the instructions in sections 6 and annexes D and E.
- Monitor SLOCAT threat information.
- Secure all access points are limited and controlled.
- Avoid idling, waiting, anchoring and slow steaming, particularly in the HRA.
- Maintain use of VHF and use small or a secure satellite telephone instead, where possible only around known or high traffic lanes on the VHF, bearing in mind that impellers are possible.

**Section 5 Ship Protection Measures**

The section highlights proven OPR that provide layered protection. This BMP is based on regional experience of attacks and will continue to evolve as methods change.

The implementation of OPR will be identified during the voyage planning process. Compare this with the consideration making further alterations to the shipboard the scope of the OPR, and/or providing additional equipment and personnel as a means of further reducing the risk of attack.

**Watch keeping and enhanced vigilance**

Diagram illustrating watchkeeping and enhanced vigilance areas on a ship.

The Master should implement the following actions to assist in raising vigilance on board:

- Provide additional, fully armed watchkeepers.
- Maintain an all round lookout from an elevated position.
- Consider shorter rotation of the watch period to maximize alertness of the lookouts.
- Maintain sufficient resources for the enhanced bridge team, preferably until dawn.

**Control of access to accommodation and machinery spaces**

An attempt to control access to the accommodation and machinery spaces to deter or delay entry effort must be directed at denying access to these spaces.

- Escape routes must remain accessible to seafarers in the event of an emergency.
- Where the door or hatch is located on an escape route from a manned compartment, it is essential it can be opened from the inside. Where the door or hatch is located in a vertical means of egress from the deck to the outside.
- Doors and hatches providing access to the bridge, accommodation and machinery spaces should be properly secured to prevent their being opened from the outside.
- Doors and hatches are secured, a design and standard number are used and access points and routes are secure. The use of these doors or hatches should be controlled by the Officer of the Watch.
- Doors and hatches are secured on the accommodation blocks to prevent unauthorised access to the bridge.
- Doors and hatches that must be closed for watertight integrity should be fully rigged down in addition to locks. Where possible, additional locking mechanisms, such as wire stops, may be used.
- Removable barriers should be used around vital health spaces so that a ship does not need to do a large course prior to arrival at port.

**Safe master points and/or citadels**

The concept of a safe master point and/or citadel should be identified in the location of a safe master point and/or citadel within a ship.

**Safe master points**

A safe master point is designated area chosen to provide maximum physical protection to the crew and will be identified during the planning process. If the threat assessment identifies risks that may result in a breach of hull or of below the waterline then a safe master point above the waterline must be identified in many ships. The central stairway may provide a safe location as it is protected by the accommodation block and is above the waterline. To minimise the effect of an explosion, consideration should be given to the help path of the blast. The safe master point should be selected with this in mind.

**Citadels**

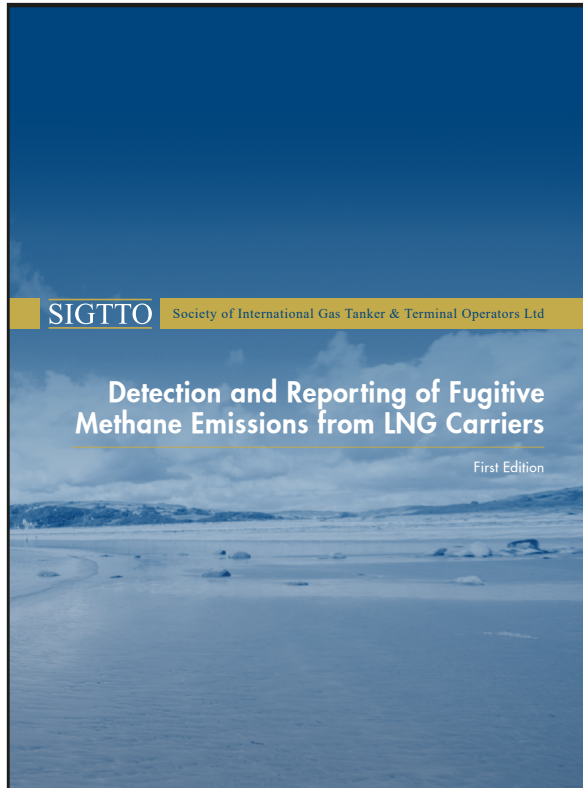
Citadels in sub-deck areas where, in the event of imminent boarding, all crew may seek protection. A citadel is designed and constructed to resist forced entry. The use of a citadel cannot guarantee a military or law enforcement response.

## CONTENTS

- Introduction
- The threat
- Threat and risk assessment
- Planning
- Ship Protection Measures
- Reporting
- Ships under attack
- Annexes

Price: Free  
Published Date: August 2018  
Number of Pages: 72  
Product Code: BP101138

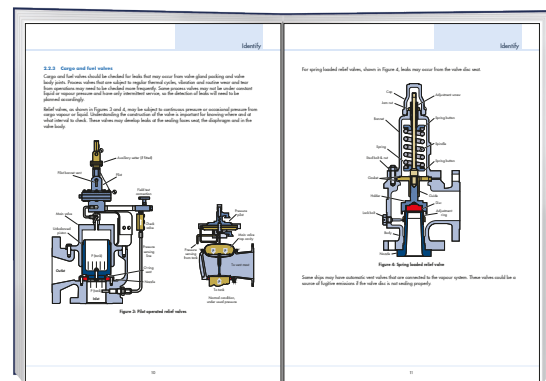
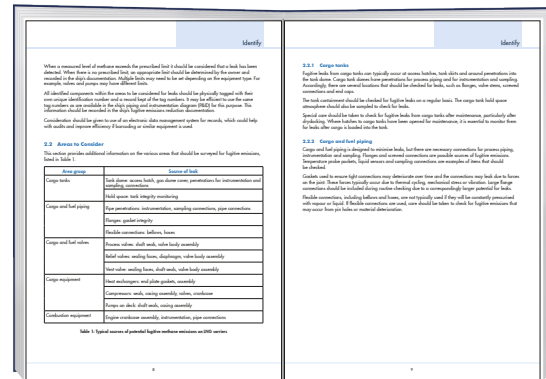
# Detection and Reporting of Fugitive Methane Emissions from LNG Carriers



## OVERVIEW

This document provides guidance to assist the gas shipping industry in its efforts to reduce methane emissions from LNG carriers. Methane is a greenhouse gas (GHG), and it is vital to minimise the environmental impact from the transportation of liquefied gas. This is the first document in a series that plans to address this issue. As a first step, this document provides guidance on the detection and reporting of fugitive methane emissions.

The main purpose of this document is to recommend that a structured system is set up to identify, detect, measure and quantify fugitive emissions of methane from LNG carriers. This is an important primary step that may also support a more comprehensive leak detection and repair (LDAR) system that is intended to reduce emissions through maintenance and design improvements.



## CONTENTS

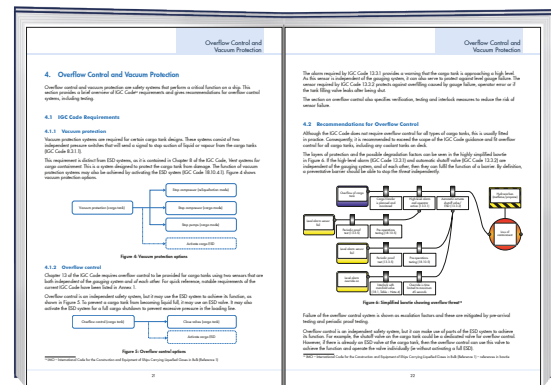
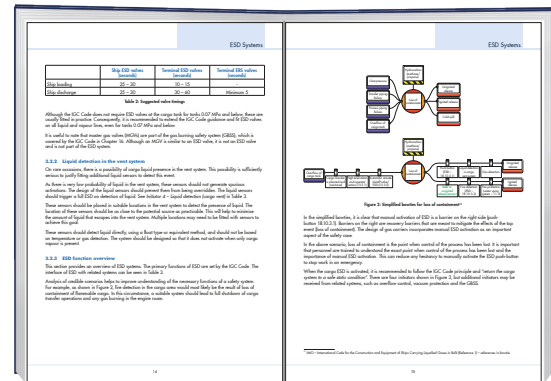
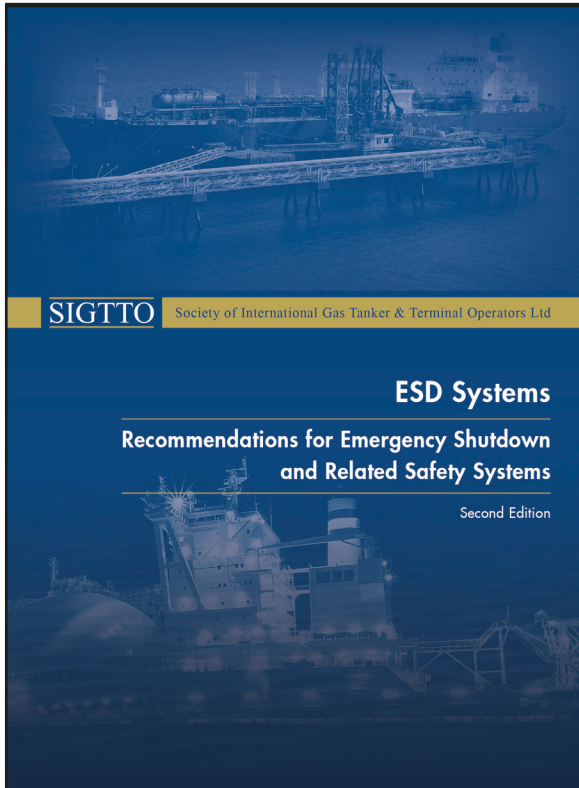
- Introduction and Scope
- Identify
- Detect, Measure and Quantify
- Records, Audits and Reporting
- Annexes

Price: Free

Published Date: July 2022

Number of Pages: 24

# ESD Systems, Second Edition



## OVERVIEW

This document provides recommendations for ESD and related safety systems, including overflow control, ship shore link and emergency release systems. Guidance for testing these systems is provided and bowties are used to help explain the IGC Code requirements.

In addition to discussing the requirements of the IGC Code, this document recommends additional measures for linked ESD systems for LPG. An overview of the types of ship shore link systems that are typically used in the industry is provided in the annexes, including guidance for cyber security issues associated with linked ESD systems.

This new document updates and replaces the previous publication, ESD Arrangements & Linked Ship/Shore Systems for Liquefied Gas Carriers (2009).

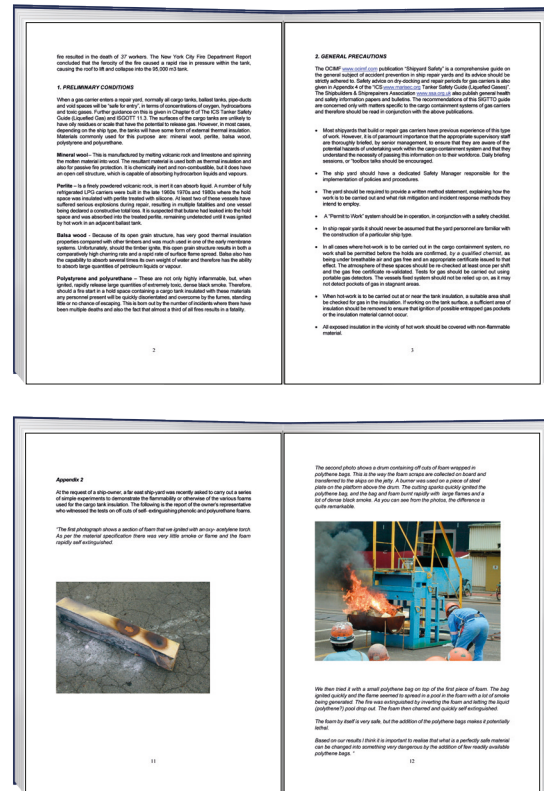
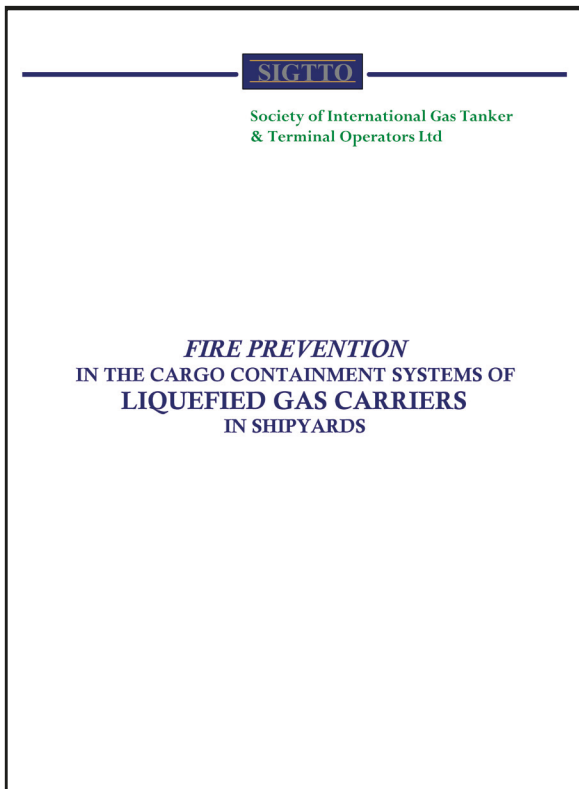
## CONTENTS

- Introduction and Scope
- Key Safety System Philosophies
- ESD Systems
- Overflow Control and Vacuum Protection
- Gas Burning Safety System
- Ship Shore Link
- Emergency Release Systems
- Annexes

Price: Free  
 Published Date: 2021  
 Number of Pages: 66  
 ISBN: 978-1-85609-998-1



# Fire Prevention in the Cargo Containment Systems of Liquefied Gas Carriers in Shipyards



## OVERVIEW

This guide was prepared to draw attention to the high number of serious casualties that have occurred involving fires in the cargo containment system of liquefied gas carriers, whilst vessels have been in shipyards. The guide proposes risk mitigation measures to those responsible for managing these activities.

## CONTENTS

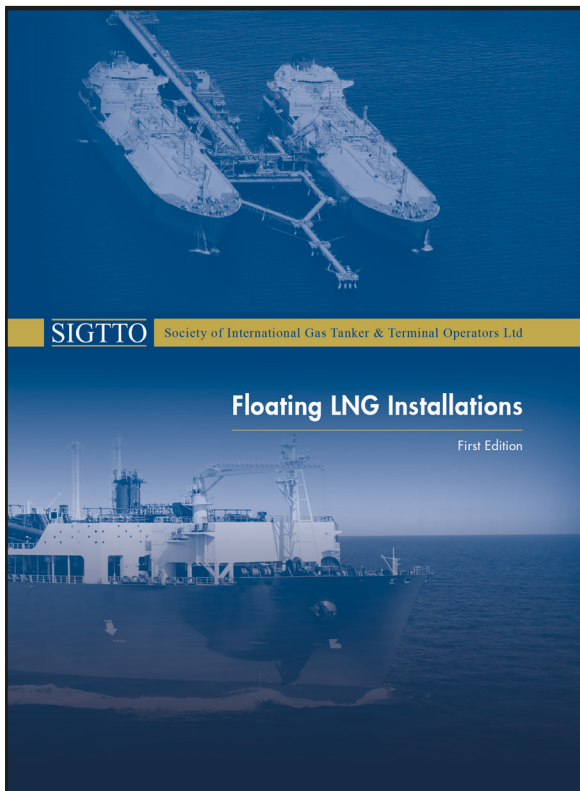
- Introduction
- Preliminary Conditions
- General Precautions
- Precautions for LNG Carriers
- Precautions for LPG Carriers
- Precautions in Vessels Under Construction
- Summary
- Appendices

Price: Free

Published Date: 2001

Number of Pages: 14

# Floating LNG Installations, First Edition



## OVERVIEW

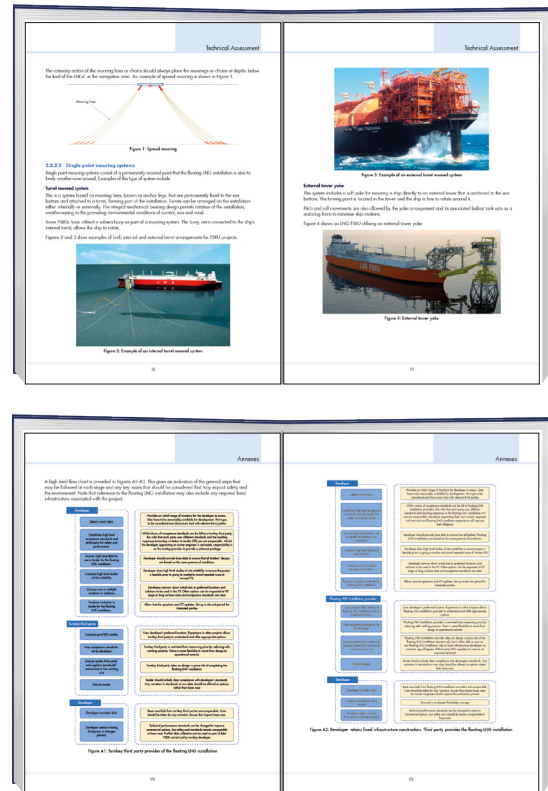
The purpose of this document is to provide guidance that covers all stages in a floating LNG installation project, from accurate assessment of the site through to safe operational status.

This document covers two critical areas when considering floating LNG installations:

1. Technical assessment
2. Operations

The technical assessment section provides guidance on the considerations for a floating LNG installation project. This includes pre-front-end engineering design and front-end engineering design (pre-FEED/FEED) data collection and design criteria, physical location and site assessment, the applicable floating LNG installations to consider and project overview from commissioning to end of life.

The operations section reinforces best practices for the safe operation of floating LNG installations and their associated infrastructure. Recommendations are based on mitigating identified risks and hazards.



## CONTENTS

- Introduction and Scope
- Technical Assessment
- Operations

Price: £225.00

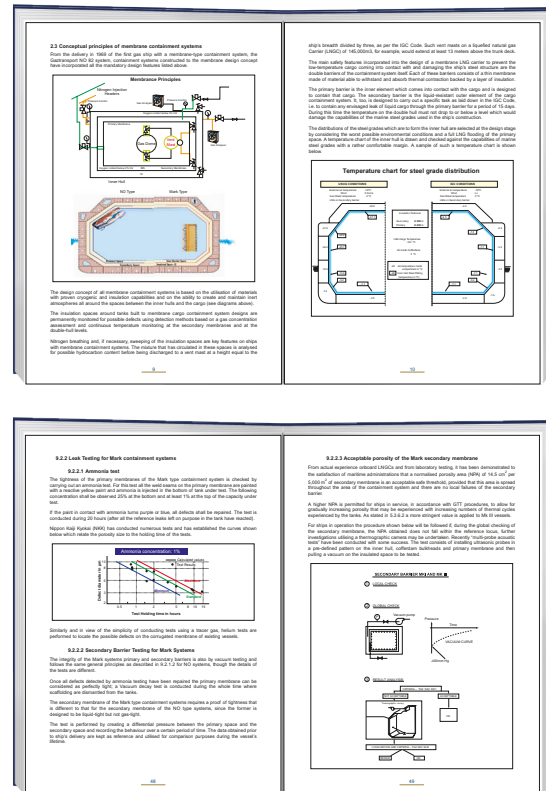
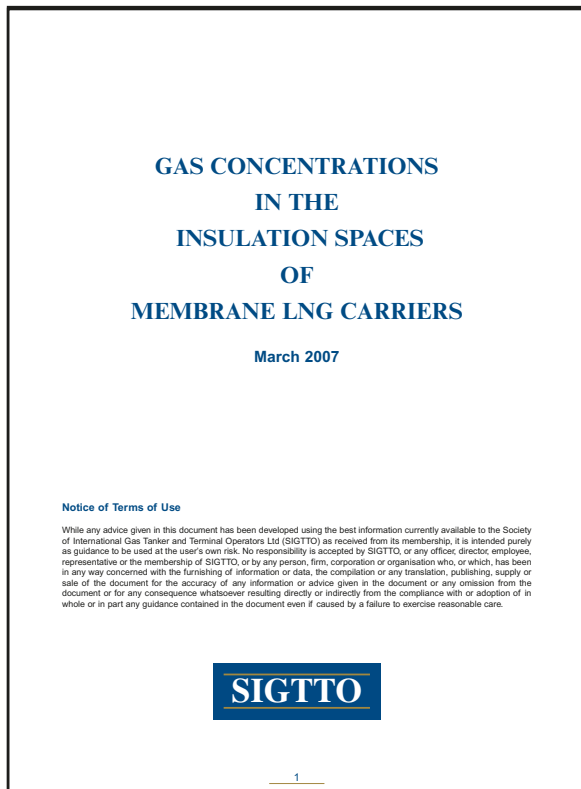
Published Date: 2021

Number of Pages: 104

Product Code: BP105232

ISBN: 978-1-85609-963-9

# Gas Concentrations in the Insulation Spaces of Membrane LNG Carriers



## OVERVIEW

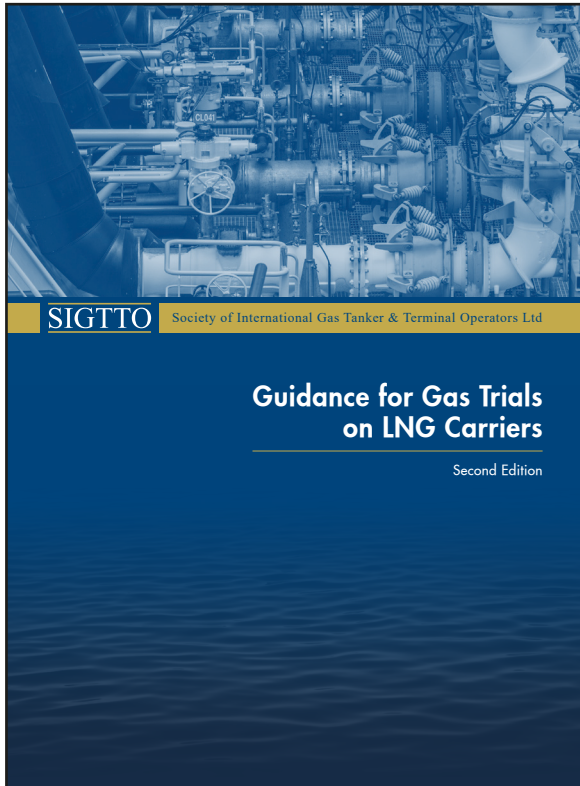
This guidance document examines the gas concentrations likely to be found in the insulation spaces of membrane LNG ships, and determines, by good engineering practice, an acceptable upper limit.

## CONTENTS

- Introduction
- Background and Design Parameters
- Statutory and Flag State Requirements
- Systems and Equipment
- Risk Assessment
- Insulation Space Pressurisation - normal conditions
- Insulation Space Pressurisation - abnormal conditions
- Monitoring and Recordkeeping
- Membrane Testing
- Vetting and Condition Assessment
- Training Requirements for Crew Responsible for the Operation of Membrane LNG Containment Systems
- Control of Emissions
- Conclusions
- Appendices

Price: Free  
 Published Date: 2007  
 Number of Pages: 77

# Guidance for Gas Trials on LNG Carriers, Second Edition

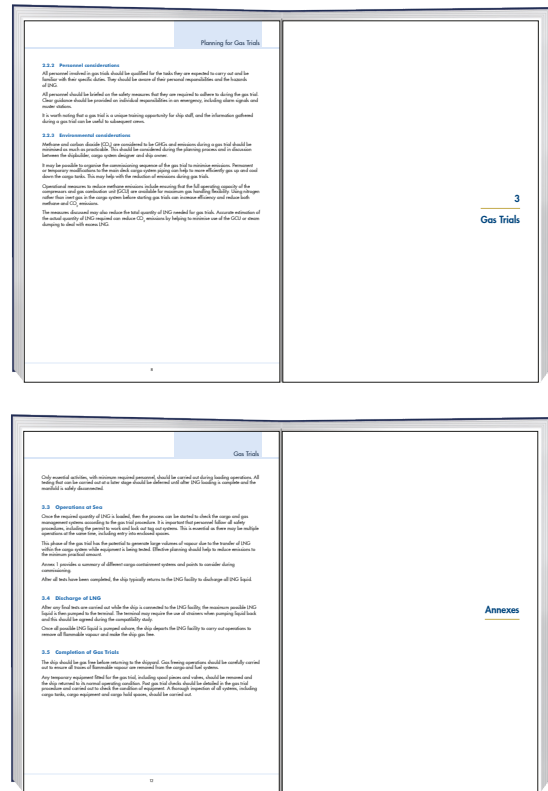


## OVERVIEW

This document provides useful guidance for organisations involved in planning gas trials for LNG carriers. Although this document is written specifically for LNG gas trials, it may be helpful for other products.

The document covers all stages of a gas trial, including preparing the gas trial procedure, testing and discharge of LNG. A significant addition to this edition is guidance for minimising the environmental impact of gas trials. It provides examples of how system design measures, process changes and operational changes can be implemented to help minimise greenhouse gas emissions.

This updates and replaces the previous edition, Guide for Planning Gas Trials for LNG Vessels (2008).

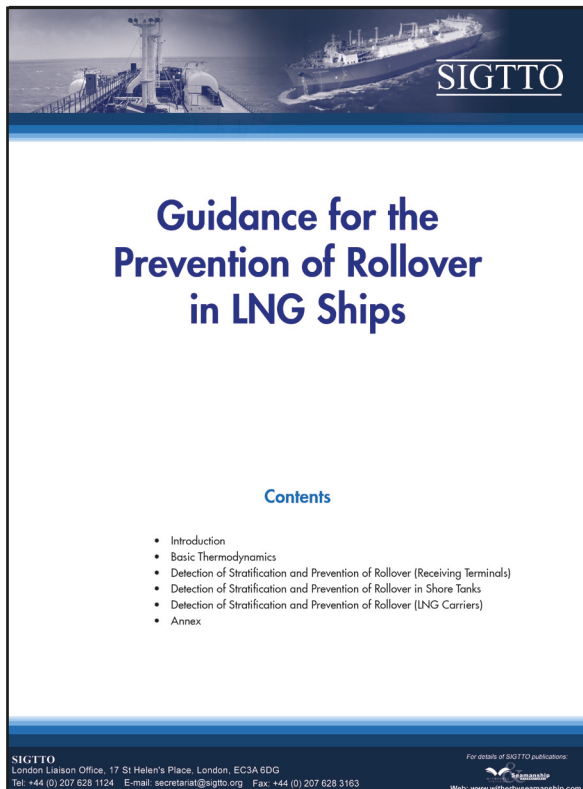


## CONTENTS

- Introduction and Scope
- Planning for Gas Trials
- Gas Trials
- Annexes

Price: Free  
 Published Date: June 2022  
 Number of Pages: 17  
 ISBN: 978-1-914993-24-4

# Guidance for the Prevention of Rollover in LNG Ships



## OVERVIEW

This paper aims to inform and advise the owners and operators of LNG carriers about the issues surrounding rollover.

This guidance is specifically applicable to LNG ships. It is also applicable to LNG ships acting as floating storage vessels, LNG Regasification Vessels (LNGRV) and Floating Storage and Regasification Units (FSRU) if no countermeasures are in place.

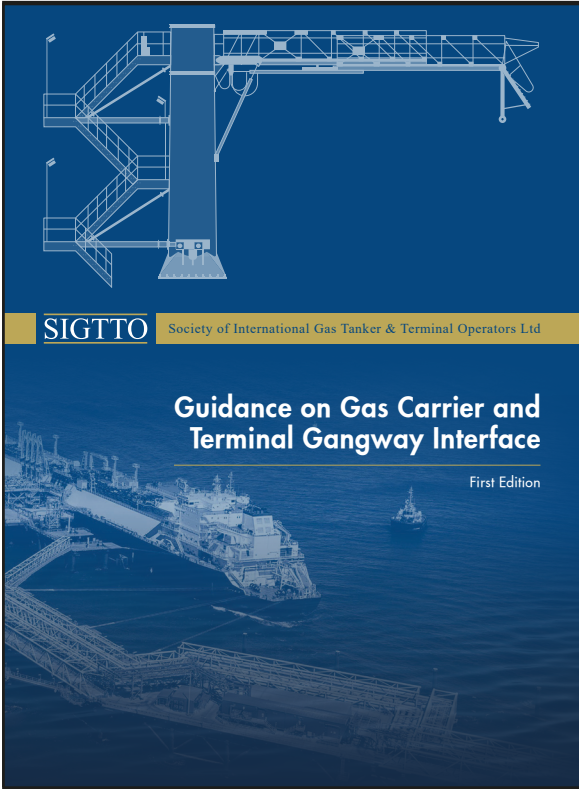


## CONTENTS

- Introduction
- Basic Thermodynamics
- Detection of Stratification and Prevention of Rollover (Receiving Terminals)
- Detection of Stratification and Prevention of Rollover in Shore Tanks
- Detection of Stratification and Prevention of Rollover (LNG Carriers)
- Annex

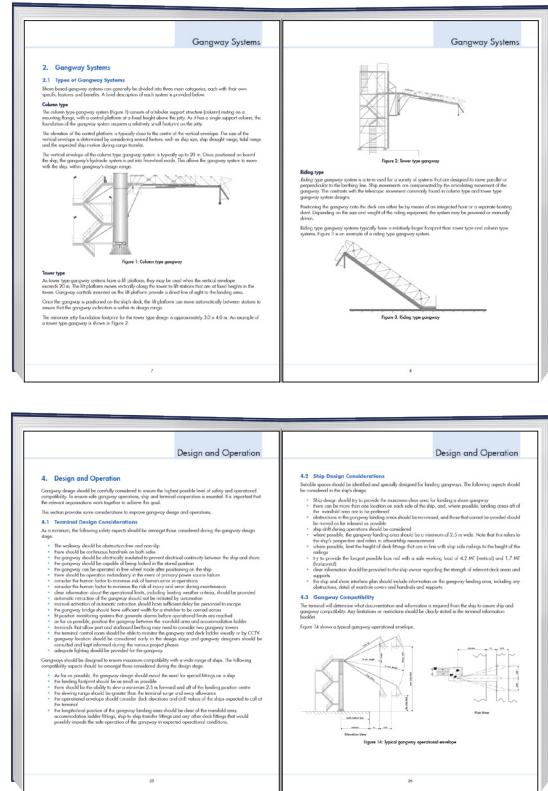
Price: Free  
Published Date: 2012  
Number of Pages: 14

# Guidance on Gas Carrier and Terminal Gangway Interface, First Edition



## OVERVIEW

This document provides information on design considerations for the gangway landing areas on ships and the gangway system for terminals. It discusses different gangway types and configurations, and provides recommendations in an effort to maximise safe access to the ship via the gangway. The document encourages the use of a structured risk-based approach to gangway design and provides references for human factors considerations.

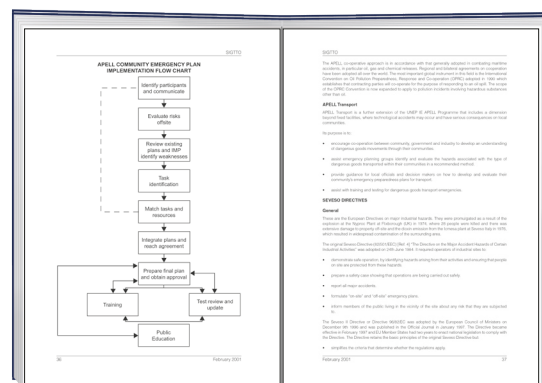
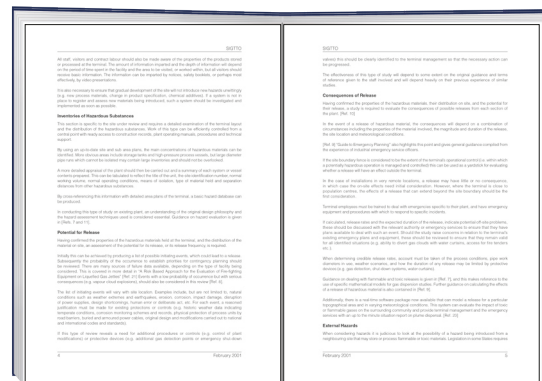
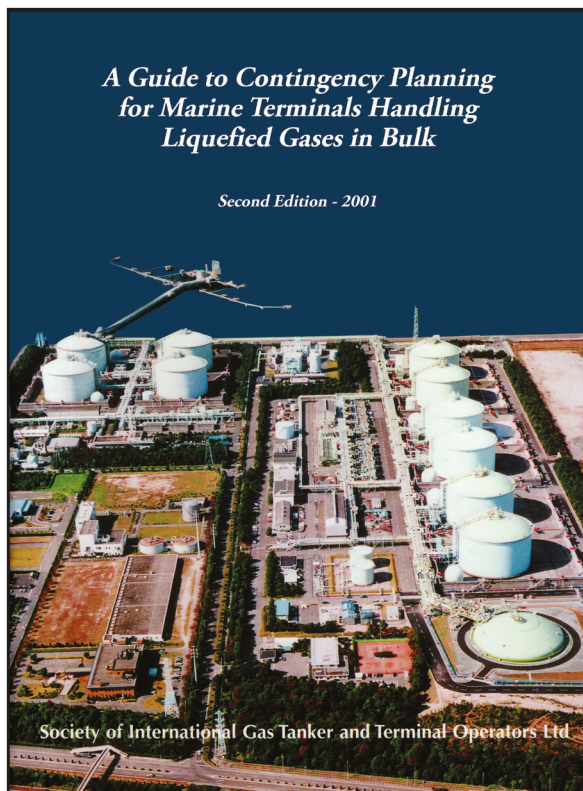


## CONTENTS

- Introduction and Scope
- Gangway Systems
- Gangway Hazard Management
- Design and Operation
- Small-scale Gas Carrier Considerations
- Annexes

Price: Free  
 Published Date: 2021  
 Number of Pages: 44  
 ISBN: 978-1-85609-969-1

# A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk, Second Edition



## OVERVIEW

This book specifically deals with the safe storage and transfer of liquefied gases at marine terminals. It can also be adapted to be used at a terminal that handles any hazardous substance in bulk. It provides terminal management with guidance on contingency planning, including identifying and controlling potential hazards, controlling incidents and the review periods.

The first edition of this guide was originally prepared in 1989 by a joint industry working group made up of members from OCIMF, ICS and SIGTTO. The document has been revised and extended to include "Guidelines for Preparing and Co-ordinating a Major Ship/Shore Emergency Exercise", published by SIGTTO in 1994.

A joint action between the International Maritime Organization (IMO) and the Environment Office of the United Nations Environment Programme (UNEP IE) in 1996 adapted an existing process, "Awareness and Preparedness for Emergencies at Local Level (APELL)" to port areas. The APELL process was developed as a response to various industrial accidents that have had a detrimental effect on the environment.

The main APELL recommendations for port areas that are included in this publication are the Seveso II Directive (Control of Major Accident Hazard Regulations (COMAH) in the UK), which is applicable to all sites where dangerous substances are located. On and off site emergency plans must be available at sites within the EU where this directive is applicable.

This guide is not a code of practice or intended to cover all types of major industrial accident. The local and national legislation should always be considered when using the guide.

## CONTENTS

- Prevention of Major Accidents
- Emergency Planning
- Incident Control
- Incident Follow-Up
- The Organisation of a Major Emergency Exercise
- Appendices
- Illustration of Typical Emergency Plan Contents List
- International Regulations and Guidelines
- APELL
- Seveso Directives

Price: £40.00

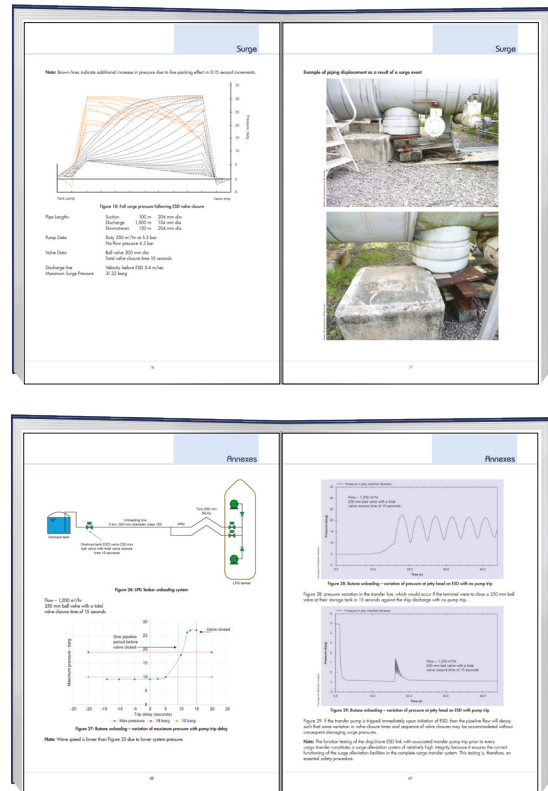
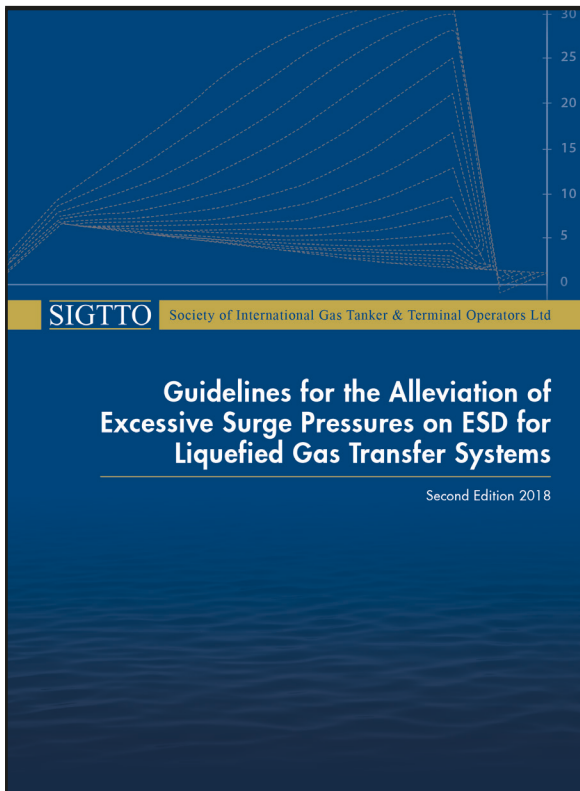
Published Date: January 2001

Number of Pages: 42

Product Code: BP101510

ISBN: 978-1-85609-215-9

# Guidelines for the Alleviation of Excessive Surge Pressures on ESD for Liquefied Gas Transfer Systems



## OVERVIEW

This publication explains the concept of surge pressure and provides practical advice on its associated hazards and risk management. It outlines the principal design and operational recommendations for cargo transfer systems and will benefit managers, designers and operators of liquefied gas carriers.

This publication provides advice at every level of liquefied gas carrier operation. It encourages a mutual understanding of safe transfer procedures between designers, engineers and operators of both liquefied gas carriers and terminal loading and unloading systems. Readers are also made aware of the factors contributing to surge pressure hazards and the benefits of a linked ship/shore ESD system in mitigating these.

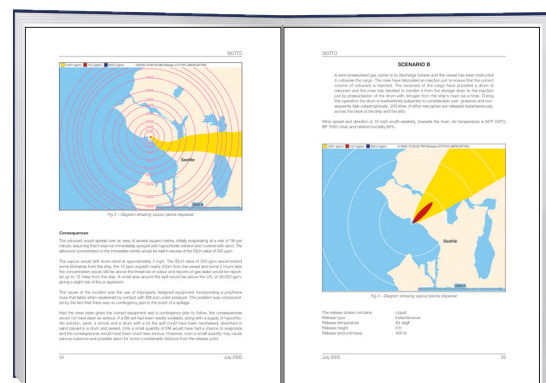
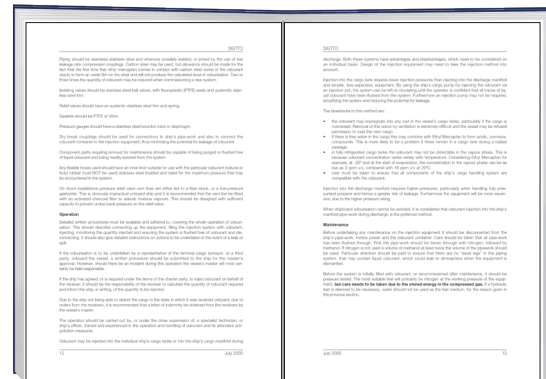
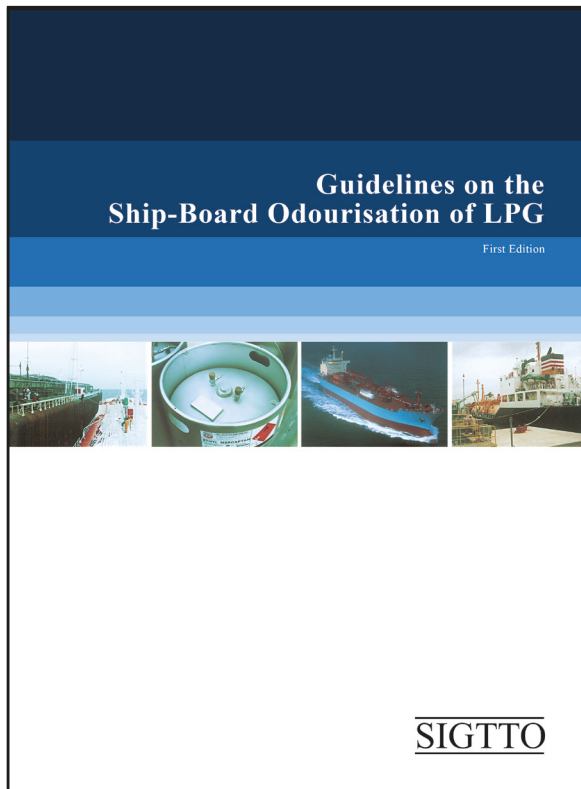
## CONTENTS

- Introduction and Scope
- Surge
- Surge Hazards and Risk Management
- Recommendations and Guidelines
- Annexes

Price: £175.00  
 Published Date: July 2018  
 Number of Pages: 66  
 Product Code: BP101124  
 ISBN: 978-1-85609-767-3



# Guidelines on the Ship-Board Odourisation of LPG



## OVERVIEW

This publication is a reference guide for operational and commercial staff in the LPG shipping and terminal industries. It is supported by photographs and diagrams that illustrate safe transportation and storage of gas odourants. It also includes a table that outlines material compatibility with ethyl mercaptan odourant.

These guidelines were produced following notification to the SIGTTO Secretariat of several potentially dangerous incidents involving odourants. Detail is given on personal, environmental and business risk management. The capabilities and limitations of odourant injection equipment are also included. These guidelines should be written into charter parties when shipboard odourisation is to take place.

## CONTENTS

- Background
- Types of Odourant
- Transportation and Storage of Odourant
- Risk Management and Safety
- Design, Operation and Maintenance of Odourant Injection Equipment
- Training
- Glossary of Terms
- Appendices

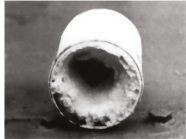

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**Published Date:** September 2000  
**Number of Pages:** 28  
**Product Code:** BP101692  
**ISBN:** 978-1-85609-209-8

# Hydrates in LPG Cargoes

Hydrates in  
LPG Cargoes

## Hydrates in LPG Cargoes

A Technological Review

## OVERVIEW

This publication is a technical review of the processes and procedures commonly found in production, storage and transportation of LPG cargoes. It examines the presence of water in LPG cargoes, the formation of hydrates and methods for their elimination.

Hydrate formation in cargo systems of refrigerated LPG carriers can damage pumps and other machinery and obstruct cargo handling. This publication, based on a review conducted for SIGTTO by Mr R C Gray of the Technology Department of British Shipbuilders, deals specifically with hydrates forming in commercially dry refrigerated LPG. It identifies the ways in which water can enter and remain within the cargo, leading to the formation of hydrates. It examines different methods to prevent ice and hydrate formation and outlines procedures for cargo tank sampling. The Appendices provide practical information on the propane-water system, use of LPG freeze valves and the addition of methanol as a treatment method.

Section 2

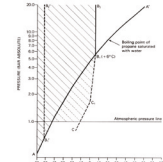


Figure 1. Stability of hydrates in LPG cargoes. The curves show the stability limits for different LPG types and hydrate formation.

Section 2

**2.6. Stability of Water in LPG Cargoes and Gas Vapors**

Stability of water in LPG cargoes is dependent on the stability of the water in an atmosphere of the vapors of the LPG. The stability of water in an atmosphere of the vapors of the LPG is dependent on the stability of the water in an atmosphere of the vapors of the LPG. The stability of water in an atmosphere of the vapors of the LPG is dependent on the stability of the water in an atmosphere of the vapors of the LPG.

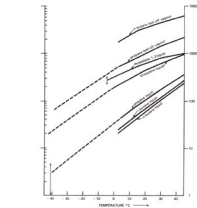


Figure 2. Stability of water in LPG cargoes and gas vapors. The curves show the stability limits for different LPG types and hydrate formation.

Section 3

**3.4.3. Methanol addition**

Methanol is added to the cargo to prevent hydrate formation. The amount of methanol to be added is dependent on the amount of water in the cargo and the stability of the water in an atmosphere of the vapors of the LPG. The stability of water in an atmosphere of the vapors of the LPG is dependent on the stability of the water in an atmosphere of the vapors of the LPG.

Section 3

**3.4.4. Methanol concentration in LPG**

The concentration of methanol in the cargo is dependent on the amount of water in the cargo and the stability of the water in an atmosphere of the vapors of the LPG. The stability of water in an atmosphere of the vapors of the LPG is dependent on the stability of the water in an atmosphere of the vapors of the LPG.

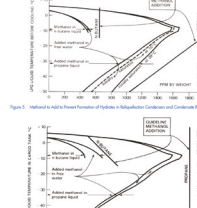


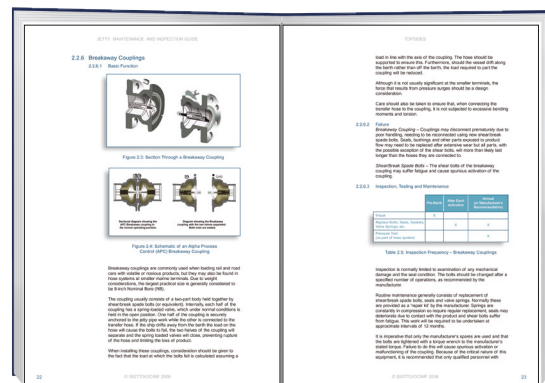
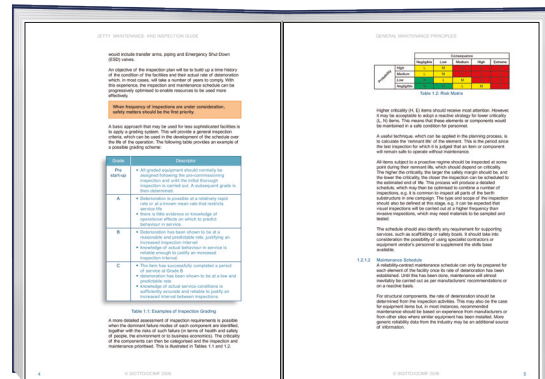
Figure 3. Stability of water in LPG cargoes and gas vapors. The curves show the stability limits for different LPG types and hydrate formation.

## CONTENTS

- Introduction of Water into LPG
- The Formation of Hydrates
- Avoidance of Ice or Hydrate Formation
- Shipboard Test Methods
- Hazards Associated with Ice/Hydrates
- Summary and Recommendations
- References
- Appendices

Price: £75.00  
 Published Date: July 2008  
 Number of Pages: 50  
 Product Code: BP100523  
 ISBN: 978-1-905331-27-7

# Jetty Maintenance and Inspection Guide



## OVERVIEW

This guide provides information on effective maintenance of critical items of equipment for both oil and liquefied gas terminal jetties. It advises on possible failure modes for each item of equipment and also discusses proactive and reactive maintenance strategies.

Reliable equipment at the jetty is vital for safe transfer of cargo between the ship and shore.

Maintenance of this equipment is particularly important because of the harsh environmental conditions often experienced.

This guide provides information on the basic function, failure, inspection, maintenance and repair of all the key equipment items and systems. It is not intended to provide guidance on safety management procedures or to replace the manufacturers' instruction manuals. However, it is designed to provide a description of a typical jetty and the likely faults that may occur if maintenance work is not carried out regularly.

## CONTENTS

- General Maintenance Principles
- Topsides
- Substructure
- List of Abbreviations
- Bibliography
- Index

Price: £175.00


Published Date: September 2008

Number of Pages: 118

Product Code: BP100334

ISBN: 978-1-85609-343-9

# A Justification into the Use of Insulation Flanges (and Electrically Discontinuous Hoses) at the Ship/Shore and Ship/Ship Interface



## A Justification into the Use of Insulation Flanges (and Electrically Discontinuous Hoses) at the Ship/Shore and Ship/Ship Interface

**Contents**

- Background
- Research
- Electrical Characteristics of Cargo Transfer Hoses
- Supporting Calculations
- Inductive Circuits
- Examples Showing the Effects of Hose Resistance and Inductance
- Effect of Capacitance
- Multiple Loading Arms and Parallel Circuits
- Testing of Insulation Flanges
- Conclusions and Recommendations
- References
- Definitions
- Appendix 1
- Acknowledgements

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 Web: www.witherbyeamanship.com




### Background

Insulation flanges have been in wide use for more than three decades and, while there have been no reported incidents of fires at tanker or gas carrier manifolds that may have been caused by arcing when connecting or disconnecting cargo hoses or arms, their use and effectiveness is still often challenged.

The purpose of this document is to provide an explanation of how insulation flanges provide protection against ignition caused by arcing.

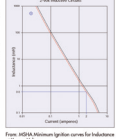


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 Web: www.witherbyeamanship.com



### Examples Showing the Effects of Hose Resistance and Inductance

Multiple loading arms and parallel circuits are common at ship/shore and ship/ship interfaces. This document provides examples of how these configurations affect the electrical characteristics of the hoses.



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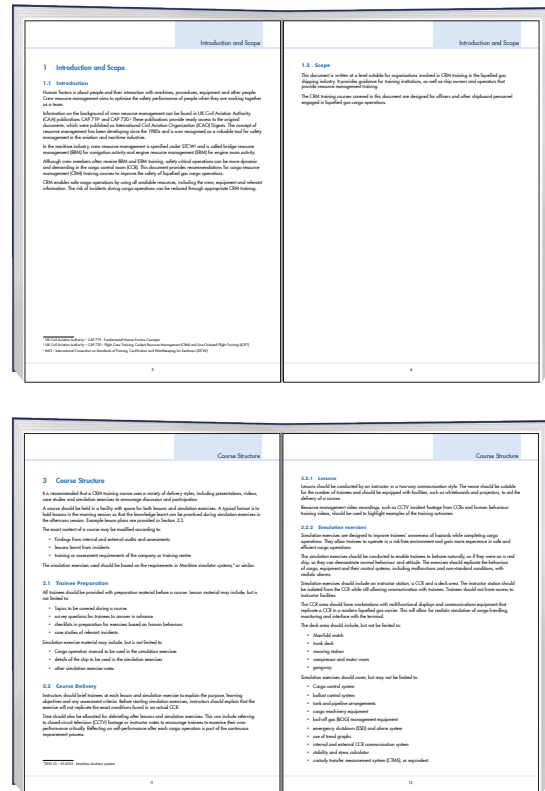
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## CONTENTS

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- Research
- Electrical Characteristics of Cargo Transfer Hoses
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- Effect of Capacitance
- Multiple Loading Arms and Parallel Circuits
- Testing of Insulation Flanges
- Conclusions and Recommendations
- References
- Definitions
- Appendix
- Acknowledgements

Price: Free  
 Published Date: 2014  
 Number of Pages: 14

# Liquefied Gas Cargo Resource Management Course, First Edition



## OVERVIEW

Cargo resource management (CRM) enables safe cargo operations by using all available resources, including the crew, equipment and relevant information. This document provides recommendations for CRM training courses to improve the safety of liquefied gas cargo operations.

The training courses covered in this document are designed for officers and other shipboard personnel engaged in cargo operations. In addition to recommending course objectives and participants, this document provides three days of example lesson plans that may be included in a CRM training course.

This document is expected to provide useful guidance for organisations involved in CRM training in the liquefied gas industry. This includes training institutions, as well as ship owners and operators that provide resource management training.

## CONTENTS

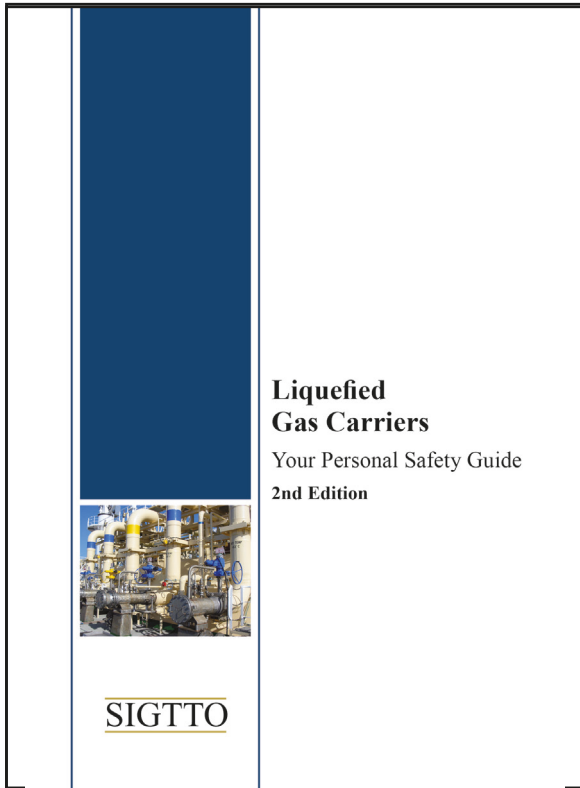
- Introduction and Scope
- Course Overview
- Course Structure
- Annexes

Price: Free

Published Date: December 2022

Number of Pages: 20

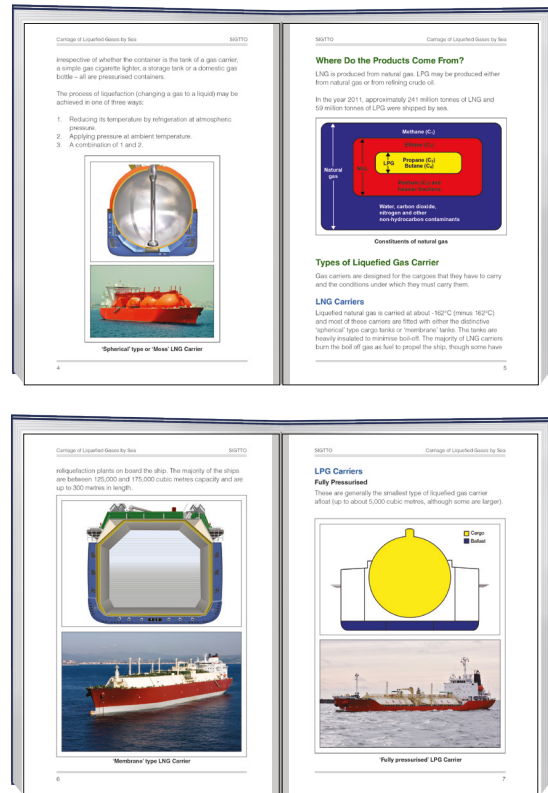
# Liquefied Gas Carriers: Your Personal Safety Guide, Second Edition



## OVERVIEW

This pocketbook provides easy to understand safety guidance that should be followed by all personnel serving on board liquefied gas carriers. It describes the hazards associated with liquefied gas products and sets out essential safeguards to protect life, the environment and the cargo being carried.

This publication highlights the hazards that may be encountered on board a liquefied gas carrier, such as toxicity, flammability, enclosed spaces and cargo spillage. It examines how these risks may be managed and provides guidance on personal protective equipment (PPE), emergency response and pollution prevention. It also outlines safety management systems (SMS), permits to work (PTW) and safety inspections.



## CONTENTS

- Introduction
- Carriage of Liquefied Gases by Sea
- Hazards and Risks of Liquefied Gas Cargoes
- Flammability
- Toxicity
- Enclosed Spaces
- Basic Firefighting
- Pollution Prevention
- Emergency Procedures
- Definitions and Descriptions

Price: £25.00

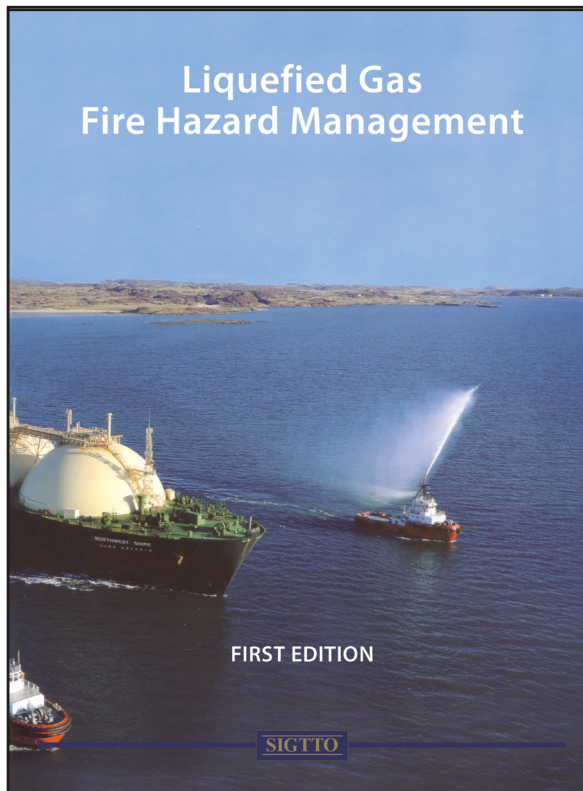
Published Date: December 2012

Number of Pages: 44

Product Code: BP101770

ISBN: 978-1-85609-572-3

# Liquefied Gas Fire Hazard Management

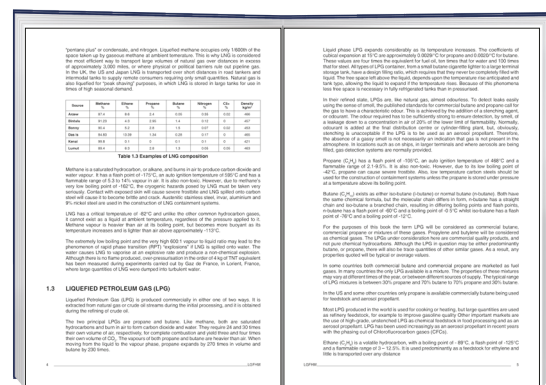
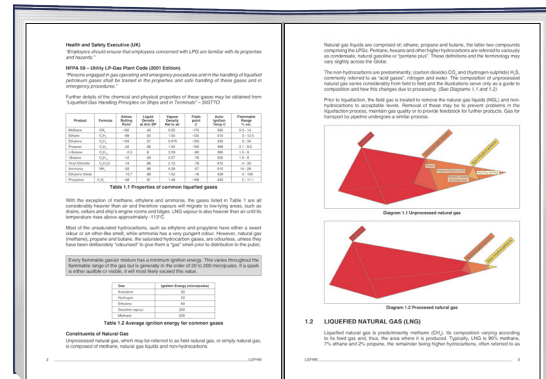


## OVERVIEW

This book examines fire hazard management in the liquefied gas shipping and terminal industry, with reference to large refrigerated and smaller pressurised storage terminals, ships, cylinder filling plant and road and rail tanker loading racks. It is aimed at operational staff involved in handling flammable liquefied gas, as well as fire officers and other emergency planners who have liquefied gas installations in their jurisdiction.

This book provides an insight into the design and operation of liquefied gas installations and the equipment that is essential to their safe and efficient functioning. It describes the properties of flammable liquids and gases and explains how they should be stored and transported. It considers how the risk of combustion can be reduced to an acceptable level and examines the lessons learnt from relevant incidents.

Fire hazard management and emergency response strategies are covered in depth, from the contingency planning stage to fire prevention and detection, firefighting media and procedures, personal protective equipment (PPE) and maintenance of critical systems. The book also lists relevant codes, standards and guidelines in use throughout the world.

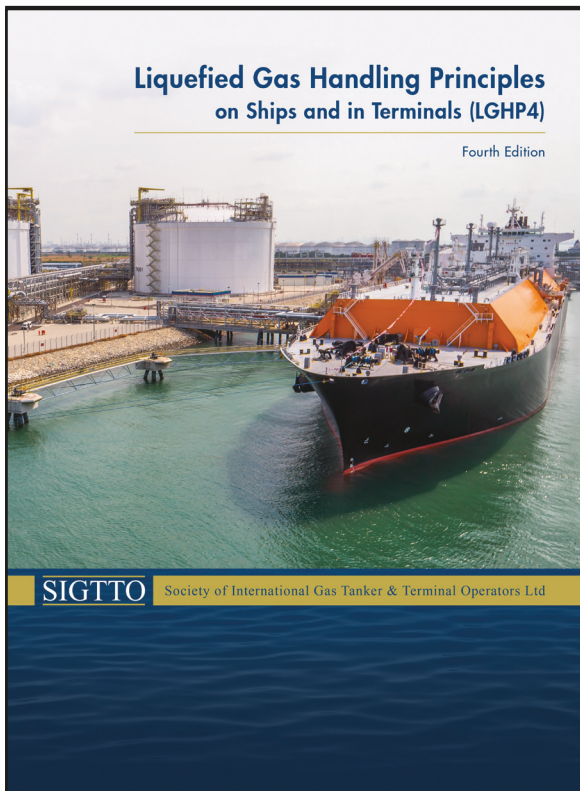


## CONTENTS

- Characteristics and Hazards of Liquefied Gases
- Liquefied Gas Installations
- Liquefied Gas Ships
- Principles of Fire Hazard Management
- Prevention of Fires and Explosions
- The Principles of Fire and Gas Detection
- Fire and Explosion Mitigation
- Emergency Response Strategies

Price: £175.00  
 Published Date: July 2004  
 Number of Pages: 198  
 Product Code: BP101777  
 ISBN: 978-1-85609-265-4

# Liquefied Gas Handling Principles on Ships and in Terminals, Fourth Edition



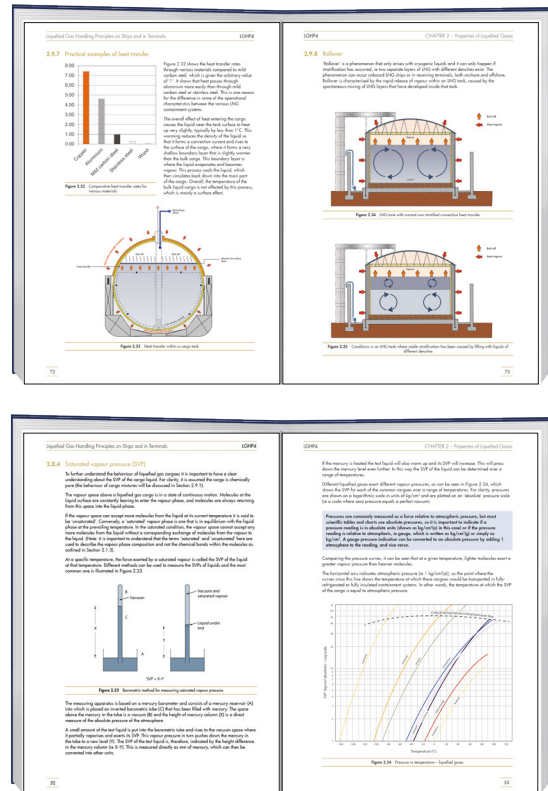
## OVERVIEW

This publication covers every aspect of the safe handling of bulk liquid gases (LNG, LPG and chemical gases) on board ships and at the ship/shore interface.

Liquefied Gas Handling Principles on Ships and in Terminals emphasises the importance of understanding the physical properties of gases in relation to the practical operation of gas handling equipment on ships and at terminals.

In the sixteen years since this publication was last updated, the liquefied gas shipping and terminal industry has undergone considerable change. This revision reflects these changes, providing updated information on ship design, propulsion systems, size of fleet, floating regasification and reliquefaction, Arctic LNG, containment systems, efficiency increases in operations, ship capacities, technology, best practice and legislation.

This title incorporates 'Quantity Calculations LPG and Chemical Gases, 2nd Edition' (SIGTTO).



## CONTENTS


- Introduction
- Properties of Liquefied Gases
- Principles of Gas Carrier Design
- The Ship — Equipment and Instrumentation
- The Terminal — Equipment and Instrumentation
- The Ship/Shore Interface
- Cargo Handling Operations
- Cargo Measurement and Calculation
- Personal Health and Safety

Price: £275.00  
 Published Date: July 2016  
 Number of Pages: 568  
 Product Code: BP100834  
 ISBN: 978-1-85609-714-7




# Liquefied Petroleum Gas Sampling Procedures

**Liquefied  
Petroleum  
Gas Sampling  
Procedures**




**Liquefied  
Petroleum  
Gas Sampling  
Procedures**



Taking Samples of Liquefied Gas Cargoes

of sample containers must be carried out in a safe location, taking into account the properties of the product, wind and weather conditions, and proximity of sources of ignition and ventilation systems, etc.



If the sample system has only an inlet connection to the sample container, it will always be necessary to vent small quantities of cargo to atmosphere. This is known as an 'open loop' system.

If a second connection is provided so that product can be returned to the cargo tanks, the arrangement is known as a 'closed loop' system and, if fitted with a sample container with dual inlet/outlet connections, minimises the amount of product vented to atmosphere.

If the main hazard from the product to be sampled is its flammability, open sampling may be used provided that care is taken to reduce the amount of product release to an absolute minimum. However, if the cargo has toxic risks, eg VCM or benzene, then SIGTTO recommends

Taking Samples of Liquefied Gas Cargoes

The use of 'closed loop' sampling to avoid release of the material to atmosphere.

The return path of this closed loop should also be fitted with double shut-off valves. These return valves should be opened full open or closed and should not be used for throttling/flow control during the sampling process.

Examples showing 'closed loop' sampling systems, on both semi-refrigerated and refrigerated ships, are shown in Figures 1, 2 and 3.




Figure 1 - Semi-refrigerated vessel closed loop sampling connection

Taking Samples of Liquefied Gas Cargoes




Figure 2 - Other operating sampling operation (semi-refrigerated)

Before starting any sampling operation, the responsible officer should verify that the equipment to be used during the process is fully compatible with the ship's sampling points, paying particular attention to the compatibility of flanged connections.

NB Care should be taken to ensure that no attempt is made to force a tapered male thread into the ship's sampling connection.

It is imperative that the sample be representative of the cargo in the ship's tanks and, to ensure this, it is common practice to recirculate cargo within the tank to be sampled for 10 to 20 minutes, using a cargo pump. Before a sample is taken, it is essential to ensure that there is sufficient cargo in the tank for the cargo pump to operate safely.

Taking Samples of Liquefied Gas Cargoes

Before recirculation is commenced, the setting of all cargo valves should be thoroughly checked to ensure that cargo is not accidentally transferred from one tank to another, causing an overflow, and all cargo tank levels be monitored during the operation.

Sample containers should be completely clean and should be purged with nitrogen or before use.

For the sample to be representative, the container has to be purged thoroughly with cargo from the sampling connection.

For refrigerated cargoes, sufficient cargo should be passed through the container to cool it down to liquid temperature.

Care should be taken not to spray any cargo directly onto the ship's steel structure to avoid the risk of leaks/fires. It should also be noted that any liquid released from an ambient temperature sample container will cause a drop in temperature due to the Joule-Thomson effect.

If the cargo is a mixture of different products the lighter components will evaporate more rapidly than the less volatile fractions, leaving an unrepresentative sample. This can be overcome by using 'closed loop' sampling, or by carefully turning the sample container so that the vent valve faces downwards during cooldown to drain off any liquid that collects.

When a sample is taken, the primary valve on the inlet should be fully open, with any first/flow control valve or the secondary valve. In the case of 'closed loop' sampling, the valve on the outlet should be fully open.

On completion of sampling, it is imperative that sufficient ullage or vapour space is left in the sample container to allow for liquid expansion.

## OVERVIEW

This book is a guide to liquefied petroleum gas sampling procedures and contains updated recommendations produced by a working group made up of several industry experts and coordinated by SIGTTO.

This publication is a comprehensive guide to liquefied petroleum gas sampling. It covers the entirety of the process from beginning to end and looks at:

- The basic reasons for taking cargo samples
- Sampling connections, eg open and closed loop systems
- Types of sample containers
- Recommended standard sample connections
- Safe procedures for taking samples.

It has been fully updated by a working group made up of several industry experts and coordinated by SIGTTO.

## CONTENTS

- Taking Samples of Liquefied Gas Cargoes
- Summary
- Bibliography

Price: £25.00

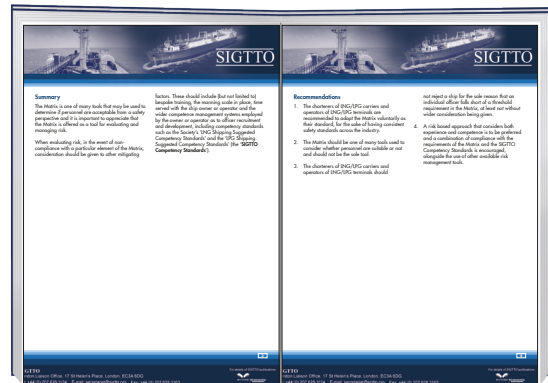
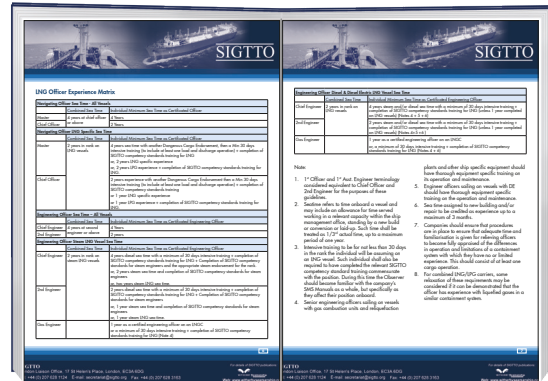
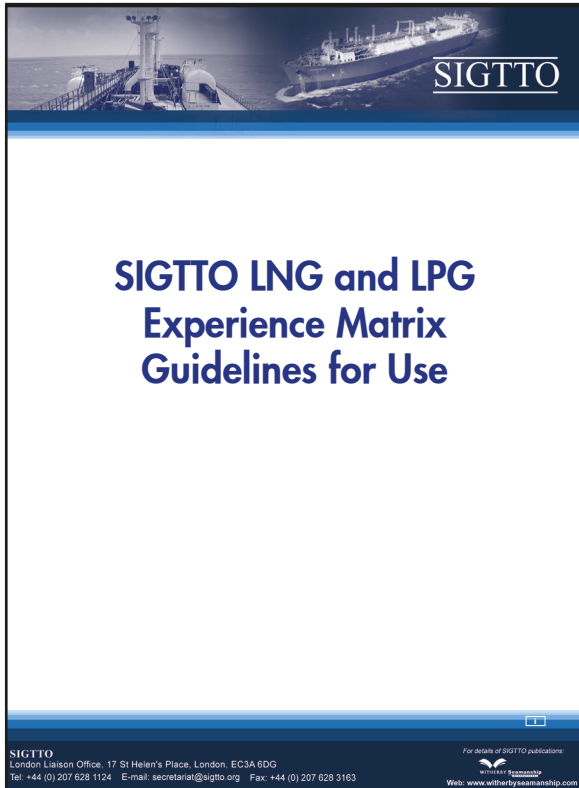
Published Date: May 2010

Number of Pages: 28

Product Code: BP100662

ISBN: 978-1-905331-99-4

# LNG and LPG Experience Matrix Guidelines for Use



## OVERVIEW

In the years since the Matrix was published, it has been brought to the attention of the Society that some terminals and charterers are applying it prescriptively, so that the levels of experience are considered to be minimum thresholds, where any shortfall is unacceptable (no matter how small). By contrast, the Society's accompanying recommendation to the Matrix is that: "in the event of non-compliance with a particular element of the experience matrix, consideration should be given to other mitigating factors, including bespoke training, the manning scale in place, time with the LNG/LPG ship owner/operator and the wider competence management systems employed by the ship operator in officer recruitment and development".

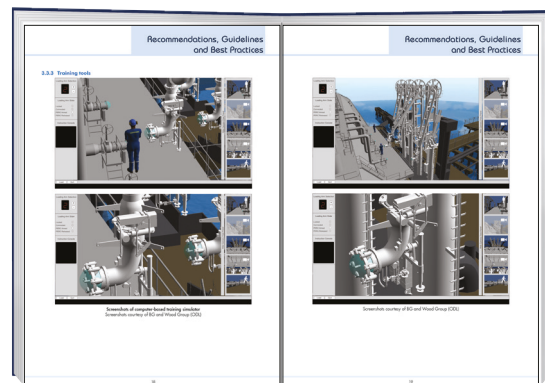
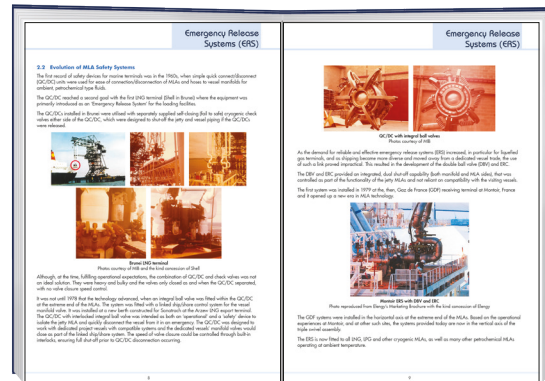
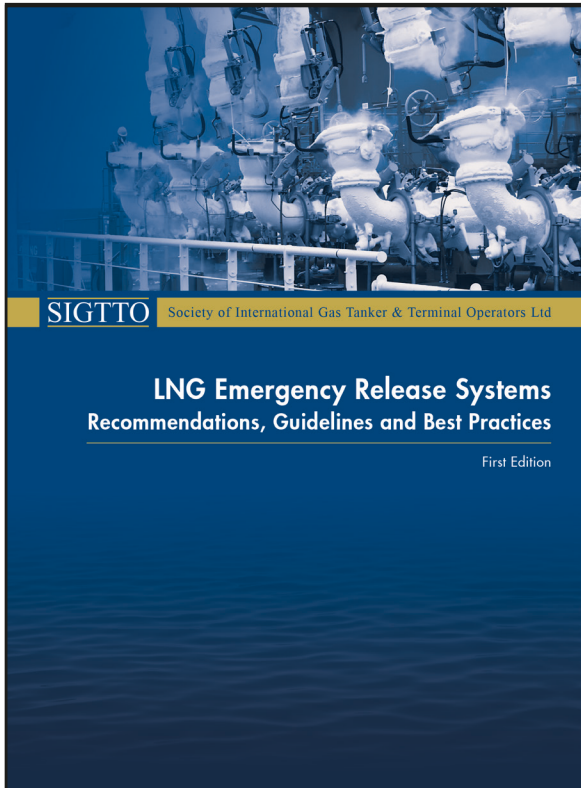
It was, therefore, agreed at GPC 73 (and subsequently approved by the board in May 2016) that the Secretariat should issue further guidance as to the recommended application of the Matrix in the assessment and management of risk.

## CONTENTS

- Present Situation
- Summary
- Recommendations
- Annex

Price: Free  
 Published Date: 2016  
 Number of Pages: 12

# LNG Emergency Release Systems – Recommendations, Guidelines and Best Practices



## OVERVIEW

This guide sets out best practice for the operation and maintenance of LNG emergency release systems (ERS), with the aim of safeguarding personnel, the environment and property during LNG operations.

Developed with the input of manufacturers, terminal operators and LNG shippers, this publication applies a risk-based approach covering the structure and operation of ERS. It sets out guidelines and best practices for ERS usage and also examines ERS hazards and risk management. The annexes provide competencies and training guides and suggested further reading.

## CONTENTS

- Introduction and Scope
- Emergency Release Systems (ERS)
- Recommendations, Guidelines and Best Practices
- Primary and Secondary Purposes
- Risks

Price: £125.00

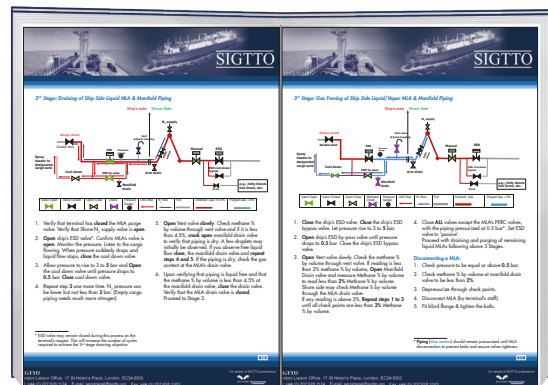
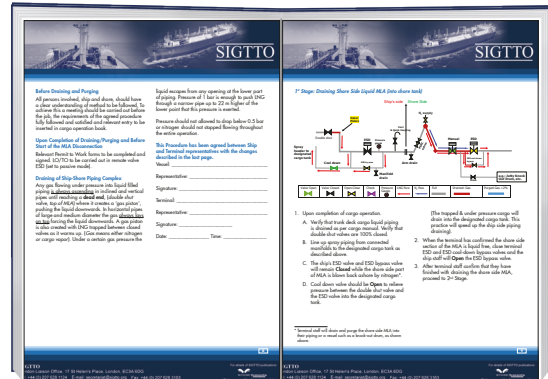
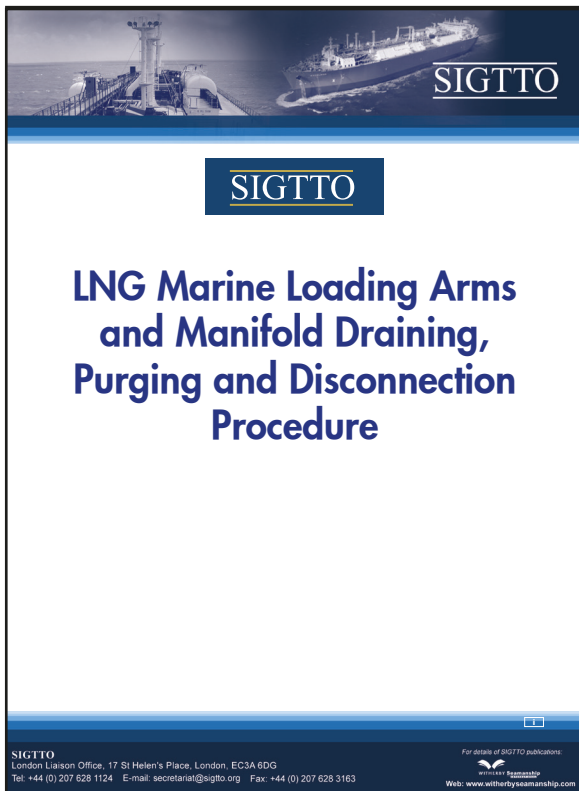
Published Date: January 2017

Number of Pages: 97

Product Code: BP100981

ISBN: 978-1-85609-730-7

# LNG Marine Loading Arms and Manifold Draining, Purging and Disconnection Procedure



## OVERVIEW

This advice has been prepared following reports that there appears to be confusion and misunderstanding among some ship and jetty operators over the safe conduct of this operation.

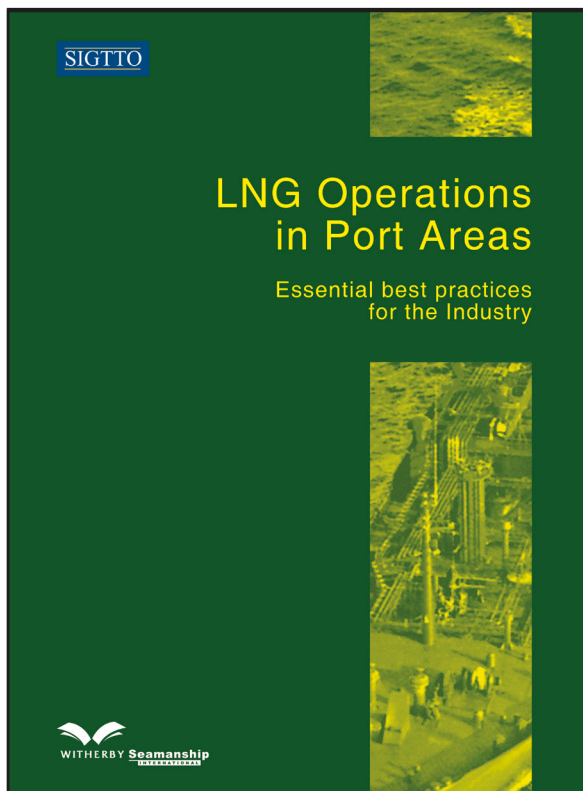
This advice specifically pertains to terminals employing rigid marine loading arms (MLAs). (The basic principles are applicable for hose systems that may be used for LNG ship-to-ship transfer, but there will be differences in the details.)

## CONTENTS

- Introduction
- Principal Objective
- Overview
- Conclusion
- Annexes

Price: Free  
 Published Date: January 2017  
 Number of Pages: 15

# LNG Operations in Port Areas: Essential Best Practices for the Industry



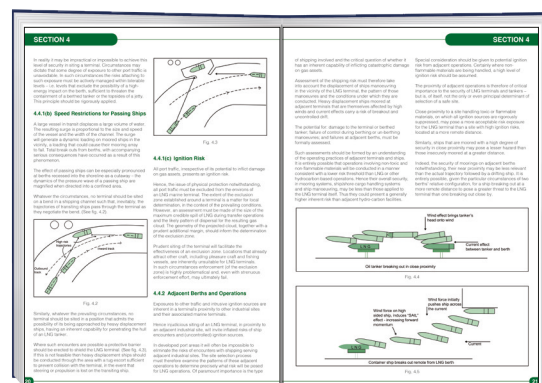
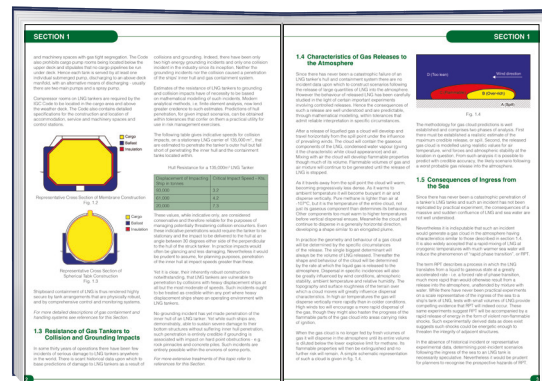
## OVERVIEW

This book highlights the risks associated with gas operations in port areas and sets out best practice guidelines covering port transit and gas transfer operations. It also considers terminal site selection and management of relations with port authorities and other stakeholders.

This book discusses the criteria influencing site selection for marine gas terminals and provides guidance on control of the main risk elements.

It acknowledges the dynamic nature of operating environments and the fact that risk profiles will change with time. Operators require both a systematic assessment of operating risk and a range of risk reduction methods that can be tailored to be effective in specific circumstances. This book aims to satisfy both these requirements.

It also looks at management of relations with the providers of port services, other port users and the wider social community of the port.

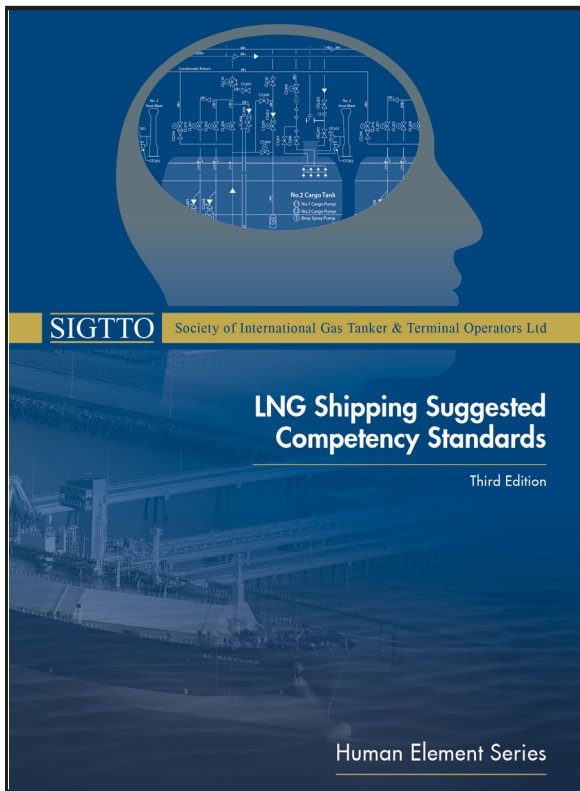


## CONTENTS

- Introduction
- Hazards of LNG Operations
- Risk Assessment
- Managing Tanker Transits
- Terminal Site Selection
- Managing Gas Transfer Operations
- Managing Relations With Port Authorities and Other Stakeholders

Price: £75.00  
 Published Date: September 2003  
 Number of Pages: 34  
 Product Code: BP101791  
 ISBN: 978-1-85609-256-2

# LNG Shipping Suggested Competency Standards, Third Edition



Underpinning Knowledge				
	Deck Operational	Cargo Operational	Cargo Management	Deck Management
1.1.1 Know and understand use and other individual responsibilities. Check a change order is appropriate to ensure that it does not fully conflict and ensure that full and complete records are maintained.				
1.1.2 Contingency Plans				
1.1.3 Know and understand the purpose, the role of emergency plans, procedures and emergency situations.				
1.1.4 Know and understand the emergency planning process				
1.1.5 Know and understand the emergency planning process				
1.1.6 Know and understand the emergency planning process				
1.1.7 Know and understand the emergency planning process				
1.1.8 Know and understand the emergency planning process				
1.1.9 Know and understand the emergency planning process				
1.1.10 Know and understand the emergency planning process				
1.1.11 Know and understand the emergency planning process				
1.1.12 Know and understand the emergency planning process				
1.1.13 Know and understand the emergency planning process				
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1.1.15 Know and understand the emergency planning process				
1.1.16 Know and understand the emergency planning process				
1.1.17 Know and understand the emergency planning process				
1.1.18 Know and understand the emergency planning process				
1.1.19 Know and understand the emergency planning process				
1.1.20 Know and understand the emergency planning process				

Underpinning Knowledge				
	Deck Operational	Cargo Operational	Cargo Management	Deck Management
2. Equipment				
2.1 Cargo System - Tank Construction				
2.2 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.3 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.4 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.5 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
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2.17 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.18 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.19 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				
2.20 Know an overview of all supporting Deck Cargo Tank & Tank Support Systems				

FSRU - Deck Management II				
	Deck Operational	Cargo Operational	Cargo Management	Deck Management
Performance Outcomes – Develop an Awareness of the Commercial Aspects of FSRU Operations				
1. Identify the critical areas and conditions in which O&M is required and applied to ensure and to maintain an O&M standard.				
2. Identify the critical areas and conditions in which O&M is required and applied to ensure and to maintain an O&M standard.				
3. Identify the critical areas and conditions in which O&M is required and applied to ensure and to maintain an O&M standard.				
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19. Identify the critical areas and conditions in which O&M is required and applied to ensure and to maintain an O&M standard.				
20. Identify the critical areas and conditions in which O&M is required and applied to ensure and to maintain an O&M standard.				

FSRU Underpinning Knowledge				
	Deck Operational	Cargo Operational	Cargo Management	Deck Management
1. Fundamental Knowledge and Understanding				
1.1 Knowledge of Ship				
1.2 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.3 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.4 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.5 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.6 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.7 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
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1.18 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.19 Know an overview of the specification and construction of cargo tank and cargo transfer systems				
1.20 Know an overview of the specification and construction of cargo tank and cargo transfer systems				

## OVERVIEW

This document is written at a level suitable for organisations involved in training officers for LNG cargo operations. The high-level nature of the content is directed at a reader who is technically qualified and experienced in the subject of training and LNG operations.

These suggested standards are useful for all types of LNG carriers, regardless of size. They are relevant to any officer that is involved in the entire LNG cargo cycle operation, including the role of cargo engineer.

It is the responsibility of the owner to decide the appropriate level and type of training required, as part of a formal competence management system. Additional training, not covered by this document, may be required for specific operations or equipment.

## CONTENTS

- Deck – Management
- Deck – Operational
- Cargo Equipment – Management
- Cargo Equipment – Operational
- Underpinning Knowledge

Price: £175.00

Published Date: January 2021

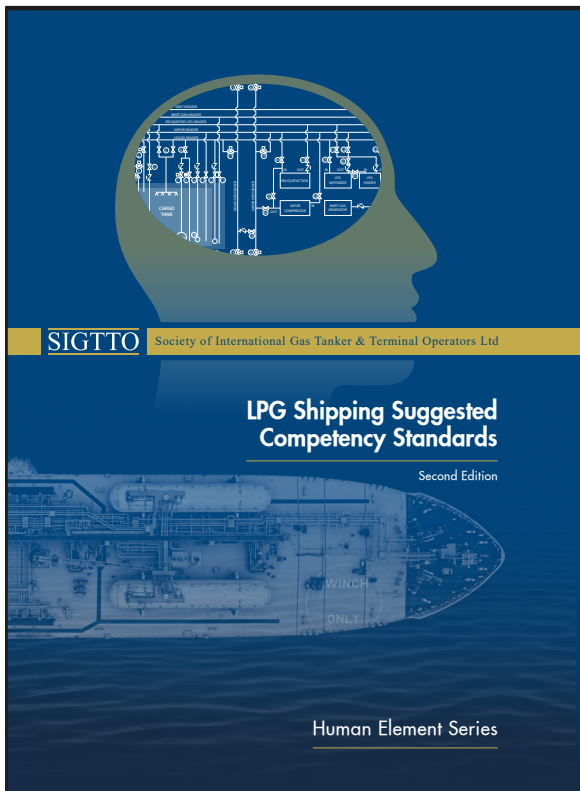
Number of Pages: 164

Product Code: BP104452

ISBN: 978-1-85609-959-2



# LPG Shipping Suggested Competency Standards, Second Edition



## OVERVIEW

This document is written for organisations involved in training officers, including cargo engineers, for LPG cargo operations. This document is written at a high level and is suitable for individuals that are technically qualified and experienced in the subject of training and LPG operations. These standards are useful for all types of LPG carriers, regardless of size, and are relevant for all types of LPG cargo operations. This includes traditional cargo transfer operations at berth, ship-to-ship transfer operations and LPG carriers with LPG fuel systems. It is the responsibility of the owner to decide the level and type of training required, as part of a formal competence management system. This new document updates and replaces the previous edition *LPG Shipping Suggested Competency Standards* (2008).

Cargo Equipment Operational 1	Cargo Equipment Operational 1
<p><b>Performance Outcomes – Develop Familiarisation and Understanding of LPG Transportation Requirements</b></p> <p><b>Unit Summary – What do you need to do?</b></p> <p>This unit defines the level of competence necessary to familiarise and understand of LPG transportation requirements, individual responsibilities and how the specific ship and cargo operations to assessment requirements and processes are combined.</p> <p><b>Level of Competence – This should be able to do the following:</b></p> <ol style="list-style-type: none"> <li>1. Identify the operational characteristics of LPG and other relevant gases and determine their impact on cargo and ship operations.</li> <li>2. Identify the regulations and guidelines, ship design, characteristics, materials and cargo-related matters and determine the impact on cargo storage, transportation and assessment.</li> <li>3. Determine specific loading and discharging factors and cargo cycles and define individual responsibilities of the vessel.</li> <li>4. Identify the ship to ship or STS interface and equipment and determine any issues they might raise during the cargo operation.</li> <li>5. Define the specific ship and cargo operations risk assessment requirements and processes for those involved.</li> </ol> <p><b>Knowledge and Understanding – What you should know:</b></p> <ol style="list-style-type: none"> <li>1. The specific and characteristics of LPG and other relevant gases.</li> <li>2. The specific and characteristics of LPG and other relevant gases related to the carriage of LPG and the differences between Liquefied Petroleum Gas, Acetylene and Liquefied Natural Gas.</li> <li>3. The regulations and guidelines related to the carriage of LPG at sea.</li> <li>4. The factors of LPG design including fully pressurised, semi-pressurised, fully refrigerated, fully vapourised and other design and safety issues, how and why they differ, how they impact the ship, with respect to the different risks they pose in the operation and cargo storage.</li> <li>5. LPG cargo classification system types including their storage and performance, when used in different operating conditions, such as factors and how they relate to the overall of cargo storage.</li> <li>6. The materials used on LPG, where they are used and why they are suitable for that purpose.</li> <li>7. Cargo tank filling systems, limitations and associated features.</li> </ol>	<ol style="list-style-type: none"> <li>8. How different types of ship to ship and STS interface processes and equipment might impact the operation of cargo operations.</li> <li>9. Safe and efficient STS interface loading and discharging.</li> <li>10. LPG specific risk assessment requirements and processes.</li> <li>11. Individual roles of responsibility.</li> </ol>

Underpinning Knowledge	Underpinning Knowledge																																																																																																														
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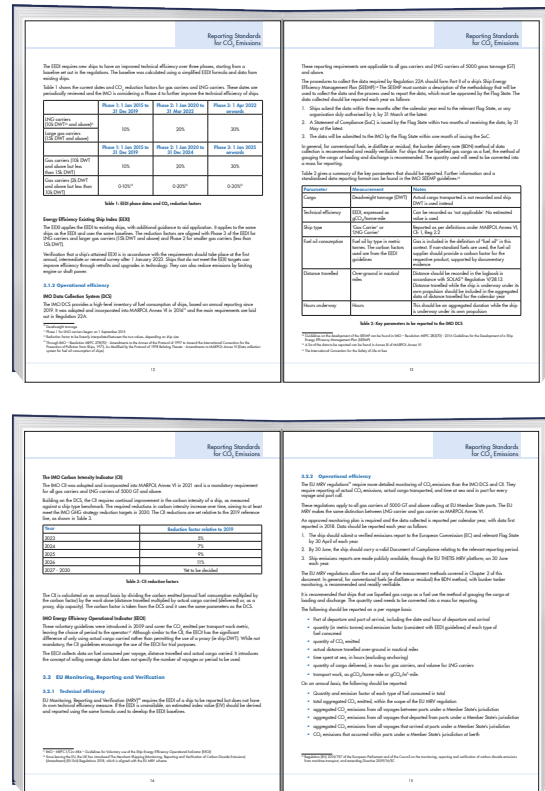
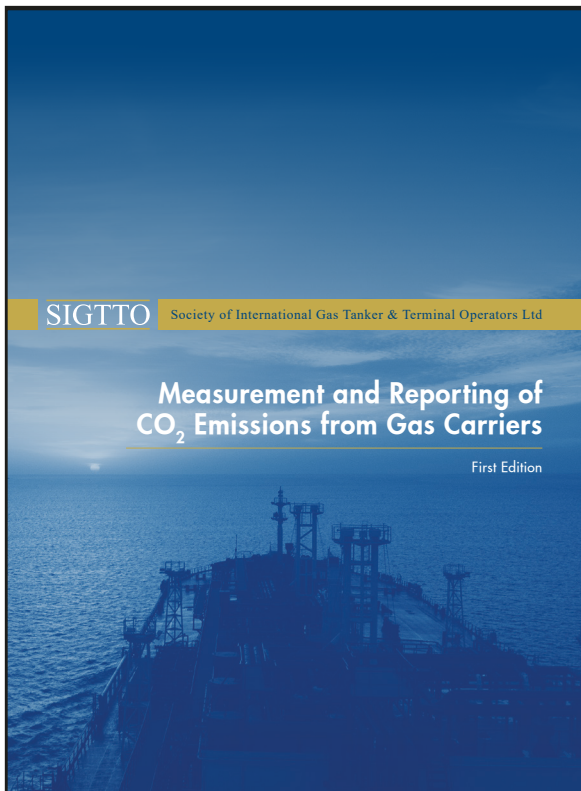
## CONTENTS

- Introduction
- Scope
- How to Use these Standards
- Performance Outcome Definitions
- Deck Operational
- Cargo Equipment Operational
- Cargo Equipment Management
- Deck Management
- Underpinning Knowledge
- Annexes

Price: £175  
 Published Date: July 2022  
 Number of Pages: 103  
 ISBN: 978-1-914992-49-0



# Measurement and Reporting of CO<sub>2</sub> Emissions from Gas Carriers



## OVERVIEW

This document provides high-level guidance to assist the gas shipping industry in its efforts to reduce carbon dioxide (CO<sub>2</sub>) emissions. CO<sub>2</sub> is considered a greenhouse gas (GHG), and it is vital to minimise the environmental impact from the transportation of liquefied gas. This is the first document in a series that plans to address this issue. As a first step, this document provides guidance on the standardised measurement and reporting of CO<sub>2</sub> emissions. This document identifies typical sources of CO<sub>2</sub> emissions from gas carriers and describes the methodologies for measuring CO<sub>2</sub> emissions. The reporting standards set by the International Maritime Organization (IMO) and European Union (EU) for CO<sub>2</sub> emissions are then explained, covering both technical and operational efficiency.

## CONTENTS

- Introduction and Scope
- Measurement of CO<sub>2</sub> Emissions
- Reporting Standards for CO<sub>2</sub> Emissions
- Annexes

Price: Free  
 Published Date: July 2022  
 Number of Pages: 20

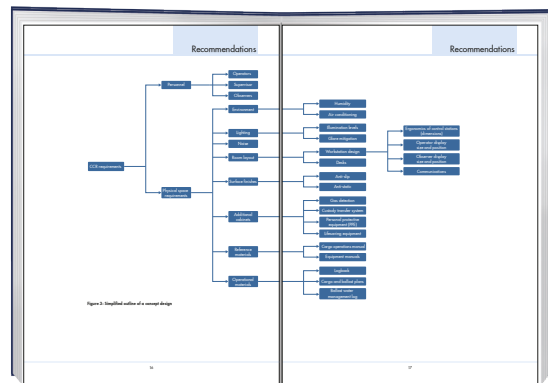
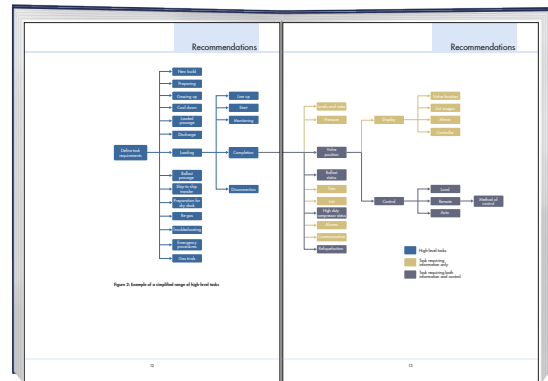
# Recommendations for Cargo Control Room HMI, First Edition



## OVERVIEW

This document recommends a human-machine interface (HMI) design process that is centred around the needs of the operator, allowing effective monitoring and control of the system. This document builds on the SIGTTO publication Recommendations for Designing Cargo Control Rooms, which recommends a human-centred approach to the design of cargo control rooms (CCRs).

Specific guidance and examples are provided to explain the HMI design process, including examples of key questions to consider when specifying the requirements of the HMI. An example of a task-based display for a loading operation is provided to show how user feedback is used to improve the presentation of information to the operator.

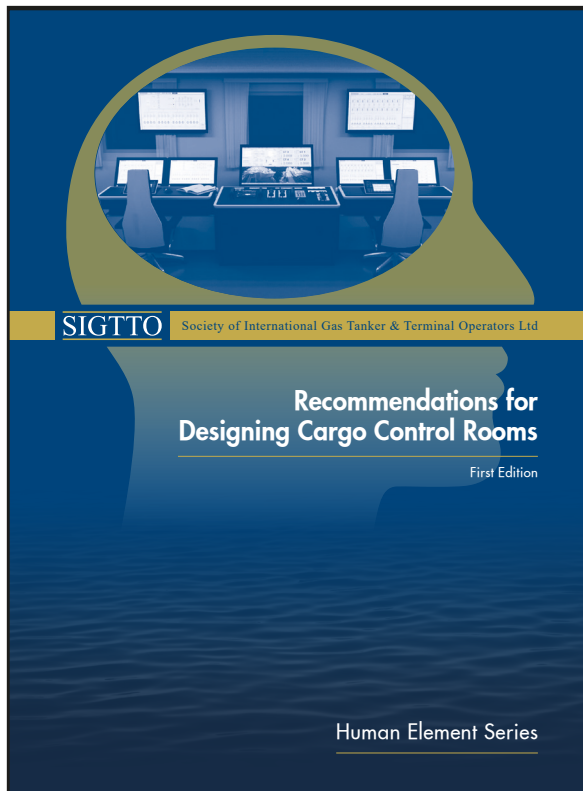


## CONTENTS

- Part – 1 Introduction
- Part – 2 Recommendations
- Annexes

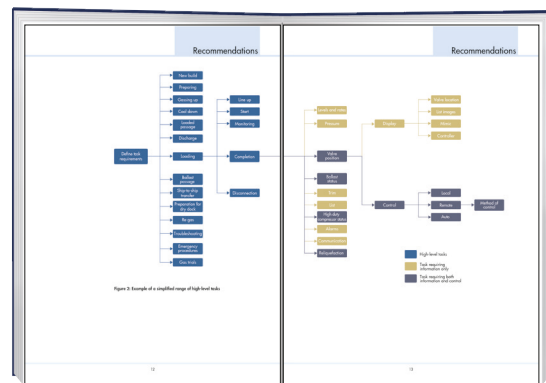
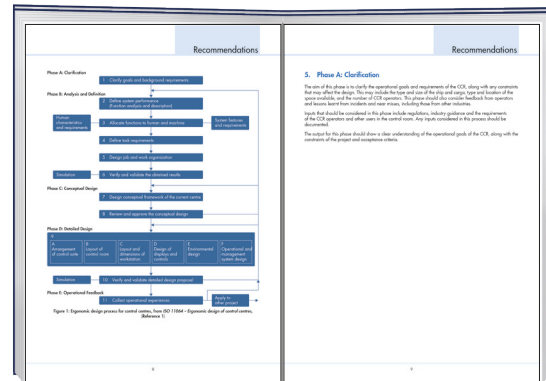
Price: Free  
 Published Date: 2021  
 Number of Pages: 42  
 ISBN: 978-1-85609-996-7

# Recommendations for Designing Cargo Control Rooms, First Edition



## OVERVIEW

This document recommends the application of ergonomic design principles to cargo control rooms (CCRs) on liquefied gas carriers.

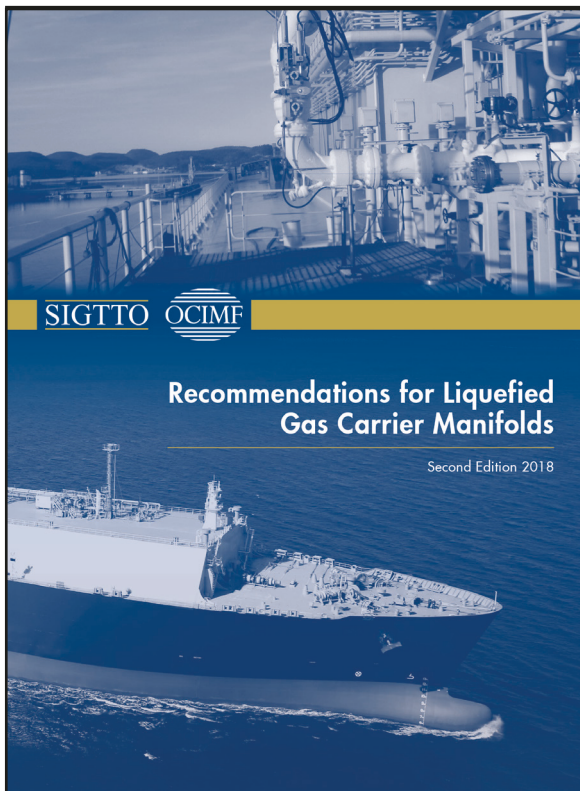


## CONTENTS

- Introduction
- Recommendations
- Annexes

Price: Free  
 Published Date: 2020  
 Number of Pages: 30  
 ISBN: 978-1-85609-957-8

# Recommendations for Liquefied Gas Carrier Manifolds



SIGTTO OCIMF

## Recommendations for Liquefied Gas Carrier Manifolds

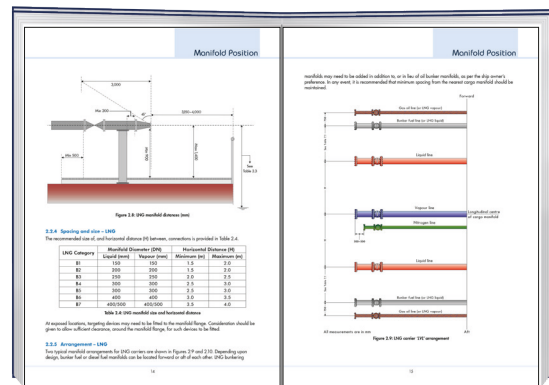
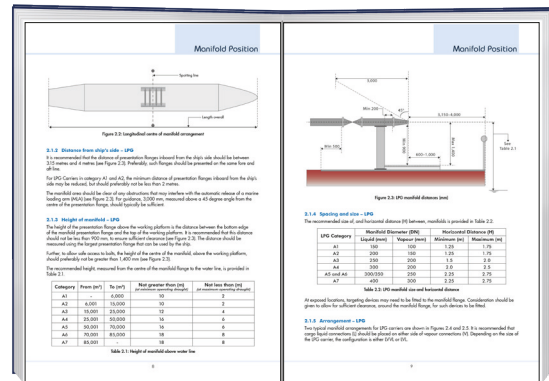
Second Edition 2018

### OVERVIEW

This publication provides recommendations on the layout, strength and fittings for gas carrier manifolds. It is applicable to both LPG and LNG carriers and is an update to the previous edition of 'Manifold Recommendations for Liquefied Gas Carriers (2011)'.  
The aim of this publication is to improve standardisation of LPG and LNG carrier manifolds to assist in the safe connection of cargo transfer equipment at every facility. Guidance is also provided on cargo spill containment, including deck protection, coaming, drip trays, gratings, drainage and water curtains.

The book categorises carriers by cargo capacity and the recommendations are scaled so they can be applied to carriers of all sizes. Some new gas carrier designs may not be able to conform to all of the recommendations. However, this document is intended to serve as a starting point with a view to minimising differences as much as possible.

The book categorises carriers by cargo capacity and the recommendations are scaled so they can be applied to carriers of all sizes. Some new gas carrier designs may not be able to conform to all of the recommendations. However, this document is intended to serve as a starting point with a view to minimising differences as much as possible.

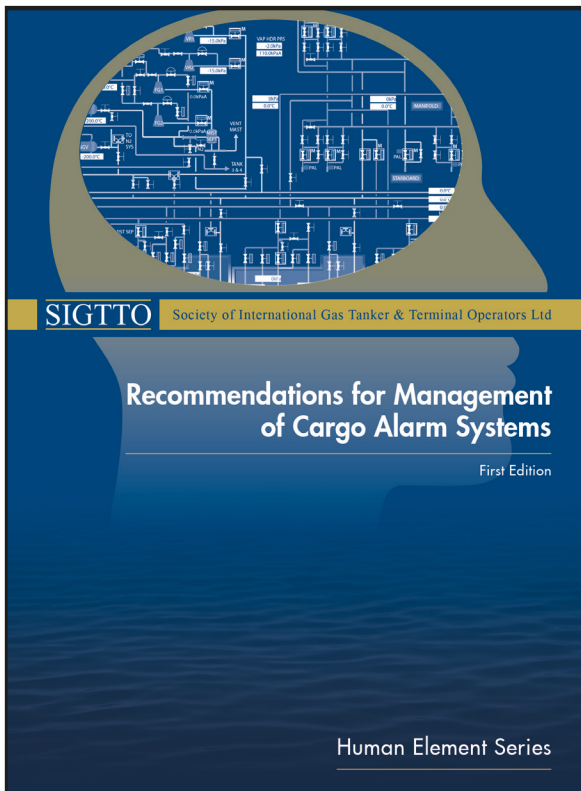


### CONTENTS

- Introduction
- Manifold Position
- Protection from Cargo Spill
- Manifold Design
- Manifold Specification and Fittings
- Additional Requirements
- Bunker Manifolds
- Annexes

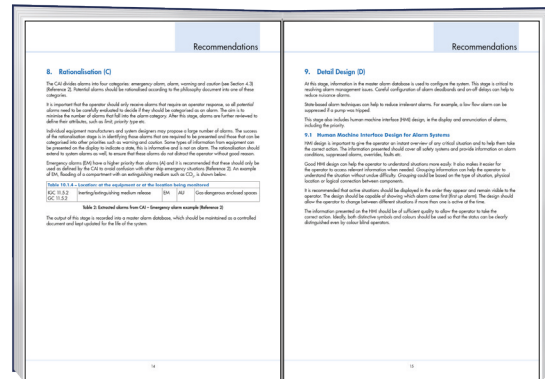
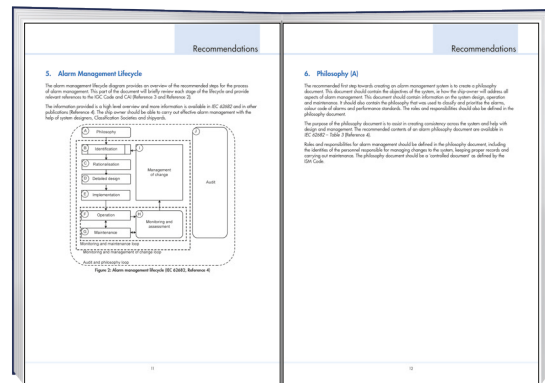
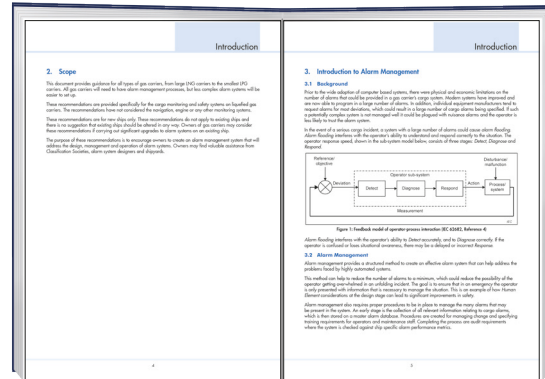
Price: £175.00  
 Published Date: March 2018  
 Number of Pages: 51  
 Product Code: BP101229  
 ISBN: 978-1-85609-769-7

# Recommendations for Management of Cargo Alarm Systems



## OVERVIEW

This publication recommends the implementation of alarm management philosophies for cargo alarm systems on gas carriers. The recommendation is for ship owners to work with system designers, Classification Societies and shipyards, to create a management system for cargo alarms on each ship. The information in this publication is based on existing philosophies in the ISM Code, the Code on Alerts and Indicators, the IGC Code and IEC 62682. Alarm management is a good example of how Human Element considerations can lead to improved safety performance.



Price: Free  
 Published Date: 2019  
 Number of Pages: 32  
 ISBN: 978-1-85609-848-9

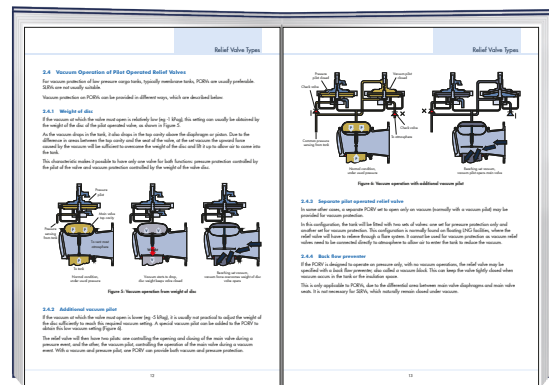
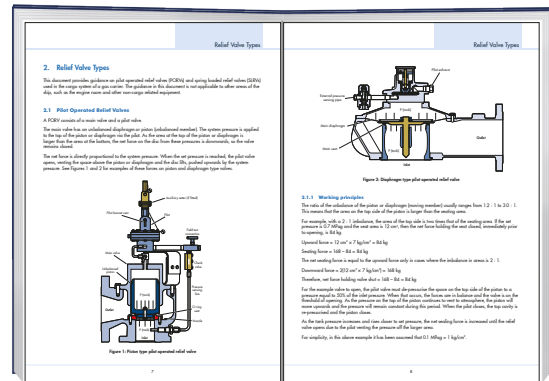
# Recommendations for Relief Valves on Gas Carriers, Third Edition



## OVERVIEW

This publication provides critical safety information on the design and maintenance of relief valves for LNG and LPG gas carriers.

This publication describes and illustrates the various types of relief valve and sets out general requirements with reference to the IGC Code. It provides recommendations on selection, design, operation and maintenance and advises on common operating problems and faults.

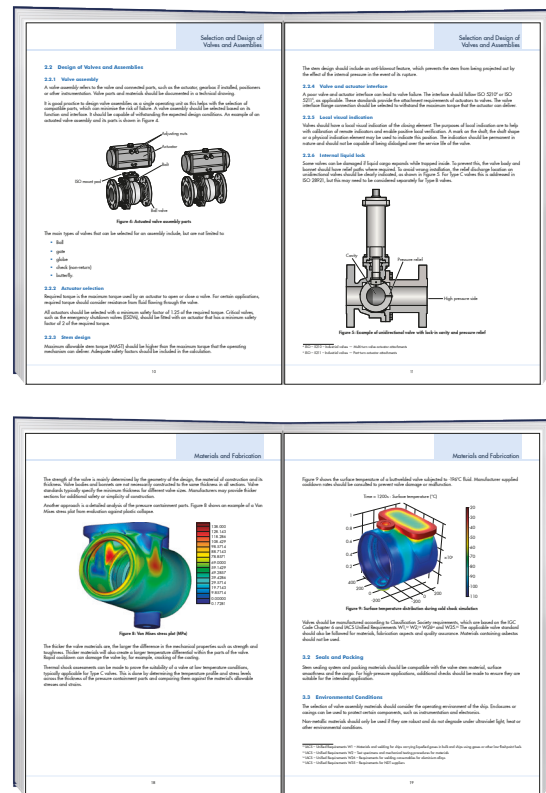
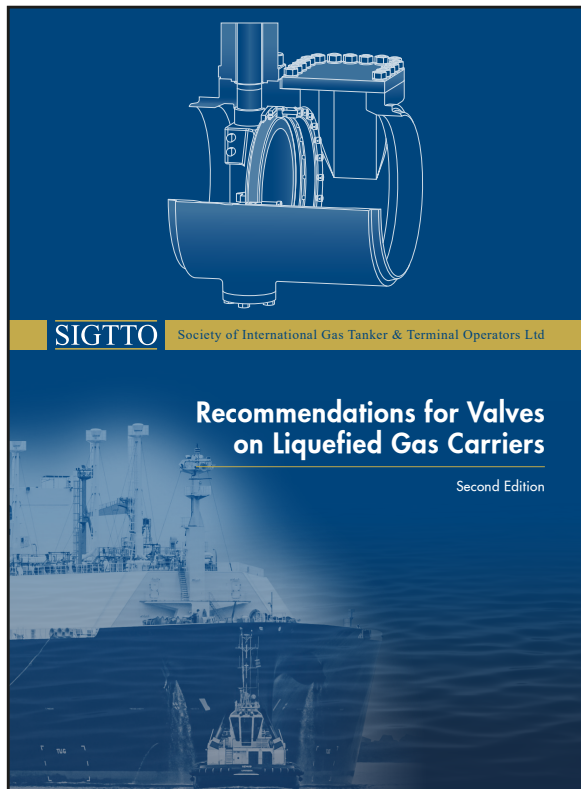


## CONTENTS

- Introduction and Scope
- Relief Valve Types
- Relief Valve Requirements
- Recommendations
- Operating Problems and Faults
- Annexes

Price: £175.00  
 Published Date: 2020  
 Number of Pages: 58  
 Product Code: BP102457  
 ISBN: 978-1-85609-825-0

# Recommendations for Valves on Liquefied Gas Carriers, Second Edition



## OVERVIEW

This document provides guidance to help reduce the likelihood of incidents, such as malfunction or valve damage. It provides recommendations for the design of valves and valve assemblies and the selection of materials. Maintenance and inspection recommendations are also provided, with an emphasis on support from the manufacturer and the robustness of the ship's planned maintenance system.

The guidance in this document is intended for valve manufacturers, shipyards and ship owners, with the aim to improve safety in the industry. In support of the International Maritime Organization's Greenhouse Gas Strategy, it includes recommendations to reduce carbon dioxide and methane emissions.

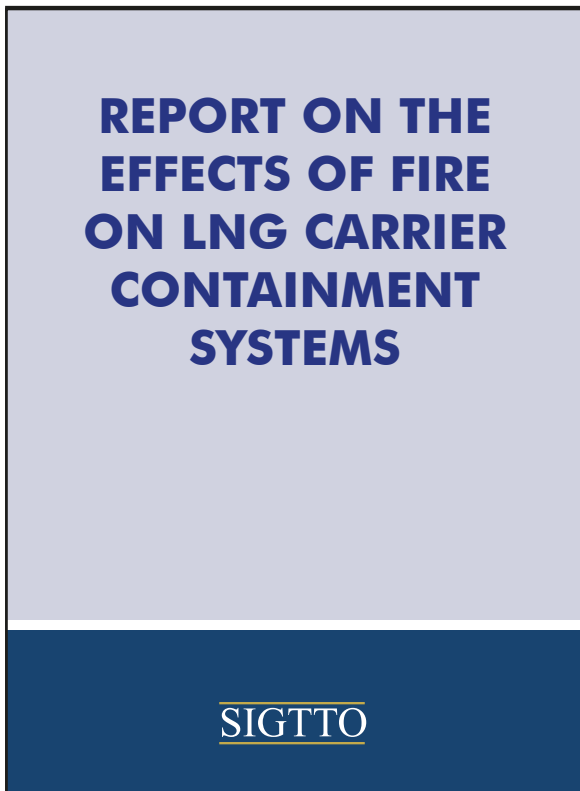
This new document combines and replaces the previous editions, The Selection and Testing of Valves for LNG Applications (2008) and The Selection and Testing of Valves for LPG Applications (2012).

## CONTENTS

- Introduction and Scope
- Selection and Design of Valves and Assemblies
- Materials and Fabrication
- Post-Fabrication Testing and Installation
- Maintenance and Inspection
- Greenhouse Gas Emissions
- Annexes

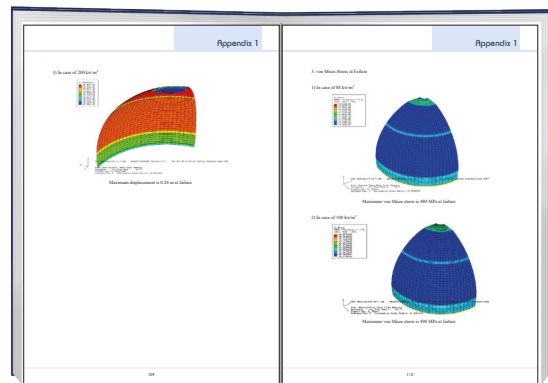
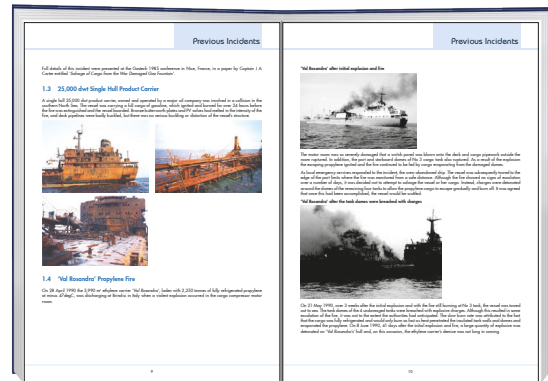
Price: Free  
 Published Date: June 2022  
 Number of Pages: 36  
 ISBN: 978-1-914993-22-0

# Report on the Effects of Fire on LNG Carrier Containment Systems



## OVERVIEW

This report investigates the response of LNGC cargo tanks exposed to a large enveloping pool fire that could possibly result from the spillage of LNG onto the sea and its subsequent ignition.



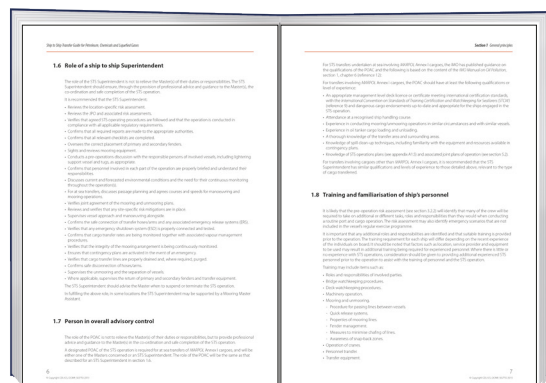
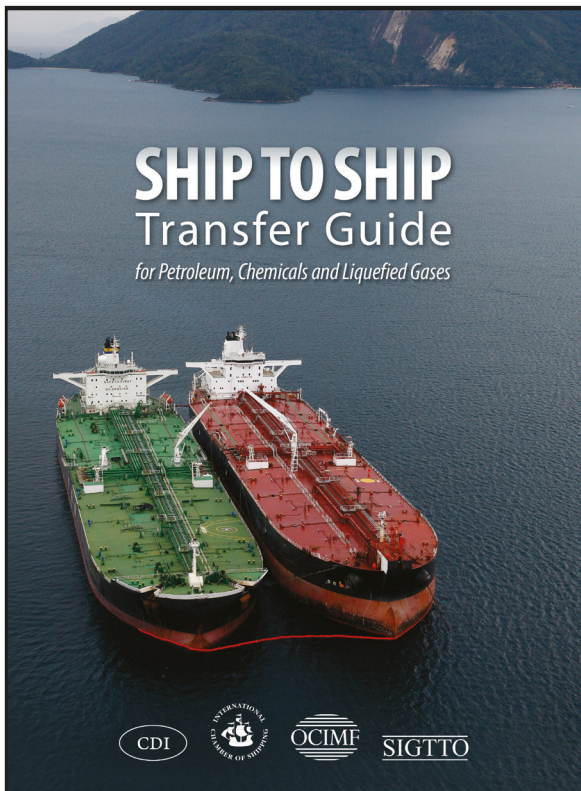
## CONTENTS

- Introductions
- Previous Incidents
- The Origins of the IGC-Code
- Fire Scenarios
- LNG Carrier Pressure Relief Systems
- Simplified Reapplication of the Code for Loss of Insulation
- Heat Transfer Into the tank
- Time Based Heat Transfer
- Response of Insulation Materials to Heat
- Discussion
- Conclusions
- Recommendations
- Appendices

Price: Free  
 Published Date: 2009  
 Number of Pages: 232



# Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases



## OVERVIEW

This cross industry publication developed jointly by ICS, OCIMF, SIGTTO and CDI provides guidance on planning and execution of STS operations. It is applicable to all ships involved in transfer activities and to all types of bulk liquid cargoes, whether transferred at sea or in port. It will benefit Masters, Marine Superintendents and others, such as STS service providers and transfer organisers, involved in STS operations.

This industry guide provides recommendations on safety, minimum equipment levels and good operating practices for STS operations. It is a required publication on the SIRE Vessel Inspection Questionnaires (VIQ) for Oil Tankers, Combination Carriers, Shuttle Tankers, Chemical Tankers and Gas Tankers.

This book supersedes:

- Ship to Ship Transfer Guide (Petroleum) 4th Edition published in 2005
- Ship to Ship Transfer Guide (Liquefied Gas) 2nd Edition published in 1995
- LNG Ship to Ship Transfer Guidelines published in 2011

This book builds on the previous recommendations and recognises experience gained in the industry of STS transfer operations, including transferring chemical (MARPOL Annex II) and liquefied natural gas (LNG) cargoes.

## CONTENTS

- General Principles
- Conditions and Requirements
- Safety
- Communications
- Operational Preparations
- Manoeuvring and Mooring
- Procedures Alongside
- Unmooring
- Equipment
- Emergencies
- Appendices

Price: £275.00

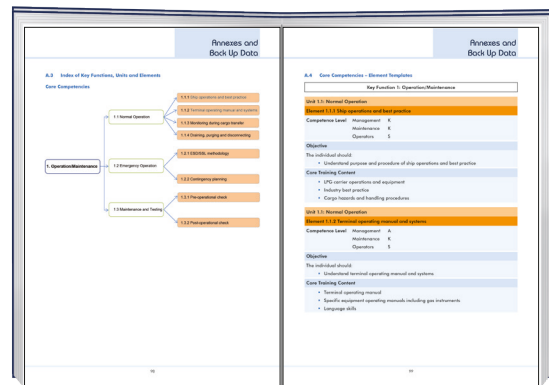
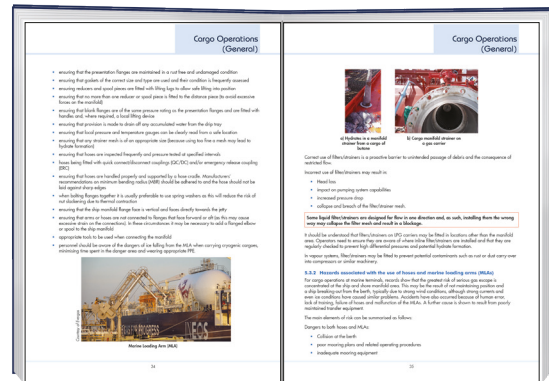
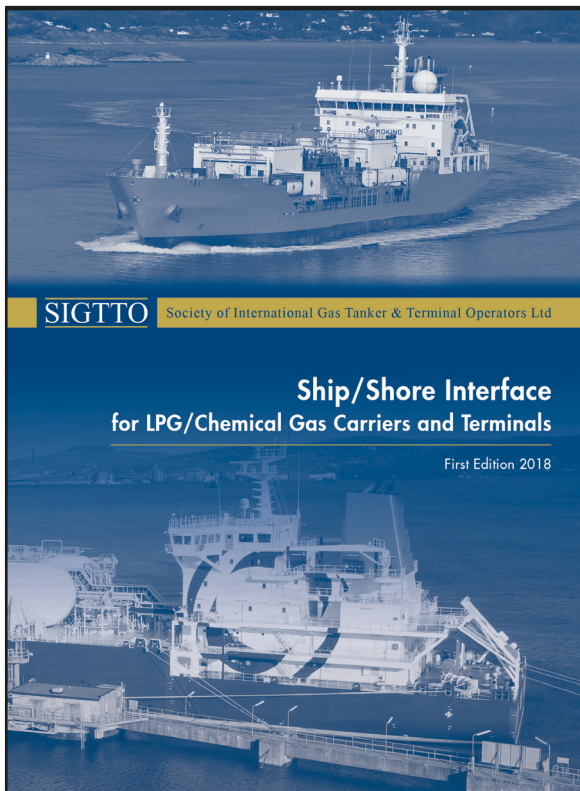
Published Date: November 2013

Number of Pages: 160

Product Code: BP102015

ISBN: 978-1-85609-594-5

# Ship/Shore Interface for LPG/Chemical Gas Carriers and Terminals



## OVERVIEW

This publication identifies potential hazards at the LPG/chemical ship/shore interface. Referencing industry regulations and guidance, it suggests best working practices for the terminal and the ship to minimise the risk of incident and to help raise overall safety awareness.

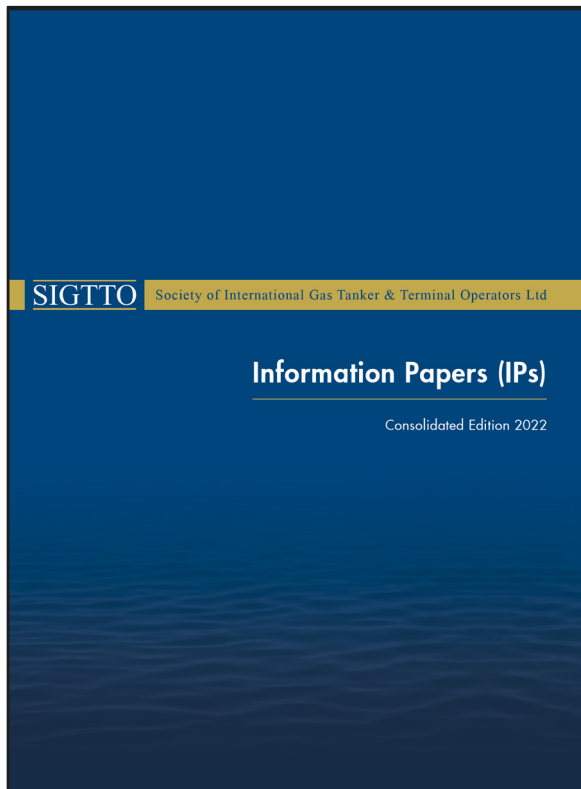
This publication describes risk assessment and hazard identification techniques that can be applied by LPG/chemical gas shipping staff and terminal operators. It identifies the principal risks at the ship/shore interface, including vessel arrival and departure, loading and discharge operations, gas detection and exposure to hazardous products. Diagrams support the text and effectively illustrate how to mitigate 'top event' hazards to cargo containment.

## CONTENTS

- Introduction, Purpose and Scope
- Hazards and Risk Management
- Operational Readiness
- Pre-Arrival
- Arrival Alongside Prior to Cargo Operations Commencing
- Cargo Operations (General)
- Cargo Loading
- Cargo Discharge
- LPG Carrier Departure
- Release of Vapour
- Cold Spill
- Asphyxiation and Toxicity

Price: £175.00  
 Published Date: July 2018  
 Number of Pages: 138  
 Product Code: BP101131  
 ISBN: 978-1-85609-770-3

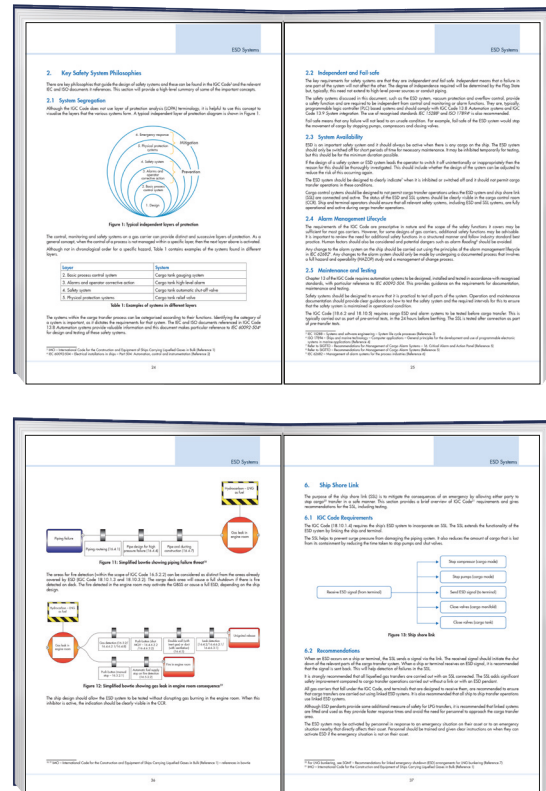
# SIGTTO Information Papers (Consolidated Edition 2022)



## OVERVIEW

This publication contains all the SIGTTO Information Papers that are in force for 2022, for the guidance of industry members.

**Price:** £195.00  
**Published Date:** February 2022  
**Number of Pages:** 521  
**Product Code:** BP105722  
**ISBN:** 978-1-914992-42-1



## CONTENTS

- A Justification into the Use of Insulation Flanges (and Electrically Discontinuous Hoses) at the Ship/Shore and Ship/Ship Interface
- ESD Systems
- Fire Prevention in the Cargo Containment Systems of Liquefied Gas Carriers in Shipyards
- Gas Concentrations in the Insulation Spaces of Membrane LNG Carriers
- Guidance for the Prevention of Rollover in LNG Ships
- Guidance on Gas Carrier and Terminal Gangway Interface
- Guide for Planning Gas Trials For LNG Vessels
- LNG and LPG Experience Matrix (Including Guidelines for Use)
- LNG Marine Loading Arms and Manifold Draining, Purging and Disconnection Procedure
- Report on the Effects of Fire On LNG Carrier Containment Systems
- Recommendations for Cargo Control Room HMI
- Recommendations for Designing Cargo Control Rooms
- Recommendations for Management of Cargo Alarm Systems
- Simulation Information Paper
- Suggested Quality Standards for LNG Training Providers
- Cont.

# Simulation Information Paper: The Use of Computer Simulation in LNG Shipping and Terminal Applications

**Simulation Information Paper**

**The Use of Computer Simulation in LNG Shipping and Terminal Applications**

**Introduction**

As computer memory and processing speeds have increased over the years at seemingly exponential rates, so has the ability to carry out complex simulation of many different facets of our every day life. Flight Simulator packages are just one example where a sophisticated package has been developed for the domestic market and has spawned a large number of aircraft models that developers have made freely available.

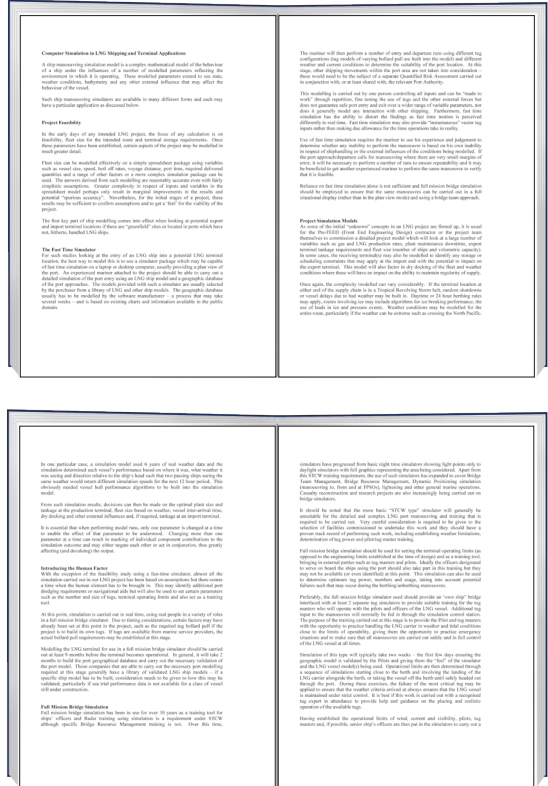
Shipping simulation has not captured the imagination of the public in quite the same way as flight simulation and remains the preserve of the specialist software developer and modeller. It is also true to say that shipping simulation carried out in real time can be tedious for those with only a passing interest.

The purpose of this paper is to look at the application of simulation in the LNG shipping and terminal interface areas of operations, to discuss the types of simulation programmes available, their application and to make some general recommendations on their use, expanding on the general statement:

*"Before LNG operations begin at a port with no previous history of the trade, it is prudent for simulator training to be provided for pilots and, perhaps, tug masters. Such training would aim to ensure all involved parties are thoroughly au fait with the proposed operation and are practised in handling emergency procedures and deviations from the plan"*

from the SIGTTO publication *"LNG Operations in Port Areas"*.

This paper will not make recommendations in respect of specialist simulation service providers (although it will list many of those with which SIGTTO Members have worked) nor will it cover the basic STCW type Bridge Resource Management or Bridge Team Training simulators that are prevalent amongst the many nautical colleges worldwide. Neither does this document seek to address the use of simulators in port channel design which is extensively covered in the PIANC document *"Approach Channels – A Guide for Design"*.



## OVERVIEW

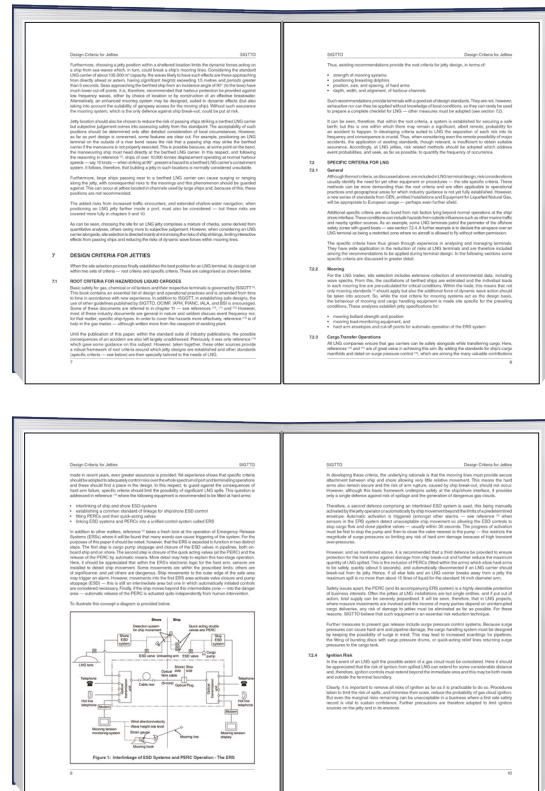
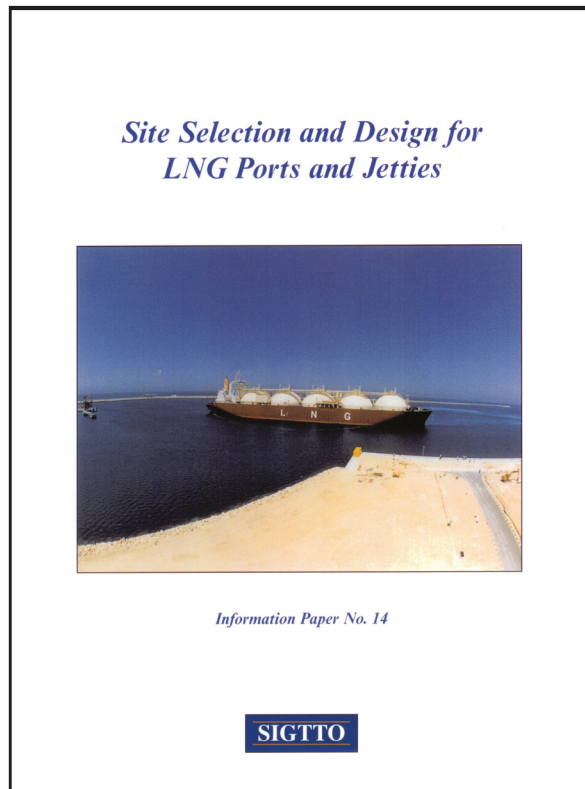
This paper looks at the application of simulation in the LNG shipping and terminal interface areas of operations. It discusses the types of simulation programmes available, their application and makes some general recommendations on their use.

Price: Free  
 Published Date: 2010  
 Number of Pages: 15

## CONTENTS

- Introduction
- Computer Simulation in LNG Shipping and Terminal Applications
- Project Feasibility
- The Fast Time Simulator
- Project Simulation Models
- Introducing the Human Factor
- Full Mission Bridge Simulation
- Factors to consider in Simulation
- Use of bow thrusters
- Berthing in the simulator
- Bridge Team and Resource Management
- Management of Simulation
- Use of Simulators as a research tool
- Other Applications of Simulation in LNG Operations and Training
- Mooring
- Use of manned models for pre-command experience
- Liquid Cargo Operations Simulators
- Steam Simulator Training
- IAS simulation
- Conclusion

# Site Selection and Design for LNG Ports and Jetties (IP No. 14)



## OVERVIEW

This book is aimed at port developers as a guide to the minimum design criteria required when a port is built or altered to accommodate LNG carriers. It contains operational and design considerations before questioning these in the context of the human element. The consequences of collisions and groundings are studied and methods of limiting the effect of such accidents are offered.

This publication addresses safety issues for LNG ports. It focuses on eliminating spillages at both the ship/shore interface and navigational approach channels.

The book outlines the way forward for site selection of LNG terminals, establishes a basis for safe jetty design and considers the safety factors in the port approach. It also considers the existing industry guidelines that cover cargo operations at the ship/shore interface. It is suggested that LNG's excellent safety record is owing to the existing standards being adopted. As the industry becomes more widespread, continuing success will depend not only on better acceptance of the existing standards but also on future improvements. Some of the newer aspects are described and a checklist can be found in the appendix.

## CONTENTS

- Summary
- Principal Recommendations
- Acknowledgments
- Introduction
- Development of LNG Standards
- Site Selection
- Design Criteria for Jetties
- Risk Management in the Port Approach
- The Human Element
- Grounding and Collision Risk
- References
- Appendix

Price: £40.00

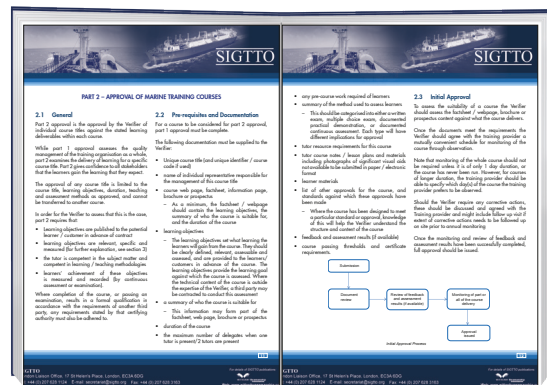
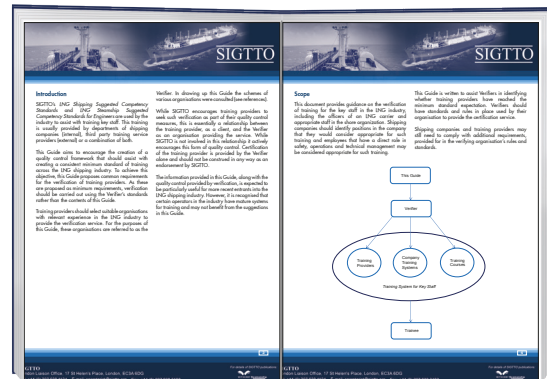
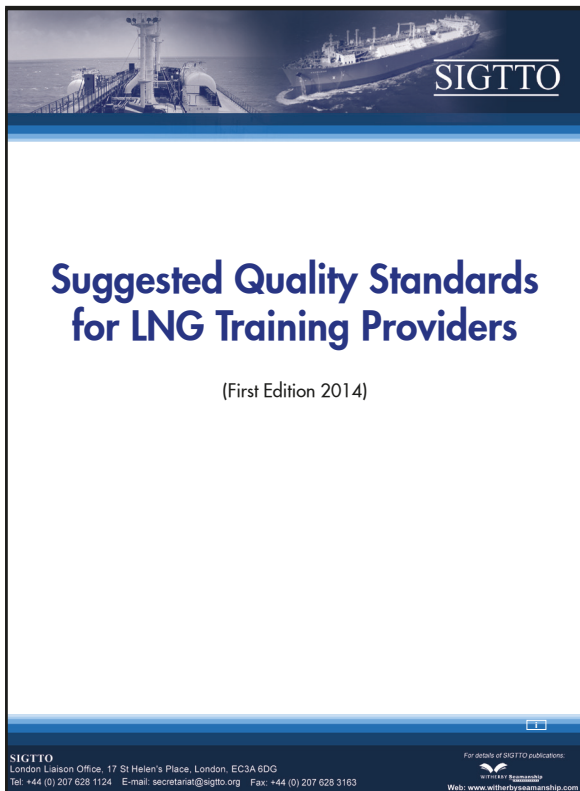
Published Date: February 1997

Number of Pages: 25

Product Code: BP102051

ISBN: 978-1-85609-129-9

# Suggested Quality Standards for LNG Training Providers



## OVERVIEW

This guide aims to encourage the creation of a quality control framework that should assist with creating a consistent minimum standard of training across the LNG shipping industry.

The guide proposes minimum goal-based objectives that may be considered in the verification process of training providers.

The information provided in this guide, along with the quality control provided by verification, is expected to be particularly useful for more recent entrants into the LNG shipping industry.

## CONTENTS

- Certification of Training Provider
- Approval of Marine Training Courses
- Annex – Training Record Books

Price: Free  
 Published Date: 2014  
 Number of Pages: 20

# Support Craft at Liquefied Gas Facilities. Principles of Emergency Response and Protection – Offshore



**SIGTTO** Society of International Gas Tanker & Terminal Operators Ltd

## Support Craft at Liquefied Gas Facilities Principles of Emergency Response and Protection - Offshore

### OVERVIEW

This publication is about the role of support craft in assisting with safe operations and emergency response for liquefied gas carriers and facilities. It looks at how the service could be improved by a more up to date approach and an improved understanding of hazards, barriers, risk scenarios and response strategies. It provides suggested competency standards to assist with the creation of training programmes for support craft crew.

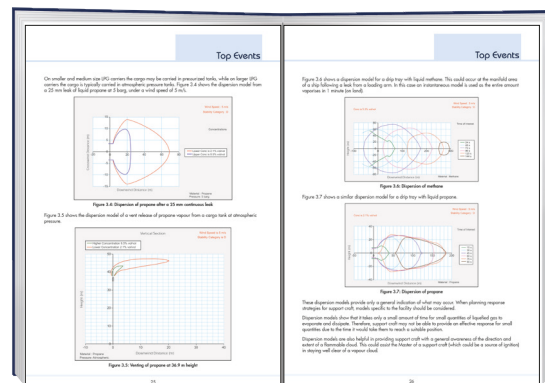
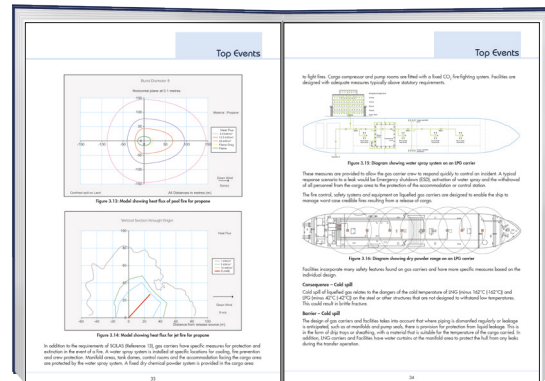
This book demonstrates how risk assessment may be used to develop response and protection strategies for support craft. It considers the 'top events' that will typically concern operators of support craft (i.e. loss of containment, collision/grounding, loss of position, and evacuation, rescue and pollution prevention) and discusses the threats, barriers and consequences of each event, highlighting the part that support craft can play in mitigating risk through planning and operational readiness.

The text is supported with colour illustrations and photographs, as well as diagrams showing the 'bowtie' method of risk assessment and management.

Annexes provide useful information on:

- Response considerations and planning
- equipment and capabilities of support craft
- water-spray systems
- support craft emergency response competencies
- fire and gas dispersion modelling.

This title incorporates A Contingency Planning and Crew Response Guide for Gas Carrier Damage at Sea and in Port Approaches, 3rd Edition (SIGTTO) and A Guide to Contingency Planning for the Gas Carrier Alongside and Within Port Limits, 2nd Edition (SIGTTO).



### CONTENTS

- Scope
- Risk Based Method and Terminology
- Document Structure
- Assessing the Risk and the Management of Specific Events
- The Operating Environment
- Top Events
- Loss of Containment
- Collision/Grounding
- Loss of Position
- Evacuation, Rescue and Pollution Prevention

Price: £125.00

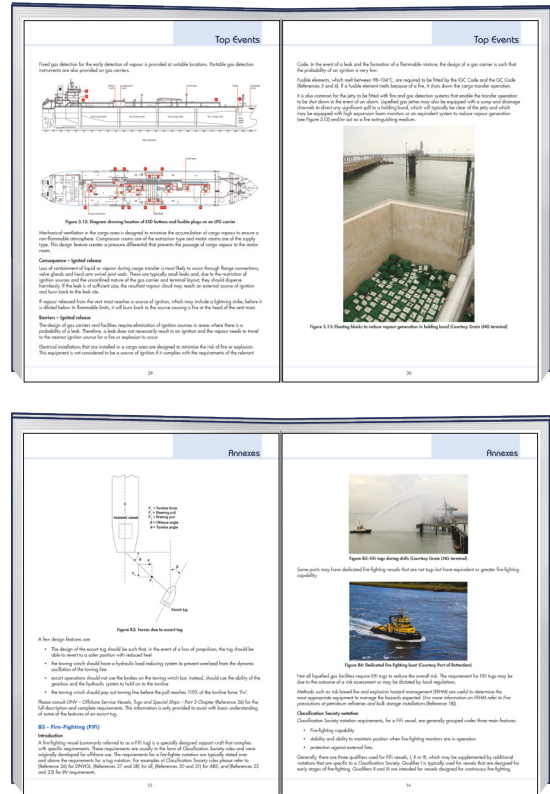
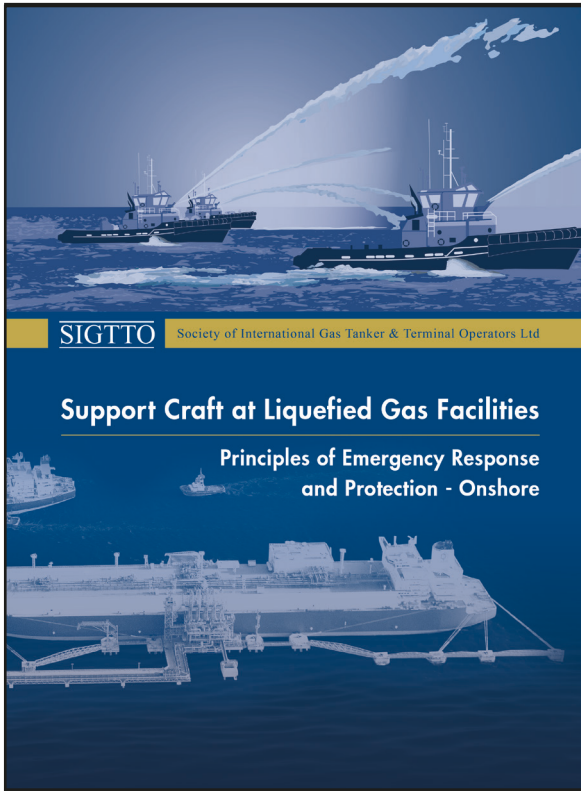
Published Date: October 2016

Number of Pages: 93

Product Code: BP100918

ISBN: 978-1-85609-715-4

# Support Craft at Liquefied Gas Facilities. Principles of Emergency Response and Protection – Onshore



## OVERVIEW

Support craft perform a vital role in assisting with safe operations and emergency response for liquefied gas carriers and facilities. This service could be improved by a more up to date approach and a deeper understanding of credible scenarios and response strategies. The information in this book is provided primarily for organisations involved in the transportation of liquefied gas cargoes, although, it may also be of assistance to regulators and government agencies.

This publication uses a risk assessment method to offer context and define some example emergency scenarios and response strategies.

All of the responses are based on the following order of priority: protection of life, the environment and property. Protection of life has been considered not only in the context of the ship and terminal staff involved in a cargo operation, but also of the emergency responders and the general public in the vicinity.

SIGTTO has ensured this publication explains the basis of design of facilities and gas carriers, including the purpose and limitation of equipment used. This should assist in the improvement of existing practice.

## CONTENTS

- Scope and Methodology
- Introduction
- Assessing the Risk and the Management of Specific Events
- The Operating Environment
- Top Events
- Annexes

Price: £125.00

Published Date: September 2015

Number of Pages: 87

Product Code: BP100448

ISBN: 978-1-85609-691-1



# Thermowells in LNG Carrier Liquid Lines

**Thermowells in LNG Carrier Liquid Lines**

**Background**

Over the last few years there has been a small but steady occurrence of failures of thermowells fitted into LNG cargo liquid lines. Whilst a simple component, the cost of repair far exceeds the cost of the component, particularly if off-hire is incurred.

These failures may be discovered when the broken off section is found in the manifold strainers at the discharge port, in a cargo tank at refit, or in some cases, a leak has developed leading, in at least one instance, to a cryogenic fracture of the deck.

These failures have been discussed in SIGTTO meetings, however, the fact that they continue to occur indicates a need for a wider discussion.

**Definition**

A thermowell, also known as a thermometer pocket, is a closed pocket inserted into the liquid line through a boss welded to the pipe with a screw threaded aperture. The thermowell is screwed into the boss and the temperature sensing element is inserted inside the thermowell. (NOTE: the sensing element inserted should be sealed into the thermowell so that failure of the thermowell does not inevitably lead to leakage, however, there is no practical way to prove the tightness of the sealing arrangements.)

Thermowells are commonly found in processing plants and ships, but the ones where problems have arisen are installed into LNG liquid cargo lines. The overall length is typically about 450 mm, which is much longer than a normal thermometer pocket (typically about 100mm long).

TYPE : DRILLED BAR STOCK, TAPER  
 MATERIAL : Carbon Steel □ SUS304 □  
 SUS316 ■ OTHERS \_\_\_\_\_

**Thermowells in LNG Carrier Liquid Lines**

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**Commentary**

There appears to be three factors at play in the increasing incidence of these failures:

- In 1980, the steel form of L20 ships contained 100, at the time of writing (April 2011) the steel was 90. Since the increasing incidence of thermowell failures has been noted, it is likely that the steel form of L20 ships is now 100.
- Thermowells that are 20 years old (approximately 1990) are 100. It is likely that the steel form of L20 ships is now 100.
- There is a significant increase in the number of thermowells installed on L20 ships. This is likely due to the fact that the number of thermowells installed on L20 ships has increased. The data for this is not available, but it is likely that the number of thermowells installed on L20 ships has increased.

**Operational Requirements and Proposed Remedy**

It is considered that these operational practices are suitable for the benefit of operators to ensure the safe and efficient operation of the vessel. They have no effect on the safety of the vessel, its crew or the environment. The proposed remedy is to ensure that the thermowells are replaced with a new design that is suitable for the increased length and diameter of the thermowells. The proposed remedy is to ensure that the thermowells are replaced with a new design that is suitable for the increased length and diameter of the thermowells.

**Recommendations**

- If you have already suffered such a failure, we suggest that you do not simply replace the thermowell with a standard thermowell. There is a significant number of thermowells installed on L20 ships, and it is likely that the number of thermowells installed on L20 ships has increased. The proposed remedy is to ensure that the thermowells are replaced with a new design that is suitable for the increased length and diameter of the thermowells.
- If you have not had this problem on your ship, we recommend that you consider the proposed remedy. The proposed remedy is to ensure that the thermowells are replaced with a new design that is suitable for the increased length and diameter of the thermowells.
- If you are involved in the design and construction of L20 vessels, we suggest that you consider the proposed remedy. The proposed remedy is to ensure that the thermowells are replaced with a new design that is suitable for the increased length and diameter of the thermowells.

## OVERVIEW

This document was produced in response to a number of failures of thermowells fitted into LNG cargo liquid lines. This document provides some further guidance and information on the subject.

## CONTENTS

- Background
- Definition
- Failure Description
- Commentary
- Operational Requirements and Proposed Remedy
- Suggestions

Price: Free  
 Published Date: 2011  
 Number of Pages: 4

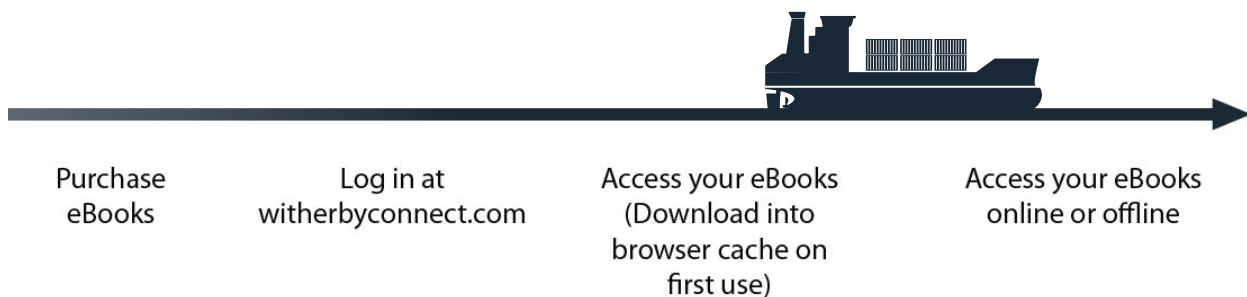
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### Crew Safety Standards and Training for Large LNG Carriers

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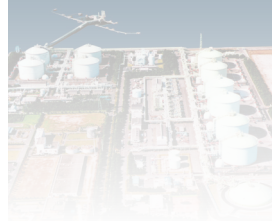
Your Personal Safety Guide

2nd Edition



### A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk

Second Edition - 2001



### A Justification into the Use of Insulation Flanges (and Electrically Discontinuous Hoses) at the Ship/Shore and Ship/Ship Interface

#### Contents

- 1. Background
- 2. Insulation
- 3. Insulation Discontinuity at Cargo Transfer
- 4. Hazards
- 5. Insulation Discontinuity
- 6. Insulation Discontinuity
- 7. Insulation Discontinuity
- 8. Insulation Discontinuity
- 9. Insulation Discontinuity
- 10. Insulation Discontinuity
- 11. Insulation Discontinuity
- 12. Insulation Discontinuity
- 13. Insulation Discontinuity
- 14. Insulation Discontinuity
- 15. Insulation Discontinuity
- 16. Insulation Discontinuity
- 17. Insulation Discontinuity
- 18. Insulation Discontinuity
- 19. Insulation Discontinuity
- 20. Insulation Discontinuity

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### LNG Operations in Port Areas

Essential best practices for the industry

