



Australian Government

MARA3001A Contribute to safe cargo operations on liquefied gas tankers

Release 1

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Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to recognise hazards associated with liquefied gas tankers and to apply appropriate hazard control measures to ensure safe cargo operation.

Application of the Unit

This unit applies to seafarers required to assist in the safe operation of a liquefied gas tanker.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Determine characteristics of tanker cargo and tankers to ensure safe transfer and transport of cargo**
 - 1.1 *Features of various types of liquefied gas tankers* are outlined
 - 1.2 *Cargo operations* of tankers are identified
 - 1.3 *Properties of cargo* being transported are identified and their impact on safety, the environment and vessel operations are outlined
 - 1.4 *Hazards* associated with the transport of cargo are clarified according to emergency response documentation
 - 1.5 *Hazard controls* associated with tanker cargo are employed according to organisational procedures
- 2 Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo**
 - 2.1 Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified
 - 2.2 SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel
 - 2.3 Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo
- 3 Take precautions to prevent hazards**
 - 3.1 Organisational policies and procedures to minimise hazards are identified
 - 3.2 Type and severity of the hazard posed by cargo is recognised
 - 3.3 Transfer and transport of cargo is monitored to prevent hazards
 - 3.4 *Gas monitoring equipment* is regularly inspected and used according to organisational procedures
- 4 Act on becoming aware of a hazardous situation**
 - 4.1 Source of hazard is identified according to organisational procedures
 - 4.2 Risk is assessed considering severity and likelihood of consequences
 - 4.3 Control measures to minimise risk are

implemented to level of responsibility or referred to appropriate person for further action

- 4.4 Containment procedures are applied where appropriate
- 4.5 Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures
- 4.6 Risk is eliminated where possible, and if not practical, actions are taken to control risk
- 4.7 Appropriate *firefighting equipment* is identified to carry out firefighting operations

5 Take precautions to prevent pollution of the environment from release of liquefied gases

- 5.1 Procedures to prevent pollution are identified and observed at all times
- 5.2 *Measures* to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
- 5.3 All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
- 5.4 Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate clearly and effectively
- Correctly identify SDS/MSDS, relevant cargo-related hazards to vessel and to personnel, and take appropriate action according to organisational procedures
- Ensure cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- Identify and act on becoming aware of a hazardous situation, according to organisational procedures
- Interpret and apply knowledge of liquefied gas tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of liquefied gas tankers
- Read and interpret SDS/MSDS
- Recognise problems and hazards that can arise when managing safety on a liquefied gas tanker, take appropriate remedial action and initiate appropriate solutions

Required Knowledge:

- Anti-static measures in hazard control
- Atmospheric control
- Cargo handling equipment
- Cargo inhibition in hazard control
- Corrosion hazards associated with tanker operations
- Emergency shut-down system (ESD)
- Environmental hazards associated with tanker operations
- Explosion and flammability hazards associated with tanker operations
- Extremely low temperatures associated with tanker operations
- Gas testing
- General arrangement and construction of liquefied gas tankers
- Health hazards associated with tanker operations
- Importance of cargo compatibility
- Inerting, drying and monitoring techniques in hazard control
- Information on a SDS/MSDS
- Loading, unloading and care in transit
- Piping systems and valves
- Pressure and temperature, including vapour pressure/temperature relationship

- Pressure hazards associated with tanker operations
- Properties and characteristics of liquefied gas
- Reactivity hazards associated with tanker operations
- Relevant chemical symbols
- Relevant firefighting operations and the use of firefighting installations
- Segregation in hazard control
- Sources of ignition associated with tanker operations
- Tanker cleaning, purging, gas-freeing and inerting
- Tanker safety culture and safety management
- Types of electrostatic charge generation
- Types of liquefied gas tankers
- Vapour leaks and clouds associated with tanker operations
- Ventilation in hazard control
- Work health and safety(WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- timely identification and reporting of potential hazards and risks
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where contributing to safe cargo operation of liquefied gas tankers may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate contributing to safe cargo operation of liquefied gas tankers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Features of various types of liquefied gas tankers must include:
- General arrangement and construction
 - Types of liquefied gas tankers
- Cargo operations must include:
- Cargo handling equipment
 - ESS
 - Loading, unloading and care in transit
 - Piping systems and valves
 - Tank cleaning, purging, gas-freeing and inerting
- Properties must include:
- Chemical symbols
 - Pressure and temperature including vapour pressure/temperature relationship
 - Types of electrostatic charge generation
- Cargo must include:
- Ammonia
 - Butadiene
 - Ethylene
 - LNG
 - LPG
 - Propylene
 - Vinyl chloride
- Hazards must include:
- Corrosion hazards
 - Electrostatic hazards
 - Environmental hazards
 - Explosion and flammability hazards
 - Extremely low temperatures
 - Health hazards
 - Pressure hazards
 - Reactivity hazards
 - Sources of ignition
 - Toxicity hazards
 - Vapour leaks and clouds
- Hazard controls must include:
- Anti-static measures
 - Atmospheric control
 - Cargo inhibition
 - Gas testing
 - Importance of cargo compatibility
 - Inerting, drying and monitoring techniques
 - Segregation

- Gas monitoring equipment must include:
- Ventilation
 - Gas monitoring instruments
 - Oxygen indicators
- Firefighting equipment must include:
- Firefighting agents
 - Fixed dry chemical systems
 - Fixed foam systems
 - Portable foam systems
- Measures must include:
- Assisting in implementing shipboard spill containment procedures
 - Reporting relevant information to the responsible person

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability