|  |  |
| --- | --- |
| **MSA Unit 134** | **QCF Ref: XXXXX** |
| Title: | **Control Liquefied Gas Cargo Operations on Domestic Vessels** |
| Level: | **3** |
| Credit value: | **4** |
| Learning outcomes - The learner will: | Assessment criteria - The learner can: |
| 1. Know the regulatory framework within which liquefied gas tanker cargo operations are carried out | 1.1 explain the content of Maritime & Coastguard Agency (MCA) ‘M’ notices covering liquefied gas tanker cargo operations1.2 explain the content of the sections of the MCA Code of Safe Working Practices For Merchant Seamen covering liquefied gas tanker cargo operations1.3 explain the content of the International Convention for the Prevention of Pollution from Ships (MARPOL) which relates to liquefied gas tanker cargo operations1.4 explain the content of the International Bulk Cargo (IBC) Code which relates to liquefied gas tanker cargo operations1.5 explain the content of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC) Code1.6 explain the content of other relevant International Maritime Organisation (IMO) instruments and industry guidelines which relate to liquefied gas tanker cargo operations1.7 explain how the application of port regulations may affect liquefied gas tanker cargo operations  |
| 2. Know how to maintain safe operations | 2.1 explain the application of safety management systems to chemical tanker operations2.2 explain the basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships including:* the chemical structure of gases
* the properties and characteristics of liquefied gases (including CO2) and their gases
* the properties of single liquids
* the nature and properties of solutions
* thermodynamic units
* basic thermodynamic laws and diagrams
* properties of materials
* effect of low temperature – brittle fracture

2.3 explain the content and use of Material Safety Data Sheets (MSDS)2.4 explain the safe working practices and procedures including:* risk assessment
* use of appropriate Personal Protective Equipment (PPE)
* precautions to be taken when entering enclosed spaces (such as compressor rooms) including use of different types of breathing apparatus
* the precautions to be taken against cold burn and frostbite
* the use of personal toxicity monitoring equipment

2.5 explain the hazards and control measures associated with liquefied gas tanker cargo operations including:* flammability
* explosion
* toxicity
* reactivity
* corrosivity
* health hazards
* inert gas composition
* electrostatic hazards
* polymerizing cargoes

2.6 explain how to calibrate and use monitoring and gas detection systems, instruments and equipment2.7 explain the dangers of non-compliance with relevant rules and regulations |
| 3. Know key features of liquefied gas tanker cargo systems | 3.1 explain liquefied gas tanker designs, systems, and equipment, including:* types of liquefied gas tankers and cargo tanks construction
* general arrangement and construction
* cargo containment systems including materials of construction and insulation
* cargo handling equipment and instrumentation
* cargo temperature maintenance system
* tank atmosphere control systems (inert gas, nitrogen), including storage, generation and distribution systems
* cofferdam heating systems
* gas detecting systems
* ballast system
* boil-off systems
* reliquefication systems
* cargo emergency shut down system
* custody transfer system

3.2 explain pump theory, characteristics and operation |
| 4. Know the principles of ship stability affecting cargo operations | 4.1 explain the effect of bulk liquid cargoes on:* trim
* stability
* structural integrity
 |
| 5. Know how to control chemical cargo operations | 5.1 explain how to apply safe preparations, procedures and checklists for all cargo operations including:* post docking and loading
* en-route
* unloading
* pre-docking preparation
* ship to ship transfer

5.2 explain how to perform cargo measurements and calculations including:* liquid phase
* gas phase
* On Board Quantity (OBQ)
* Remain On Board (ROB)
* boil-off cargo calculations

5.3 explain how to manage and supervise personnel with cargo related responsibilities |
| 6. Know how to implement pollution control measures, including response to a spill | 6.1 explain the procedures for prevention of pollution of the environment and the atmosphere6.2 explain the correct documentation to be carried and completed6.3 explain how to take pollution control action in the case of a pollution incident, including making appropriate reports |
| 7. Know the precautions to be taken when repair and maintenance work is carried out | 7.1 explain the planning and general precautions to be taken before and during repair and maintenance work including work affecting pumping, piping, electrical and control systems7.2 explain the precautions to be taken for hot and cold work7.3 explain the precautions to be taken to maintain electrical safety  |
| 8. Know how to respond to emergencies arising from chemical cargo operations | 8.1 explain liquefied gas tanker emergency procedures including:* ship emergency response plans
* cargo operations emergency shutdown
* emergency cargo valve operations
* actions to be taken in the event of failure of systems or services essential to cargo
* fire fighting on liquefied gas tankers
* jettisoning of cargo
* enclosed space rescue

8.2 explain actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour8.3 explain medical first aid procedures with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG) |
|  |  |
| Additional information about the unit | This unit is designed for study by those working towards meeting the requirements for a BML (Boatmaster Licence) Liquefied Gas Cargo Operations Endorsement |
| Unit aim(s) | The aim of the unit is to provide the knowledge underpinning proficiency required to control liquefied gas cargo operations on domestic vessels, including the requirements for a BML Liquefied Gas Cargo Operations Endorsement |
| Unit expiry date |  |
| Details of the relationship between the unit and relevant national occupational standards (if appropriate) | MSA Maritime NOS 2012: A01, B14, B36 |
| Details of the relationship between the unit and other standards or curricula (if appropriate) | MCA syllabus for the BML Liquefied Gas Cargo Operations Endorsement |
| Assessment requirements specified by a sector or regulatory body (if appropriate) | Knowledge will be tested either in writing or orally, (and if the latter subsequently recorded).  |
| Endorsement of the unit by a sector or other appropriate body (if required) | Maritime Skills AllianceMaritime & Coastguard Agency |
| Location of the unit within the subject/sector classification system | Transportation Operations and Maintenance |
| Name of the organisation submitting the unit | SQA, for the Maritime Skills Alliance |
| Availability for use | Unrestricted |
| Availability for delivery |  |
| Guided Learning Hours | 40 |