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| **MSA Unit 133** | **QCF Ref: XXXXX** |
| Title: | **Control Chemical 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 chemical tanker cargo operations are carried out | 1.1 explain the content of Maritime & Coastguard Agency (MCA) ‘M’ notices covering chemical tanker cargo operations1.2 explain the content of the sections of the MCA Code of Safe Working Practices For Merchant Seamen covering chemical tanker cargo operations1.3 explain the content of the International Convention for the Prevention of Pollution from Ships (MARPOL) which relates to oil tanker cargo operations1.5 explain the content of other relevant International Maritime Organisation (IMO) instruments and industry guidelines which relate to chemical tanker cargo operations1.6 explain how the application of port regulations may affect chemical 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 chemical and physical properties of noxious liquid substances including:* chemical cargo categories (corrosive, toxic, flammable, explosive)
* chemical groups and industrial usage
* reactivity of cargoes

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 including use of different types of breathing apparatus

2.5 explain the hazards and control measures associated with chemical tanker cargo operations including:* flammability and explosion
* toxicity
* health hazards
* inert gas composition
* electrostatic hazards
* reactivity
* corrosivity
* low boiling point cargoes
* high density cargoes
* solidifying cargoes
* 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 chemical tanker cargo systems | 3.1 explain chemical tanker designs, systems, and equipment, including:* general arrangement and construction
* pumping arrangement and equipment
* tank construction and arrangement
* pipeline and drainage systems
* tank and cargo pipeline pressure and temperature control systems and alarms
* gauging control systems and alarms
* gas detecting systems
* cargo heating and cooling systems
* tank cleaning systems
* cargo tank environmental control systems
* ballast systems
* cargo area venting and accommodation ventilation
* vapour return and recovery systems
* fire-fighting systems
* tank, pipeline and fittings material and coatings
* slop management

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
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| 5. Know how to control chemical cargo operations | 5.1 explain how to develop and apply cargo-related operation plans, procedures and check lists5.2 explain how to perform cargo measurements and calculations5.3 explain how to carry out loading, stowing, carrying and discharging operations including:* use of loading and unloading plans
* ballasting and deballasting operations
* tank cleaning operations
* tank atmosphere control
* inerting
* gas freeing
* ship to ship transfers
* inhibition and stabilization requirements
* heating and cooling requirements and consequences to adjacent cargoes
* cargo compatibility and segregation
* high viscosity cargoes
* cargo residue operations
* operational tank entry

5.4 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 work7.2 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 monitoring and safety systems8.2 explain chemical tanker emergency procedures including:* ship emergency response plans
* cargo operations emergency shutdown
* actions to be taken in the event of failure of systems or services essential to cargo
* fire fighting on chemical tankers
* enclosed space rescue
* cargo reactivity
* jettisoning cargo
* use of Material Safety Data Sheets (MSDS)

8.2 explain actions to be taken following collision, grounding or spillage8.3 explain medical first aid procedures with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG) |
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| Additional information about the unit | This unit is designed for study by those working towards meeting the requirements for a BML Chemical Cargo Operations Endorsement |
| Unit aim(s) | The aim of the unit is to provide the knowledge underpinning proficiency required to control chemical cargo operations on domestic vessels, including the requirements for a BML Chemical 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, B35, B36 |
| Details of the relationship between the unit and other standards or curricula (if appropriate) | MCA syllabus for the BML Chemical 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 |