

**Excerpts from the International Convention on Standards of  
Training, Certification and Watchkeeping for Seafarers, 1978, as  
amended**

**and**

**Seafarers' Training, Certification and Watchkeeping Code, as  
amended**

**NOTICE:** These excerpts are provided for background information. By themselves, they do not constitute Coast Guard policy.

**The Manila Amendments to the annex to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978**

**Chapter I**  
General provisions

**Regulation I/6**

*Training and assessment*

Each Party shall ensure that:

- .1 the training and assessment of seafarers, as required under the Convention, are administered, supervised and monitored in accordance with the provisions of section A-I/6 of the STCW Code; and
- .2 those responsible for the training and assessment of competence of seafarers, as required under the Convention, are appropriately qualified in accordance with the provisions of section A-I/6 of the STCW Code for the type and level of training and assessment involved.

**Regulation I/12**

*Use of simulators*

1 The performance standards and other provisions set forth in section A-I/12 and such other requirements as are prescribed in part A of the STCW Code for any certificate concerned shall be complied with in respect of:

- .1 all mandatory simulator-based training;
- .2 any assessment of competency required by part A of the STCW Code which is carried out by means of a simulator; and
- .3 any demonstration, by means of a simulator, of continued proficiency required by part A of the STCW Code.

**Chapter V**

Special training requirements  
for personnel on certain types of ships

**Regulation V/1-1**

*Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on oil and chemical tankers*

1 Officers and ratings assigned specific duties and responsibilities related to cargo or cargo equipment on oil or chemical tankers shall hold a certificate in basic training for oil and chemical tanker cargo operations.

2 Every candidate for a certificate in basic training for oil and chemical tanker cargo operations shall have completed basic training in accordance with provisions of section A-VI/1 of the STCW Code and shall have completed:



**7** Administrations shall ensure that a certificate of proficiency is issued to seafarers, who are qualified in accordance with paragraphs 2, 4 or 6 as appropriate, or that an existing certificate of competency or certificate of proficiency is duly endorsed.

**Regulation V/1-2**

*Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on liquefied gas tankers*

**1** Officers and ratings assigned specific duties and responsibilities related to cargo or cargo equipment on liquefied gas tankers shall hold a certificate in basic training for liquefied gas tanker cargo operations.

**2** Every candidate for a certificate in basic training for liquefied gas tanker cargo operations shall have completed basic training in accordance with provisions of section A-VI/1 of the STCW Code and shall have completed:

- .1** at least three months of approved seagoing service on liquefied gas tankers and meet the standard of competence specified in section A-V/1-2, paragraph 1 of the STCW Code; or
- .2** an approved basic training for liquefied gas tanker cargo operations and meet the standard of competence specified in section A-V/1-2, paragraph 1 of the STCW Code.

**3** Masters, chief engineer officers, chief mates, second engineer officers and any person with immediate responsibility for loading, discharging, care in transit, handling of cargo, tank cleaning or other cargo-related operations on liquefied gas tankers shall hold a certificate in advanced training for liquefied gas tanker cargo operations.

**4** Every candidate for a certificate in advanced training for liquefied gas tanker cargo operations shall:

- .1** meet the requirements for certification in basic training for liquefied gas tanker cargo operations; and
- .2** while qualified for certification in basic training for liquefied gas tanker cargo operations, have:
  - .2.1** at least three months of approved seagoing service on liquefied gas tankers, or
  - .2.2** at least one month of approved onboard training on liquefied gas tankers, in a supernumerary capacity, which includes at least three loading and three unloading operations and is documented in an approved training record book taking into account guidance in section B-V/1; and
- .3** have completed approved advanced training for liquefied gas tanker cargo operations and meet the standard of competence specified in section A-V/1-2, paragraph 2 of the STCW Code.

**5** Administrations shall ensure that a certificate of proficiency is issued to seafarers, who are qualified in accordance with paragraphs 2 or 4 as appropriate, or that an existing certificate of competency or certificate of proficiency is duly endorsed.

**The Manila Amendments to the Seafarers' Training, Certification and Watchkeeping  
(STCW) Code**

**Chapter I**

Standards regarding general provisions

**Section A-I/6**

*Training and assessment*

**1** Each Party shall ensure that all training and assessment of seafarers for certification under the Convention is:

- .1** structured in accordance with written programmes, including such methods and media of delivery, procedures, and course material as are necessary to achieve the prescribed standard of competence; and
- .2** conducted, monitored, evaluated and supported by persons qualified in accordance with paragraphs 4, 5 and 6.

**2** Persons conducting in-service training or assessment on board ship shall only do so when such training or assessment will not adversely affect the normal operation of the ship and they can dedicate their time and attention to training or assessment.

**Qualifications of instructors, supervisors and assessors\***

**3** Each Party shall ensure that instructors, supervisors and assessors are appropriately qualified for the particular types and levels of training or assessment of competence of seafarers either on board or ashore, as required under the Convention, in accordance with the provisions of this section.

**In-service training**

**4** Any person conducting in-service training of a seafarer, either on board or ashore, which is intended to be used in qualifying for certification under the Convention, shall:

- .1** have an appreciation of the training programme and an understanding of the specific training objectives for the particular type of training being conducted;
- .2** be qualified in the task for which training is being conducted; and
- .3** if conducting training using a simulator:
  - .3.1** have received appropriate guidance in instructional techniques involving the use of simulators; and
  - .3.2** have gained practical operational experience on the particular type of simulator being used.

**5** Any person responsible for the supervision of in-service training of a seafarer intended to be used in qualifying for certification under the Convention shall have a full understanding of the training programme and the specific objectives for each type of training being conducted.

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\* The relevant IMO Model Course(s) may be of assistance in the preparation of courses.

### **Assessment of competence**

**6** Any person conducting in-service assessment of competence of a seafarer, either on board or ashore, which is intended to be used in qualifying for certification under the Convention, shall:

- .1** have an appropriate level of knowledge and understanding of the competence to be assessed;
- .2** be qualified in the task for which the assessment is being made;
- .3** have received appropriate guidance in assessment methods and practice;
- .4** have gained practical assessment experience; and
- .5** if conducting assessment involving the use of simulators, have gained practical assessment experience on the particular type of simulator under the supervision and to the satisfaction of an experienced assessor.

### **Training and assessment within an institution**

**7** Each Party which recognizes a course of training, a training institution, or a qualification granted by a training institution, as part of its requirements for the issue of a certificate required under the Convention, shall ensure that the qualifications and experience of instructors and assessors are covered in the application of the quality standard provisions of section A-I/8. Such qualification, experience and application of quality standards shall incorporate appropriate training in instructional techniques, and training and assessment methods and practice, and shall comply with all applicable requirements of paragraphs 4 to 6.

### **Section A-I/12**

*Standards governing the use of simulators*

### **Part 1 – Performance standards**

#### **General performance standards for simulators used in training**

**1** Each Party shall ensure that any simulator used for mandatory simulator-based training shall:

- .1** be suitable for the selected objectives and training tasks;
- .2** be capable of simulating the operating capabilities of shipboard equipment concerned, to a level of physical realism appropriate to training objectives, and include the capabilities, limitations and possible errors of such equipment;
- .3** have sufficient behavioural realism to allow a trainee to acquire the skills appropriate to the training objectives;
- .4** provide a controlled operating environment, capable of producing a variety of conditions, which may include emergency, hazardous or unusual situations relevant to the training objectives;
- .5** provide an interface through which a trainee can interact with the equipment, the simulated environment and, as appropriate, the instructor; and
- .6** permit an instructor to control, monitor and record exercises for the effective debriefing of trainees.

## **General performance standards for simulators used in assessment of competence**

2 Each Party shall ensure that any simulator used for the assessment of competence required under the Convention or for any demonstration of continued proficiency so required shall:

- .1 be capable of satisfying the specified assessment objectives;
- .2 be capable of simulating the operational capabilities of the shipboard equipment concerned to a level of physical realism appropriate to the assessment objectives, and include the capabilities, limitations and possible errors of such equipment;
- .3 have sufficient behavioural realism to allow a candidate to exhibit the skills appropriate to the assessment objectives;
- .4 provide an interface through which a candidate can interact with the equipment and simulated environment;
- .5 provide a controlled operating environment, capable of producing a variety of conditions, which may include emergency, hazardous or unusual situations relevant to assessment objectives; and
- .6 permit an assessor to control, monitor and record exercises for the effective assessment of the performance of candidates.

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## **Part 2 – Other provisions**

### **Simulator training objectives**

6 Each Party shall ensure that the aims and objectives of simulator-based training are defined within an overall training programme and that specific training objectives and tasks are selected so as to relate as closely as possible to shipboard tasks and practices.

### **Training procedures**

7 In conducting mandatory simulator-based training, instructors shall ensure that:

- .1 trainees are adequately briefed beforehand on the exercise objectives and tasks and are given sufficient planning time before the exercise starts;
- .2 trainees have adequate familiarization time on the simulator and with its equipment before any training or assessment exercise commences;
- .3 guidance given and exercise stimuli are appropriate to the selected exercise objectives and tasks and to the level of trainee experience;
- .4 exercises are effectively monitored, supported as appropriate by audio and visual observation of trainee activity and pre- and post-exercise evaluation reports;
- .5 trainees are effectively debriefed to ensure that training objectives have been met and that operational skills demonstrated are of an acceptable standard;
- .6 the use of peer assessment during debriefing is encouraged; and

- .7 simulator exercises are designed and tested so as to ensure their suitability for the specified training objectives.

### **Assessment procedures**

**8** Where simulators are used to assess the ability of candidates to demonstrate levels of competency, assessors shall ensure that:

- .1 performance criteria are identified clearly and explicitly and are valid and available to the candidates;
- .2 assessment criteria are established clearly and are explicit to ensure reliability and uniformity of assessment and to optimize objective measurement and evaluation, so that subjective judgements are kept to the minimum;
- .3 candidates are briefed clearly on the tasks and/or skills to be assessed and on the tasks and performance criteria by which their competency will be determined;
- .4 assessment of performance takes into account normal operating procedures and any behavioural interaction with other candidates on the simulator or with simulator staff;
- .5 scoring or grading methods to assess performance are used with caution until they have been validated; and
- .6 the prime criterion is that a candidate demonstrates the ability to carry out a task safely and effectively to the satisfaction of the assessor.

### **Qualifications of instructors and assessors<sup>\*</sup>**

**9** Each Party shall ensure that instructors and assessors are appropriately qualified and experienced for the particular types and levels of training and corresponding assessment of competence as specified in regulation I/6 and section A-I/6.

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<sup>\*</sup> The relevant IMO Model Course(s) and resolution MSC.64(67), *Recommendations on new and amended performance standards*, may be of assistance in the preparation of courses.

## Chapter V

### Standards regarding special training requirements for personnel on certain types of ships

#### Section A-V/1-1

*Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on oil and chemical tankers*

#### Standard of competence

- 1** Every candidate for certification in basic training for oil and chemical tanker cargo operations shall be required to:
  - .1** demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/1-1-1; and
  - .2** provide evidence of having achieved:
    - .2.1** the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/1-1-1, and
    - .2.2** the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/1-1-1.
- 2** Every candidate for certification in advanced training for oil tanker cargo operations shall be required to:
  - .1** demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/1-1-2; and
  - .2** provide evidence of having achieved:
    - .2.1** the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/1-1-2, and
    - .2.2** the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/1-1-2.
- 3** Every candidate for certification in advanced training for chemical tanker cargo operations shall be required to:
  - .1** demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/1-1-3; and
  - .2** provide evidence of having achieved:
    - .2.1** the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/1-1-3, and
    - .2.2** the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/1-1-3.

**Table A-V/1-1-1**  
*Specification of minimum standard of competence in basic training  
for oil and chemical tanker cargo operations*

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the safe cargo operation of oil and chemical tankers	<p>Basic knowledge of tankers:</p> <p>.1 types of oil and chemical tankers</p> <p>.2 general arrangement and construction</p> <p>Basic knowledge of cargo operations:</p> <p>.1 piping systems and valves</p> <p>.2 cargo pumps</p> <p>.3 loading and unloading</p> <p>.4 tank cleaning, purging, gas-freeing and inerting</p> <p>Basic knowledge of the physical properties of oil and chemicals:</p> <p>.1 pressure and temperature, including vapour pressure/temperature relationship</p> <p>.2 types of electrostatic charge generation</p> <p>.3 chemical symbols</p> <p>Knowledge and understanding of tanker safety culture and safety management</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications within the area of responsibility are clear and effective</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards	<p>Basic knowledge of the hazards associated with tanker operations, including:</p> <ul style="list-style-type: none"> <li>.1 health hazards</li> <li>.2 environmental hazards</li> <li>.3 reactivity hazards</li> <li>.4 corrosion hazards</li> <li>.5 explosion and flammability hazards</li> <li>.6 sources of ignition, including electrostatic hazards</li> <li>.7 toxicity hazards</li> <li>.8 vapour leaks and clouds</li> </ul> <p>Basic knowledge of hazard controls:</p> <ul style="list-style-type: none"> <li>.1 inerting, water padding, drying agents and monitoring techniques</li> <li>.2 anti-static measures</li> <li>.3 ventilation</li> <li>.4 segregation</li> <li>.5 cargo inhibition</li> <li>.6 importance of cargo compatibility</li> <li>.7 atmospheric control</li> <li>.8 gas testing</li> </ul> <p>Understanding of information on a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures</p> <p>Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Apply occupational health and safety precautions and measures</p>	<p>Function and proper use of gas-measuring instruments and similar equipment</p> <p>Proper use of safety equipment and protective devices, including:</p> <ul style="list-style-type: none"> <li>.1 breathing apparatus and tank-evacuating equipment</li> <li>.2 protective clothing and equipment</li> <li>.3 resuscitators</li> <li>.4 rescue and escape equipment</li> </ul> <p>Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to oil and chemical tankers, including:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 safety measures for hot and cold work</li> <li>.4 electrical safety</li> <li>.5 ship/shore safety checklist</li> </ul> <p>Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures for entry into enclosed spaces are observed.</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Appropriate safety and protective equipment is correctly used</p> <p>First aid do's and don'ts</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Carry out fire-fighting operations	<p>Tanker fire response organization and action to be taken</p> <p>Fire hazards associated with cargo handling and transportation of hazardous and noxious liquids in bulk</p> <p>Fire-fighting agents used to extinguish oil and chemical fires</p> <p>Fixed fire-fighting foam system operations</p> <p>Portable fire-fighting foam operations</p> <p>Fixed dry chemical system operations</p> <p>Spill containment in relation to fire-fighting operations</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practicable, in darkness</p>	<p>Initial actions and follow-up actions on becoming aware of fire on board conform with established practices and procedures</p> <p>Action taken on identifying muster signal is appropriate to the indicated emergency and complies with established procedures</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents</p>
Respond to emergencies	<p>Basic knowledge of emergency procedures, including emergency shutdown</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent pollution of the environment from the release of oil or chemicals	<p>Basic knowledge of the effects of oil and chemical pollution on human and marine life</p> <p>Basic knowledge of shipboard procedures to prevent pollution</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <p>.1 report relevant information to the responsible persons</p> <p>.2 assist in implementing shipboard spill-containment procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Procedures designed to safeguard the environment are observed at all times</p>

**Table A-V/1-1-2**  
*Specification of minimum standard of competence in advanced training  
 for oil tanker cargo operations*

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of an oil tanker</i></p> <p>Knowledge of oil tanker design, systems and equipment, including:</p> <p>.1 general arrangement and construction</p> <p>.2 pumping arrangement and equipment</p> <p>.3 tank arrangement, pipeline system and tank venting arrangement</p> <p>.4 gauging systems and alarms</p> <p>.5 cargo heating systems</p> <p>.6 tank cleaning, gas-freeing and inerting systems</p> <p>.7 ballast system</p> <p>.8 cargo area venting and accommodation ventilation</p> <p>.9 slop arrangements</p> <p>.10 vapour recovery systems</p> <p>.11 cargo-related electrical and electronic control system</p> <p>.12 environmental protection equipment, including Oil Discharge Monitoring Equipment (ODME)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account oil tanker designs, systems and equipment</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p> <p>Potential non-compliance with cargo-operation-related procedures is promptly identified and rectified</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Actions taken and procedures followed are correctly applied and the appropriate shipboard cargo-related equipment is properly used</p> <p>Calibration and use of monitoring and gas-detection equipment comply with operational practices and procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.13 tank coating</p> <p>.14 tank temperature and pressure control systems</p> <p>.15 fire-fighting systems</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p>Proficiency in tanker safety culture and implementation of safety-management system</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Ability to perform cargo measurements and calculations</p> <p>Knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity</p> <p>Knowledge and understanding of oil cargo-related operations, including:</p> <p>.1 loading and unloading plans</p> <p>.2 ballasting and deballasting</p> <p>.3 tank cleaning operations</p> <p>.4 inerting</p> <p>.5 gas-freeing</p>		<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.6 ship-to-ship transfers</p> <p>.7 load on top</p> <p>.8 crude oil washing</p> <p>Development and application of cargo-related operation plans, procedures and checklists</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities</p>		<p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>
<p>Familiarity with physical and chemical properties of oil cargoes</p>	<p>Knowledge and understanding of the physical and chemical properties of oil cargoes</p> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Effective use is made of information resources for identification of properties and characteristics of oil cargoes and related gases, and their impact on safety, the environment and vessel operation</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with oil tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 toxicity</li> <li>.2 flammability and explosion</li> <li>.3 health hazards</li> <li>.4 inert gas composition</li> <li>.5 electrostatic hazards</li> </ul> <p>Knowledge and understanding of dangers of non-compliance with relevant rules/regulations</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with oil tanker cargo operations are correctly identified, and proper control measures are taken</p>
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to oil tankers:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 precautions for hot and cold work</li> <li>.4 precautions for electrical safety</li> <li>.5 use of appropriate Personal Protective Equipment (PPE)</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p> <p>Procedures for entry into enclosed spaces are observed</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Knowledge and understanding of oil tanker emergency procedures, including:</p> <ul style="list-style-type: none"> <li>.1 ship emergency response plans</li> <li>.2 cargo operations emergency shutdown</li> <li>.3 actions to be taken in the event of failure of systems or services essential to cargo</li> <li>.4 fire-fighting on oil tankers</li> <li>.5 enclosed space rescue</li> <li>.6 use of a Material Safety Data Sheet (MSDS)</li> </ul> <p>Actions to be taken following collision, grounding, or spillage</p> <p>Knowledge of medical first aid procedures on board oil tankers</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines</p>
Take precautions to prevent pollution of the environment	<p>Understanding of procedures to prevent pollution of the atmosphere and the environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor and control compliance with legislative requirements	Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended, and other relevant IMO instruments, industry guidelines and port regulations as commonly applied	Examination and assessment of evidence obtained from one or more of the following: <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice

Table A-V/1-1-3  
*Specification of minimum standard of competence in advanced training  
 for chemical tanker cargo operations*

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of a chemical tanker</i></p> <p>Knowledge of chemical tanker designs, systems, and equipment, including:</p> <ul style="list-style-type: none"> <li>.1 general arrangement and construction</li> <li>.2 pumping arrangement and equipment</li> <li>.3 tank construction and arrangement</li> <li>.4 pipeline and drainage systems</li> <li>.5 tank and cargo pipeline pressure and temperature control systems and alarms</li> <li>.6 gauging control systems and alarms</li> <li>.7 gas-detecting systems</li> <li>.8 cargo heating and cooling systems</li> <li>.9 tank cleaning systems</li> <li>.10 cargo tank environmental control systems</li> <li>.11 ballast systems</li> <li>.12 cargo area venting and accommodation ventilation</li> <li>.13 vapour return/recovery systems</li> <li>.14 fire-fighting systems</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account chemical tanker designs, systems and equipment</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.15 tank, pipeline and fittings' material and coatings</p> <p>.16 slop management</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p>Proficiency in tanker safety culture and implementation of safety management system</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown system</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Ability to perform cargo measurements and calculations</p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity</p> <p>Knowledge and understanding of chemical cargo-related operations, including:</p> <p>.1 loading and unloading plans</p> <p>.2 ballasting and deballasting</p> <p>.3 tank cleaning operations</p> <p>.4 tank atmosphere control</p>		<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Potential non-compliance with cargo-related procedures is promptly identified and rectified</p> <p>Actions taken and procedures followed are correctly identified and appropriate shipboard cargo-related equipment is properly used</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.5 inerting</p> <p>.6 gas-freeing</p> <p>.7 ship-to-ship transfers</p> <p>.8 inhibition and stabilization requirements</p> <p>.9 heating and cooling requirements and consequences to adjacent cargoes</p> <p>.10 cargo compatibility and segregation</p> <p>.11 high-viscosity cargoes</p> <p>.12 cargo residue operations</p> <p>.13 operational tank entry</p> <p>Development and application of cargo-related operation plans, procedures and checklists</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities</p>		<p>Calibration and use of monitoring and gas-detection equipment are consistent with safe operational practices and procedures</p> <p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Familiarity with physical and chemical properties of chemical cargoes	<p>Knowledge and understanding of the chemical and the physical properties of noxious liquid substances, including:</p> <ul style="list-style-type: none"> <li>.1 chemical cargoes categories (corrosive, toxic, flammable, explosive)</li> <li>.2 chemical groups and industrial usage</li> <li>.3 reactivity of cargoes</li> </ul> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Effective use is made of information resources for identification of properties and characteristics of noxious liquid substances and related gases, and their impact on safety, environmental protection and vessel operation</p>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with chemical tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 flammability and explosion</li> <li>.2 toxicity</li> <li>.3 health hazards</li> <li>.4 inert gas composition</li> <li>.5 electrostatic hazards</li> <li>.6 reactivity</li> <li>.7 corrosivity</li> <li>.8 low-boiling-point cargoes</li> <li>.9 high-density cargoes</li> <li>.10 solidifying cargoes</li> <li>.11 polymerizing cargoes</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with chemical tanker cargo operations are correctly identified, and proper control measures are taken</p>
Take	Knowledge and		

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
precautions to prevent hazards (continued)	understanding of dangers of non-compliance with relevant rules/regulations		
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to chemical tankers:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 precautions for hot and cold work</li> <li>.4 precautions for electrical safety</li> <li>.5 use of appropriate Personal Protective Equipment (PPE)</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p> <p>Procedures for entry into enclosed spaces are observed</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Knowledge and understanding of chemical tanker emergency procedures, including:</p> <ul style="list-style-type: none"> <li>.1 ship emergency response plans</li> <li>.2 cargo operations emergency shutdown</li> <li>.3 actions to be taken in the event of failure of systems or services essential to cargo</li> <li>.4 fire fighting on chemical tankers</li> <li>.5 enclosed space rescue</li> <li>.6 cargo reactivity</li> <li>.7 jettisoning cargo</li> <li>.8 use of a Material Safety Data Sheet (MSDS)</li> </ul> <p>Actions to be taken following collision, grounding, or spillage</p> <p>Knowledge of medical first aid procedures on board chemical tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the atmosphere and the environment	Examination and assessment of evidence obtained from one or more of the following: <ol style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ol>	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment
Monitor and control compliance with legislative requirements	Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied  Proficiency in the use of the IBC Code and related documents	Examination and assessment of evidence obtained from one or more of the following: <ol style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ol>	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice

**Section A-V/1-2**

*Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on liquefied gas tankers*

**Standard of competence**

1 Every candidate for certification in basic training for liquefied gas tanker cargo operations shall be required to:

- .1 demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/1-2-1; and
- .2 provide evidence of having achieved:
  - .2.1 the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/1-2-1, and
  - .2.2 the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/1-2-1.

2 Every candidate for certification in advanced training for liquefied gas tanker cargo operations shall be required to:

- .1 demonstrate the competence to undertake the tasks, duties and responsibilities listed in column 1 of table A-V/1-2-2; and
- .2 provide evidence of having achieved:
  - .2.1 the minimum knowledge, understanding and proficiency listed in column 2 of table A-V/1-2-2, and
  - .2.2 the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-V/1-2-2.

**Table A-V/1-2-1**  
*Specification of minimum standard of competence in basic training  
 for liquefied gas tanker cargo operations*

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the safe operation of a liquefied gas tanker	<p><i>Design and operational characteristics of liquefied gas tankers</i></p> <p>Basic knowledge of liquefied gas tankers</p> <p>.1 types of liquefied gas tankers</p> <p>.2 general arrangement and construction</p> <p>Basic knowledge of cargo operations:</p> <p>.1 piping systems and valves</p> <p>.2 cargo handling equipment</p> <p>.3 loading, unloading and care in transit</p> <p>.4 emergency shutdown (ESD) system</p> <p>.5 tank cleaning, purging, gas-freeing and inerting</p> <p>Basic knowledge of the physical properties of liquefied gases, including:</p> <p>.1 properties and characteristics</p> <p>.2 pressure and temperature, including vapour pressure/temperature relationship</p> <p>.3 types of electrostatic charge generation</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications within the area of responsibility are clear and effective</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of a liquefied gas tanker (continued)	.4 chemical symbols  Knowledge and understanding of tanker safety culture and safety management		
Take precautions to prevent hazards	Basic knowledge of the hazards associated with tanker operations, including:  .1 health hazards .2 environmental hazards .3 reactivity hazards .4 corrosion hazards .5 explosion and flammability hazards .6 sources of ignition .7 electrostatic hazards .8 toxicity hazards .9 vapour leaks and clouds .10 extremely low temperatures .11 pressure hazards  Basic knowledge of hazard controls:  .1 inerting, drying and monitoring techniques .2 anti-static measures .3 ventilation .4 segregation .5 cargo inhibition .6 importance of cargo compatibility	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience .2 approved training ship experience .3 approved simulator training .4 approved training programme	Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures  Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards (continued)	.7 atmospheric control .8 gas testing Understanding of information on a Material Safety Data Sheet (MSDS)		
Apply occupational health and safety precautions and measures	Function and proper use of gas-measuring instruments and similar equipment Proper use of safety equipment and protective devices, including: .1 breathing apparatus and tank evacuating equipment .2 protective clothing and equipment .3 resuscitators .4 rescue and escape equipment Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to liquefied gas tankers, including: .1 precautions to be taken when entering enclosed spaces .2 precautions to be taken before and during repair and maintenance work .3 safety measures for hot and cold work .4 electrical safety .5 ship/shore safety checklist	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training .4 approved training programme	Procedures for entry into enclosed spaces are observed Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times Appropriate safety and protective equipment is correctly used

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Apply occupational health and safety precautions and measures <i>(continued)</i>	Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS)		First aid do's and don'ts
Carry out fire-fighting operations	<p>Tanker fire organization and action to be taken</p> <p>Special hazards associated with cargo handling and transportation of liquefied gases in bulk</p> <p>Fire-fighting agents used to extinguish gas fires</p> <p>Fixed fire-fighting foam system operations</p> <p>Portable fire-fighting foam operations</p> <p>Fixed dry chemical system operations</p> <p>Basic knowledge of spill containment in relation to fire-fighting operations</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g. simulated shipboard conditions) and, whenever possible and practicable, in darkness</p>	<p>Initial actions and follow-up actions on becoming aware of an emergency conform with established practices and procedures</p> <p>Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents</p>
Respond to emergencies	Basic knowledge of emergency procedures, including emergency shutdown	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ol>	The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent pollution of the environment from the release of liquefied gases	<p>Basic knowledge of the effects of pollution on human and marine life</p> <p>Basic knowledge of shipboard procedures to prevent pollution</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <p>.1 report relevant information to the responsible persons</p> <p>.2 assist in implementing shipboard spill-containment procedures</p> <p>.3 prevent brittle fracture</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Procedures designed to safeguard the environment are observed at all times</p>

**Table A-V/1-2-2**  
*Specification of minimum standard of competence in advanced training  
 for liquefied gas tanker cargo operations*

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of a liquefied gas tanker</i></p> <p>Knowledge of liquefied gas tanker design, systems, and equipment, including:</p> <ul style="list-style-type: none"> <li>.1 types of liquefied gas tankers and cargo tanks construction</li> <li>.2 general arrangement and construction</li> <li>.3 cargo containment systems, including materials of construction and insulation</li> <li>.4 cargo-handling equipment and instrumentation, including:               <ul style="list-style-type: none"> <li>.1 cargo pumps and pumping arrangements</li> <li>.2 cargo pipelines and valves</li> <li>.3 expansion devices</li> <li>.4 flame screens</li> <li>.5 temperature monitoring systems</li> <li>.6 cargo tank level-gauging systems</li> <li>.7 tank pressure monitoring and control systems</li> </ul> </li> <li>.5 cargo temperature maintenance system</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account liquefied gas tanker designs, systems and equipment</p> <p>Pumping operations are carried out in accordance with accepted principles and procedures and are relevant to the type of cargo</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations <i>(continued)</i></p>	<p>.6 tank atmosphere control systems (inert gas, nitrogen), including storage, generation and distribution systems</p> <p>.7 cofferdam heating systems</p> <p>.8 gas-detecting systems</p> <p>.9 ballast system</p> <p>.10 boil-off systems</p> <p>.11 reliquefaction systems</p> <p>.12 cargo Emergency Shut Down system (ESD)</p> <p>.13 custody transfer system</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity</p> <p>Proficiency in tanker safety culture and implementation of safety management requirements</p>		<p>Proper loading, stowage and unloading of liquefied gas cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Potential non-compliance with cargo-related procedures is promptly identified and rectified</p> <p>Actions taken and procedures followed correctly identify and make full use of appropriate shipboard equipment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>Proficiency to apply safe preparations, procedures and checklists for all cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 post docking and loading: <ul style="list-style-type: none"> <li>.1 tank inspection</li> <li>.2 inerting (O<sub>2</sub> reduction, dewpoint reduction)</li> <li>.3 gassing-up</li> <li>.4 cooling down</li> <li>.5 loading</li> <li>.6 deballasting</li> <li>.7 sampling, including closed-loop sampling</li> </ul> </li> <li>.2 sea passage: <ul style="list-style-type: none"> <li>.1 cooling down</li> <li>.2 pressure maintenance</li> <li>.3 boil-off</li> <li>.4 inhibiting</li> </ul> </li> <li>.3 unloading: <ul style="list-style-type: none"> <li>.1 unloading</li> <li>.2 ballasting</li> <li>.3 stripping and cleaning systems</li> <li>.4 systems to make the tank liquid-free</li> </ul> </li> <li>.4 pre-docking preparation: <ul style="list-style-type: none"> <li>.1 warm-up</li> <li>.2 inerting</li> <li>.3 gas-freeing</li> </ul> </li> <li>.5 ship-to-ship transfer</li> </ul>		<p>Calibration and use of monitoring and gas-detection equipment is consistent with safe operational practices and procedures</p> <p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations ( <i>continued</i> )	<p>Proficiency to perform cargo measurements and calculations, including:</p> <ul style="list-style-type: none"> <li>.1 liquid phase</li> <li>.2 gas phase</li> <li>.3 On Board Quantity (OBQ)</li> <li>.4 Remain On Board (ROB)</li> <li>.5 boil-off cargo calculations</li> </ul> <p>Proficiency to manage and supervise personnel with cargo-related responsibilities</p>		<p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>
Familiarity with physical and chemical properties of liquefied gas cargoes	<p>Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships, including:</p> <ul style="list-style-type: none"> <li>.1 the chemical structure of gases</li> <li>.2 the properties and characteristics of liquefied gases (including CO<sub>2</sub>) and their vapours, including: <ul style="list-style-type: none"> <li>.1 simple gas laws</li> <li>.2 states of matter</li> <li>.3 liquid and vapour densities</li> <li>.4 diffusion and mixing of gases</li> <li>.5 compression of gases</li> </ul> </li> <li>.6 reliquefaction and refrigeration of gases</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Effective use is made of information resources for identification of properties and characteristics of liquefied gases and their impact on safety, environmental protection and vessel operation</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Familiarity with physical and chemical properties of liquefied gas cargoes (continued)	<p>.7 critical temperature of gases and pressure</p> <p>.8 flashpoint, upper and lower explosive limits, auto-ignition temperature</p> <p>.9 compatibility, reactivity and positive segregation of gases</p> <p>.10 polymerization</p> <p>.11 saturated vapour pressure/reference temperature</p> <p>.12 dewpoint and bubble point</p> <p>.13 lubrication of compressors</p> <p>.14 hydrate formation</p> <p>.3 the properties of single liquids</p> <p>.4 the nature and properties of solutions</p> <p>.5 thermodynamic units</p> <p>.6 basic thermodynamic laws and diagrams</p> <p>.7 properties of materials</p> <p>.8 effect of low temperature – brittle fracture</p> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>		

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 flammability</li> <li>.2 explosion</li> <li>.3 toxicity</li> <li>.4 reactivity</li> <li>.5 corrosivity</li> <li>.6 health hazards</li> <li>.7 inert gas composition</li> <li>.8 electrostatic hazards</li> <li>.9 polymerizing cargoes</li> </ul> <p>Proficiency to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Knowledge and understanding of dangers of non-compliance with relevant rules/regulations</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with liquefied gas tanker cargo operations are correctly identified, and proper control measures are taken</p> <p>Use of gas-detection devices is in accordance with manuals and good practice</p>
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers, including:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces (such as compressor rooms), including the correct use of different types of breathing apparatus</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Apply occupational health and safety precautions <i>(continued)</i>	<p>.2 precautions to be taken before and during repair and maintenance work, including work affecting pumping, piping, electrical and control systems</p> <p>.3 precautions for hot and cold work</p> <p>.4 precautions for electrical safety</p> <p>.5 use of appropriate Personal Protective Equipment (PPE)</p> <p>.6 precautions for cold burn and frostbite</p> <p>.7 proper use of personal toxicity monitoring equipment</p>		
Respond to emergencies	<p>Knowledge and understanding of liquefied gas tanker emergency procedures, including:</p> <p>.1 ship emergency response plans</p> <p>.2 cargo operations emergency shutdown procedure</p> <p>.3 emergency cargo valve operations</p> <p>.4 actions to be taken in the event of failure of systems or services essential to cargo operations</p> <p>.5 fire-fighting on liquefied gas tankers</p> <p>.6 jettisoning of cargo</p> <p>.7 enclosed space rescue</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>The type and impact of emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority and the levels and timescales of making reports and informing personnel on board are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation are appropriate to the nature of the emergency and implemented promptly</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies ( <i>continued</i> )	<p>Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour</p> <p>Knowledge of medical first-aid procedures and antidotes on board liquefied gas tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)</p>		The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the environment	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment
Monitor and control compliance with legislative requirements	<p>Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied</p> <p>Proficiency in the use of the IBC and IGC Codes and related documents</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	The handling of liquefied gas cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practices

**GUIDANCE REGARDING PROVISIONS OF THE ANNEX TO  
THE STCW CONVENTION  
PART B**

**Chapter I**

Guidance regarding general provisions

**Section B-I/6**

*Guidance regarding training and assessment*

**Qualifications of instructors and assessors**

**1** Each Party should ensure that instructors and assessors are appropriately qualified and experienced for the particular types and levels of training or assessment of competence of seafarers, as required under the Convention, in accordance with the guidelines in this section.

**In-service training and assessment**

**2** Any person, on board or ashore, conducting in-service training of a seafarer intended to be used in qualifying for certification under the Convention should have received appropriate guidance in instructional techniques\* .

**3** Any person responsible for the supervision of in-service training of a seafarer intended to be used in qualifying for certification under the Convention should have appropriate knowledge of instructional techniques and of training methods and practice.

**4** Any person, on board or ashore, conducting an in-service assessment of the competence of a seafarer intended to be used in qualifying for certification under the Convention should have:

- .1** received appropriate guidance in assessment methods and practice\* ; and
- .2** gained practical assessment experience under the supervision and to the satisfaction of an experienced assessor.

**5** Any person responsible for the supervision of the in-service assessment of competence of a seafarer intended to be used in qualifying for certification under the Convention should have a full understanding of the assessment system, assessment methods and practice\* .

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\* The relevant IMO Model Course(s) may be of assistance in the preparation of courses.

**Chapter V**  
Guidance regarding special training requirements  
for personnel on certain types of ships

**Section B-V/1**

*Guidance regarding the training and qualifications of tanker personnel*

**Person with immediate responsibility**

**1** The term “person with immediate responsibility” as used in paragraphs 3 and 5 of regulation V/1-1 and paragraph 3 of regulation V/1-2 means a person being in a decision-making capacity with respect to loading, discharging, care in transit, handling of cargo, tank cleaning or other cargo-related operations.

**Familiarization training for all tanker personnel**

**2** All tanker personnel should undergo familiarization training on board and, where appropriate, ashore before being assigned to shipboard duties, which should be given by qualified personnel experienced in the handling and characteristics of oil, chemical or liquefied gas cargoes, as appropriate, and the safety procedures involved. The training should at least cover the matters set out in paragraphs 3 to 8 below.

**Regulations**

**3** Knowledge of the ship’s rules and regulations governing the safety of personnel on board a tanker in port and at sea.

**Health hazards and precautions to be taken**

**4** Dangers of skin contact; inhalation and accidental swallowing of cargo; the harmful properties of the cargoes carried, personnel accidents and associated first aid; lists of do’s and don’ts.

**Fire prevention and fire fighting**

**5** Control of smoking and cooking restrictions; sources of ignition; fire and explosion prevention; methods of fire fighting; portable fire extinguishers and fixed installations.

**Pollution prevention**

**6** Procedures to be followed to prevent air and water pollution and measures which will be taken in the event of spillage.

**Safety equipment and its use**

**7** The proper use of protective clothing and equipment, resuscitators, escape and rescue equipment.

**Emergency procedures**

**8** Familiarization with the emergency plan procedures.

## **Proof of qualification**

**9** The master of every oil, chemical and liquefied gas tanker should ensure that the officer or the person primarily responsible for the cargo possesses the appropriate certificate, issued or endorsed or validated as required by regulation V/1-1, paragraph 3; regulation V/1-1, paragraph 5 or regulation V/1-2, paragraph 3, as appropriate, and has had adequate recent practical experience on board an appropriate type of tanker to permit that officer or person to safely perform the duties assigned.

## **Guidance regarding approved onboard training**

### **General**

**10** The purpose of qualifying shipboard service is to provide training and knowledge for the safe carriage of specific tanker cargoes.

**11** To satisfy the experience appropriate to their duties on the type of tanker on which they serve referred to in regulation V/1-1, paragraph 4.2.2, regulation V/1-1, paragraph 6.2.2 and regulation V/1-2, paragraph 4.2.2, onboard training should:

- .1** emphasize practical “hands on experience” and be related to the employment of the seafarer, i.e. the training of deck and engineering departments may be different;
- .2** be under the supervision of personnel qualified and experienced in the handling, characteristics and safety procedures of the cargoes being carried by the vessel;
- .3** be on board the tanker carrying products relative to the tanker Certificate of Proficiency/Endorsement being sought and should be such that the specialist equipment is brought into operation but may be on a ballast passage between cargoes for part of that period;
- .4** take part in at least three loading and discharge operations; and\*
- .5** at least cover the matters set out in “Onboard training criteria” in paragraph 19.

**12** The onboard training programme must in no way affect the safe running or the seaworthiness of the vessel.

### **Onboard training programme**

**13** The trainee should be carried in a supernumerary capacity (i.e. the trainee will have no other duties than that of undertaking the training programme and emergency duties).

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\* A loading or discharging operation is considered to be the loading or discharge of more than 60% of the total cargo tank capacity of the vessel. Loading/discharges of less than this quantity may be summed together to be equivalent to this quantity.

**14** The programme of onboard training should be managed and coordinated by the company which manages the ship on which the seagoing service is to be performed and be a vessel nominated by the company as a training vessel.\*

**15** At all times, the trainee should be aware of two identifiable individuals who are immediately responsible for the management of the programme of onboard training. The first of these is a qualified seagoing officer, referred to as the “shipboard training officer”, who, under the authority of the master, should organize and supervise the programme of training. The second should be a person nominated by the company, referred to as the “company training officer”, who should have an overall responsibility for the training programme and for coordination with training organizations.

**16** The trainee should be provided with an approved training record book to enable a comprehensive record of practical training and experience at sea to be maintained. The approved training record book should be laid out in such a way that it can provide detailed information about the tasks and duties which should be undertaken and the progress towards their completion. Duly completed and countersigned by the master, the approved record book will provide unique evidence that a structured programme of onboard training has been completed leading towards the issue of a relevant Certificate in Advanced Training for Tanker Cargo Operations.

**17** During the approved onboard training programme the trainee should be instructed in the loading, discharging, care in transit, handling of cargo, tank cleaning or other cargo-related operations of the tanker to ensure that the experience gained is at least equal to that which would be obtained in three months’ normal service.

**18** If the three-loading and three-unloading criteria cannot be achieved within the one-month onboard training period, then the period of onboard training should be extended until these criteria have been satisfactorily achieved.

### **Onboard training criteria**

**19** The onboard training should at least provide knowledge and experience, relevant to the applicable tanker type, of the following:

#### **.1 Safety**

##### **.1.1 All tanker types**

- .1** Ship’s safety-management system
- .2** Cargo-specific fire-fighting equipment and procedures
- .3** Cargo-specific first-aid procedures, including the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)
- .4** Ship-/cargo-specific hazards, including smoking regulations, oxygen-depleted atmospheres, cargo hydrocarbon narcosis and toxicity
- .5** Risk assessment systems
- .6** Permit to work, including hot work and enclosed spaces entry procedures
- .7** Use of personal protective equipment

##### **.1.2 Additional for liquefied gas tankers**

- .1** Dangers and precautions related to handling and storage of cargoes at cryogenic temperatures

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\* A nominated training vessel is a trading vessel named by the company that is suitable for the purpose of this guidance, as applicable.

**.2 Construction, cargo, cargo tanks and pipelines****.2.1 All tanker types**

- .1 Hull/tank construction and limitations
- .2 Cargo connections
- .3 Properties and hazards associated with the types of cargo being carried, including use of Material Safety Data Sheets
- .4 The risks that cargo operations (such as purging/gas-freeing/tank cleaning) may have on the accommodation ventilation systems and actions to mitigate these risks
- .5 Configuration of cargo and ballast system
- .6 Pumps and associated equipment
- .7 Specialist equipment associated with the cargo operations
- .8 Particulars of the tanker's construction and how this affects the cargo operations

**.2.2 Additional for liquefied gas tankers**

- .1 Use of segregation, separation and airlocks to maintain gas-safe areas
- .2 Cargo tank, inter-barrier, insulation spaces, and pipeline relief valves and vapour venting systems
- .3 Cargo vapour compressors and associated equipment

**.3 Trim and stability****.3.1 All tanker types**

- .1 Tanker's stability information and calculating equipment
- .2 Importance of maintaining stress levels within acceptable limits
- .3 Dangers of free surface effect and "sloshing" effect

**.4 Cargo operations****.4.1 All tanker types**

- .1 Pre-planning of loading/in-transit care, discharge/ballast operations
- .2 Record keeping
- .3 Start up/stopping procedures, including emergency shutdown
- .4 Attention required for mooring arrangements during cargo operations
- .5 Purging and inerting requirements and associated hazards
- .6 Loading cargo, including topping-off operations
- .7 Discharging cargo, including draining and stripping operations
- .8 Monitoring of cargo during loading/discharging operations, including sampling where applicable
- .9 Tank gauging and alarm systems
- .10 Dangers from electrostatic discharge and its prevention
- .11 Ballasting and deballasting operations
- .12 Maintenance requirements, including coating inspections

**.4.2 Additional for chemical tankers**

- .1 Polymerization, cargo compatibility, tank coating compatibility and other reactions
- .2 Functions of inhibitors and catalysts
- .3 Vapour/gas dispersion

**.4.3 Additional for liquefied gas tankers**

- .1 Polymerization, cargo compatibility, tank coating compatibility and other reactions
- .2 Functions of inhibitors and catalysts
- .3 Causes of backpressure and pressure surge effects

- .4 Use of boil-off gas as a fuel
- .5 Vapour/gas dispersion
- .6 Purging and cool-down operations
- .7 Operation and maintenance of re-liquefaction equipment
- .8 Understanding and use of the custody transfer system
- .4.4 Additional for oil tankers**
  - .1 Crude oil washing systems
- .5 Tank washing/cleaning**
  - .5.1 All tanker types**
    - .1 Tank cleaning systems and equipment fitted on the tanker
    - .2 Pre-planning of tank washing/cleaning operations
    - .3 Tank washing procedures, including purging and inerting
    - .4 Control of slops/waste product
    - .5 Electro-static hazards
    - .6 Cleanliness requirements
    - .7 Maintenance requirements
  - .5.2 Additional for chemical tankers**
    - .1 Removal of inhibitors and residues
    - .2 Use of absorption, cleaning agents and detergents
  - .5.3 Additional for liquefied gas tankers**
    - .1 Hot-gassing/boil-off of liquid residues and regassification process
- .6 Inert gas systems**
  - .6.1 All tanker types**
    - .1 Inerting system(s) and equipment fitted to the tanker
    - .2 Hazards associated with inerting of spaces, with particular reference to safe entry into tanks
    - .3 Purging, maintaining inert atmosphere and gas-freeing operations
    - .4 Maintenance requirements
- .7 Pollution prevention and control**
  - .7.1 All tanker types**
    - .1 International, flag State and company regulations, documentation and plans
    - .2 Operation of the tanker's pollution-prevention systems and equipment, including discharge monitoring
    - .3 Operation of the tanker's pollution-containment equipment
- .8 Gas-detection equipment and instruments**
  - .8.1 All tanker types**
    - .1 Use and calibration of personal, portable and fixed gas analysers, with particular reference to oxygen and hydrocarbon monitoring equipment
    - .2 Operation, maintenance and limitation of cargo tank level measuring, level alarm and temperature-measuring systems
  - .8.2 Additional for liquefied gas tankers**
    - .1 Operation and maintenance of hull temperature measurement

## **.9 Publications**

### **.9.1 All tanker types**

- .1** International, flag State and company publications relevant to the operation of the tanker, including SOLAS, MARPOL and applicable guidance manuals
- .2** Operating and maintenance manuals specific to the equipment on board
- .3** Established industrial standards and code of safe working practice (e.g., ICS, OCIMF, SIGTTO)

### **Section B-V/1-1**

*Guidance regarding training and qualifications of masters, officers and ratings on oil and chemical tankers*

#### **Oil tanker training**

**20** The training required by paragraphs 2.2 and 4.3 of regulation V/1-1 in respect of oil tankers should be set out in a training plan which clearly expresses, for all parties involved, the objectives of the training. Training may be given on board or ashore, where appropriate. It should be supplemented by practical instruction on board and, where appropriate, in a suitable shore-based installation. All training and instruction should be given by properly qualified and suitably experienced personnel\*.

**21** As much use as possible should be made of shipboard operation and equipment manuals, films and suitable visual aids, and the opportunity should be taken to introduce discussion of the part to be played by the safety organization on board ship and the role of safety officers and safety committees.

#### **Chemical tanker training**

**22** The training required by paragraphs 2.2 and 6.3 of regulation V/1-1 in respect of chemical tankers should be set out in a training plan which clearly expresses, for all parties involved, the objectives of the training. Training may be given on board or ashore, where appropriate. It should be supplemented by practical instruction on board and, where appropriate, in a suitable shore-based installation. All training and instruction should be given by properly qualified and suitably experienced personnel\*.

**23** As much use as possible should be made of shipboard operation and equipment manuals, films and suitable visual aids, and the opportunity should be taken to introduce discussion of the part to be played by the safety organization on board ship and the role of safety officers and safety committees.

### **Section B-V/1-2**

*Guidance regarding training and qualifications of masters, officers and ratings on liquefied gas tankers*

**24** The training required by paragraphs 2.2 and 4.3 of regulation V/1-2 in respect of liquefied gas tankers should be set out in a training plan which clearly expresses, for all parties involved, the objectives of the training. Training may be given on board or ashore, where appropriate. It should be supplemented by practical instruction on board and, where appropriate, in a suitable shore-based installation. All training and instruction should be given by properly qualified and suitably experienced personnel\*.

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\* The relevant IMO Model Course(s) may be of assistance in the preparation of courses.

**25** As much use as possible should be made of shipboard operation and equipment manuals, films and suitable visual aids, and the opportunity should be taken to introduce discussion of the part to be played by the safety organization on board ship and the role of safety officers and safety committees.