

**Minimum standard of competence in advanced training for chemical tanker cargo operations (STCW Reg V/1-1)**

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</p>	<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>

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<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>

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<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>

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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>

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Take precautions to prevent hazards <i>(continued)</i>	Knowledge and 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> <ol 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> </ol>	<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>	<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>

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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>

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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:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training  .4 approved training programme	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:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training  .4 approved training programme	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice

