



INTERNATIONAL
MARITIME
ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611

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INTERIM GUIDELINES ON TRAINING FOR SEAFARERS ON SHIPS USING AMMONIA AS FUEL

- 1 The Sub-Committee on Human Element, Training and Watchkeeping (HTW), at its eleventh session (10 to 14 February 2025), agreed that generic interim guidelines on training for seafarers on ships using alternative fuels and new technologies should be developed in parallel with several individual sets of fuel/technology-specific interim guidelines.
- 2 The Maritime Safety Committee, at its 110th session (18 to 27 June 2025), having noted the above-mentioned agreement by the HTW Sub-Committee, approved STCW.7/Circ.25 on *Generic interim guidelines on training for seafarers on ships using alternative fuels and new technologies*.
- 3 Subsequently, the Committee, at its 111th session (13 to 22 May 2026), approved the *Interim guidelines on training for seafarers on ships using ammonia as fuel* (the Interim Guidelines), prepared by the HTW Sub-Committee, at its twelfth session (23 to 27 February 2026), as set out in the annex. These Interim Guidelines should serve as the primary reference for the development of training of seafarers on ships using ammonia as fuel.
- 4 The Committee agreed to keep the Interim Guidelines under review, taking into account operational experience gained with their application.
- 5 Member States are invited to bring the Interim Guidelines to the attention of all parties concerned.

ANNEX

INTERIM GUIDELINES ON TRAINING FOR SEAFARERS ON SHIPS USING AMMONIA AS FUEL

1 INTRODUCTION

- 1.1 The purpose of these Interim Guidelines is to provide a reference for the development and approval of training for seafarers on ships using ammonia as fuel to support the reduction of greenhouse gas emissions from international shipping.

Application

- 1.2 Unless expressly provided otherwise, these Interim Guidelines apply to seafarers on ships using ammonia as fuel.
- 1.3 Where specific provisions of this document differ from the requirements of mandatory instruments applicable to seafarers working on ships using ammonia, the provisions of those mandatory instruments should take precedence.

Goal

- 1.4 The goal of these Interim Guidelines is to provide an international standard for the development and approval of training of seafarers serving on ships using ammonia as fuel.

General provisions for training and familiarization

- 1.5 All seafarers serving on board ships using ammonia as fuel should, prior to being assigned shipboard duties, be familiarized with their specific duties and with all ship arrangements, installations, equipment, procedures, and ship characteristics that are relevant to their routine or emergency duties, as specified in regulation I/14.5 of the STCW Convention.
- 1.6 In accordance with MSC.1/Circ.1687 on *Interim guidelines for the safety of ships using ammonia as fuel*, paragraph 19.2.2, masters, officers, ratings, and other personnel on ships using ammonia as fuel should have received training and be qualified in the use of gaseous fuel in accordance with the regulation V/3 of the STCW Convention and section A-V/3 of the STCW Code, taking into account the specific hazards of ammonia used as fuel.
- 1.7 In addition, seafarers should receive appropriate training on the associated risks and emergency procedures, in accordance with their duties and responsibilities.
- 1.8 On that basis, the following training approach comprising basic and advanced training levels may be applied:
- .1 basic training for seafarers responsible for designated safety duties associated with the care, use or in emergency response to the fuel and systems on board ships using ammonia as fuel should be delivered in accordance with the knowledge, understanding and proficiency (KUPs) specified in table 1 of these Interim Guidelines and should meet the standard competence specified therein; and

- .2 advanced training for the masters, engineer officers and all personnel with immediate responsibility for the care and use of fuel and systems on board ships using ammonia as fuel should be delivered in accordance with the KUPs specified in tables 1 and 2 of these Interim Guidelines and should meet the standard competence specified therein.

1.9 The competences in tables 1 and 2 of these Interim Guidelines have been developed based on the standards of competences for basic and advanced training set out in STCW.7/Circ.25 on the *Generic interim guidelines on training for seafarers using alternative fuels and new technologies*.

2 TRAINING REQUIREMENTS

General

- 2.1 Prior to being assigned duties on board a ship using ammonia as fuel, all seafarers should receive appropriate training in accordance with this section.
- 2.2 The Administration may, in respect of ships of less than 500 gross tonnage, except for passenger ships, if it considers that a ship's size and the length or character of its voyage are such as to render the application of the full requirements of this section unreasonable or impracticable, exempt the seafarers on such a ship or class of ships from some of the requirements, bearing in mind the safety of people on board, the ship and property and the protection of the marine environment.
- 2.3 Seafarers responsible for designated safety duties associated with the care, use or in emergency response to the fuels and fuel systems on board ships using ammonia as fuel should receive basic training or instruction in accordance with paragraphs 3.1 and 3.2 below and should meet the standard of competence specified therein.
- 2.4 Masters, engineer officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships using ammonia as fuel should receive advanced training in accordance with paragraph 3.3 and 3.4 and should meet the standard of competence specified therein, taking into account the knowledge, understanding and proficiencies to meet the standard of competence specified in paragraph 3.1, as appropriate.
- 2.5 Basic and advanced training should be given by qualified personnel experienced in the handling and characteristics of the fuels and fuel systems used, and the safety procedures involved.
- 2.6 It is important to emphasize the need to take account of risk analyses. All risk analyses carried out should be made available to participants during training.

3 STANDARDS OF COMPETENCE

Standard of competence for basic training

- 3.1 Seafarers responsible for designated safety duties associated with the care, use or in emergency response to the use of the fuels and fuel systems on board ships using ammonia as fuel should, before being assigned to shipboard duties:
 - .1 receive basic training or instruction as determined by the Administration on the use of ammonia and related fuel systems so as to:

- .1 contribute to the safe operation of a ship;
 - .2 take precautions to prevent hazards on a ship;
 - .3 apply occupational health and safety precautions and measures;
 - .4 carry out fire-fighting operations on a ship;
 - .5 respond to emergencies; and
 - .6 take precautions to prevent pollution of the environment from ships; and
- .2 be required to provide evidence of having achieved the standard of competence provided to undertake their duties and responsibilities through:
- .1 demonstration of competence in accordance with the methods and criteria for evaluating competence determined by the Administration; and
 - .2 examination or continuous assessment as part of a training programme determined by the Administration.
- 3.2 Documentary evidence should be issued by the Administration indicating that the holder has completed the basic training.

Standard of competence for advanced training

- 3.3 Masters, engineer officers and all personnel with immediate responsibility for the care and use of the fuels and fuel systems on board ships using ammonia as fuel should, before being assigned to shipboard duties:
- .1 receive advanced training in addition to the competences outlined in paragraph 3.1.1 above as determined by the Administration on the use of ammonia and related fuel systems so as to:
 - .1 be familiar with physical and chemical properties of the fuels and/or characteristics of the systems aboard ships;
 - .2 operate controls of the fuels and fuel systems related to propulsion plant and engineering systems and services and safety devices on ships;
 - .3 be able to safely perform and monitor all operations related to the fuels and fuel systems used on board ships;
 - .4 plan and monitor safe bunkering, stowage and securing of the fuels on board ships;
 - .5 take precautions to prevent pollution of the environment from ships;
 - .6 monitor and control compliance with legislative requirements;
 - .7 take precautions to prevent hazards;

- .8 apply occupational health and safety precautions and measures on board ships; and
 - .9 have knowledge of the prevention, control and firefighting and extinguishing systems on board ships;
- .2 be required to provide evidence of having achieved the standard of competence provided to undertake their duties and responsibilities through:
 - .1 demonstration of competence in accordance with the methods and criteria for evaluating competence determined by the Administration; and
 - .2 examination or continuous assessment as part of a training programme determined by the Administration; and
- 3.4 Documentary evidence should be issued by the Administration indicating that the holder has completed the advanced training.

4 EMERGENCY EXERCISES

- 4.1 Emergency exercises related to the fuels and fuel systems on board ships using ammonia as fuel should be conducted at regular intervals. The response and safety system for hazard and accident control should be reviewed and tested.

Table 1
*Specification of minimum standard of competence in basic training for seafarers on board ships using ammonia as fuel
(assessed against table A-V/3-1 of the STCW Code for reference)*

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
1 Contribute to the safe operation of a ship	1.1	Design and operational characteristics of ships using ammonia as fuel under different storage conditions
	1.2	Basic knowledge of fuel systems and fuel storage systems:
	.1	ammonia as fuel on board ships
	.2	types of ammonia fuel storage systems
	.3	atmospheric, low-temperature, compressed or pressurized storage of ammonia fuels on board ships.
	.4	general arrangement of fuel systems and fuel storage systems on board ships using ammonia as fuel, including Fuel Preparation Room (FPR) and Tank Connection Space.
	.5	Provisions for hazardous areas, toxic spaces and toxic areas
	.6	typical fire safety plan
	.7	monitoring, control and safety systems aboard ships using ammonia as fuel.
	1.3	Basic knowledge of fuels and fuel storage systems' operations on board ships using ammonia as fuel:
	.1	piping systems and valves
	.2	atmospheric, pressurized, compressed or low-temperature storage

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.3 relief systems, protection screens, and ammonia vapour treatment systems .4 basic bunkering operations and bunkering systems related to ammonia .5 protection against high-pressure, low-temperature accidents .6 fuel leak monitoring and detection 1.4 Basic knowledge of the physical and chemical properties of ammonia as fuel on board ships, including: .1 properties and characteristics of ammonia .2 pressure and temperature relationship of ammonia in gaseous and liquefied phases .3 Understanding the consequences and behaviour of ammonia being discharged into water, air and on deck (in vapour and liquid form) 1.5 Knowledge and understanding of safety requirements and safety management on board ships using ammonia as fuel.
2 Take precautions to prevent hazards on a ship	2.1 Basic knowledge of the hazards associated with operations on ships using ammonia as fuel, including but not limited to: .1 health hazards .2 environmental hazards .3 reactivity hazards

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
	.4	corrosion hazards associated with ammonia, including its reaction with water and moisture
	.5	ignition, implosion, explosion and flammability hazards
	.6	sources of ignition
	.7	electrostatic hazards
	.8	toxicity hazards and threshold level
	.9	liquid pools, vapour leaks and clouds including vapour dispersion
	.10	low temperatures
	.11	pressure hazards
	.12	external environmental conditions that affect operations
	2.2	Basic knowledge of hazard controls:
	.1	emptying, inerting, drying, gas freeing and monitoring techniques
	.2	anti-static measures
	.3	ventilation protocols (considering toxic vapour releases)
	.4	release protocols (during purging, engine shutdown etc.) including treatment systems
	.5	segregation
	.6	measures to prevent ignition, fire, implosion and explosion

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.7 atmospheric and temperature control .8 gas testing .9 protection against low temperature damages 2.3 Understanding of fuel characteristics on ships using ammonia as fuel as found on a Safety Data Sheet (SDS)
3 Apply occupational health and safety precautions and measures	3.1 Proper use of gas-measuring instruments and similar equipment: .1 gas detection (flammable and toxic levels of ammonia) 3.2 Proper use of specialized safety equipment and protective devices compatible with ammonia exposure, including: .1 breathing apparatus .2 protective clothing .3 resuscitators .4 rescue and escape equipment 3.3 Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to ships having ammonia as fuel, including: .1 precautions to be taken before entering hazardous areas, toxic areas, toxic spaces, and spaces adjacent to these areas.

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
	.2	precautions to be taken before and during repair and maintenance work
	.3	material compatibilities with ammonia systems
	.4	safety measures for hot and cold work
	.5	measures for decontaminating personal protective equipment, tools or equipment.
	3.4	Basic knowledge of first aid with reference to a Safety Data Sheet (SDS)
4 Carry out fire-fighting operations on a ship	4.1	Knowledge of the methods and fire-fighting appliances to detect, control and extinguish fires of ammonia fuels including portable heat-detection devices.
5 Respond to emergencies	5.1	Basic knowledge of contingency plan, emergency procedures and preparedness, including but not limited to: .1 ammonia leaks and escape .2 use safe havens .3 search and rescue from ammonia-contaminated area .4 personal injury .5 training and safety drills, including understanding the role of the Ammonia Release Mitigation System (ARMS) and double-walled pipes as safety measures to tackle toxicity hazards

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
6 Take precautions to prevent pollution of the environment from the release of fuels found on ships	6.1	Basic knowledge of measures to be taken in the event of leakage/spillage/venting of fuels from ships using ammonia as fuel, including the need to: .1 report relevant information to the responsible persons .2 awareness of shipboard spill/leakage/venting response procedures .3 awareness of appropriate personal protection when responding to a spill/leakage/venting of ammonia

Table 2
*Specification of minimum standard of competence in advanced training for seafarers on board ships using ammonia as fuel
(assessed against table A-V/3-2 of the STCW Code for reference)*

Competence	Knowledge, Understanding and Proficiency
	Ammonia
1 Familiarity with physical and chemical properties of fuels aboard ships	1.1 Basic knowledge and understanding of simple chemistry and physics and the relevant definitions related to safe bunkering and use of ammonia used as fuel: .1 the chemical structure of ammonia .2 the properties and characteristics of ammonia including: .1 simple physical laws .2 states of matter of ammonia including phase changes .3 liquid and vapour densities .4 liquefaction of gases .5 boil-off of low-temperature fuel (ammonia) .6 diffusion and mixing of gases .7 compression and expansion of gases .8 critical pressure and temperature of gases .9 flashpoint of ammonia, upper and lower flammable limits, auto-ignition temperature .10 saturated vapour pressure/ reference temperature

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
	.11 hydrate formation .12 combustion properties: heating values .13 pollutant characteristics of ammonia fuels .3 the nature and properties of solutions (toxicity and corrosivity of water-ammonia mixtures) .4 thermodynamic units .5 basic thermodynamic laws and diagrams .6 properties of materials and compatibility with ammonia .7 quality of fuel including the effect of impurities .8 effect of low temperature, including ductile or brittle fracture for liquid low temperature fuels 1.2 Understanding the information contained in a Safety Data Sheet (SDS) about ammonia fuels	
2 Operate controls of fuel related to propulsion plant and engineering systems and services and safety devices on ships	2.1	Operating principles of marine power plants
	2.2	Knowledge of Ships' auxiliary machinery
	2.3	Knowledge of marine engineering terms
3 Ability to safely perform and monitor all operations related to the fuels used on board ships	3.1	Knowledge of design and characteristics of ships using ammonia as fuel under different storage conditions

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
	3.2	Knowledge of ship design, systems, and equipment found on ships having ammonia as fuel, including:
	.1	fuel systems for different propulsion systems
	.2	general arrangement and construction
	.3	fuel storage systems on board ships using ammonia as fuel, including materials of construction and insulation
	.4	fuel-handling equipment and instrumentations on board ships:
	.1	fuel pumps and pumping arrangements
	.2	fuel pipelines (double-walled piping) and valves
	.3	vapour/boil-off management
	.4	expansion devices
	.5	temperature and pressure monitoring systems
	.6	fuel tank level-gauging systems
	.7	tank pressure monitoring and control systems
	.5	low temperature fuel tanks temperature and pressure maintenance
	.6	fuel system atmosphere control systems (nitrogen), including storage, generation and distribution
	.7	fuel residue and effluent drain system

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.8 lubricants and compressors, or other equipment .9 toxic and flammable gas-detecting systems .10 flame detection systems .11 vapour / boil-off gas (BOG) management and control systems including liquefaction and reliquefaction .12 alarm and fuel Emergency Shut Down system (ESD)
	3.3 Knowledge of fuel system theory and characteristics, including types of fuel system pumps and their safe operation on board ships using ammonia as fuel .1 low pressure pumps .2 high pressure pumps .3 compressors .4 vapourizers .5 heaters .6 heat exchangers .7 filters .8 ventilation system related to spaces where fuel vapours could be present .9 venting and vapour systems for the ammonia fuel

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.10 pressure build-up units 3.4 Knowledge of safe procedures and checklists for taking fuel tanks in and out of service, including: .1 inerting .2 gas freeing .3 tank preparation (conditioning/drying) .4 initial loading .5 temperature and pressure control .6 heating of fuel .7 vapour management .8 emptying systems
4 Plan and monitor safe bunkering, stowage and securing of the fuel on board ships	4.1 General knowledge of ships using ammonia as fuel 4.2 Ability to use all data available on board related to bunkering, storage and securing of ammonia as fuel 4.3 Ability to establish clear and concise communications between the ship and the terminal, truck or the bunker-supply ship 4.4 Knowledge of safety and emergency procedures for operation of machinery, fuel and control systems for ships using ammonia as fuel

Competence	Knowledge, Understanding and Proficiency	
	Ammonia	
	4.5	Proficiency in the operation of bunkering systems on board ships using ammonia as fuel including: .1 procedures related to pre-bunkering including tank conditioning and post-bunkering .2 emergency procedures .3 ship-shore/ship-ship interface and use of ship-shore checklist related to ammonia.
	4.6	Proficiency to perform fuel-system measurements and calculations, including: .1 maximum fill quantity .2 On Board Quantity (OBQ) .3 Minimum Remain On Board (ROB) .4 fuel consumption calculations
	4.7	Ability to ensure the safe management of bunkering and other ammonia-related operations concurrent with other onboard operations, both in port and at sea
5 Take precautions to prevent pollution of the environment from the release of fuels from ships	5.1	Knowledge of the effects of pollution on human and environment .1 awareness of the dynamics of gas plume and modelling techniques
	5.2	Knowledge of measures to be taken in the event of spillage/leakage/venting (including management of ammonia-contaminated water)
	5.3	Understanding of procedures to prevent pollution of the environment

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	5.4 Knowledge of measures to be taken towards the local or port authority in case of larger emissions of ammonia or the release of a gas plume
6 Monitor and control compliance with legislative requirements	6.1 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 6.2 Proficiency in the use of the applicable regulatory codes and related documents as appropriate to the ship
7 Take precautions to prevent hazards	7.1 Knowledge and understanding of the hazards and control measures associated with fuel system operations on board ships having ammonia as fuel, including but not limited to: .1 flammability .2 implosion and explosion, including Boiling Liquid Expanding Vapour Explosion (BLEVE) .3 toxicity hazards and threshold level .4 reactivity (interactions with water/moisture (hygroscopic)) .5 corrosivity .6 health hazards .7 inert gas composition .8 electrostatic hazards

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.9 liquid or vapour leaks .10 phase change hazards .11 pressurized gases .12 low temperature 7.2 Proficiency to calibrate and use monitoring and fuel/gas detection systems, instruments and equipment on board ships using ammonia as fuel 7.3 Knowledge and understanding of dangers of non-compliance with relevant rules/regulations 7.4 Knowledge and understanding of risk assessment methods analysis on board ships using ammonia as fuel 7.5 Ability to elaborate and develop risk analysis related to risks on board ships using ammonia as fuel 7.6 Ability to elaborate and develop safety plans and safety instructions for ships using ammonia as fuel 7.7 Knowledge of hot work, toxic spaces, toxic areas, hazardous areas, enclosed spaces, spaces adjacent to hazardous areas and tank entry, including permitting procedures
8 Apply occupational health and safety precautions and measures on board a ship	8.1 Proper use of specialized safety equipment and protective devices compatible with ammonia exposure, including: .1 breathing apparatus and evacuating equipment .2 protective clothing and equipment

Competence	Knowledge, Understanding and Proficiency
	Ammonia
	.3 resuscitators .4 rescue and personal escape equipment .5 personal toxicity and gas monitoring equipment and portable gas meters
	8.2 Knowledge of function, limitation (if any) of gas-measuring instruments and similar equipment: .1 atmosphere testing and gas detection including toxic levels of ammonia
	8.3 Knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to ships having ammonia as fuel, including: .1 precautions to be taken before and during repair and maintenance work .2 material compatibilities with ammonia systems .3 electrical safety .4 ship/shore safety checklist .5 safety measures for hot and cold work .6 precautions for cold burn and frostbite .7 emergency muster stations/safe havens .8 measures for decontaminating personal protective equipment, tools, or equipment after exposure to ammonia
	8.4 Basic knowledge of first aid with reference to a Safety Data Sheet (SDS)

Competence	Knowledge, Understanding and Proficiency
	Ammonia
9 Knowledge of the prevention, control and fire-fighting and extinguishing systems on board ships	9.1 Fire organization and action to be taken on ships using ammonia as fuel 9.2 Special hazards associated with fuel systems and fuel handling on ships using ammonia as fuel 9.3 Fire-fighting system operations 9.4 Reporting and notifying relevant authorities and involved parties