

**PART A**

**Mandatory standards regarding provisions of the annex to the STCW Convention**

**CHAPTER III**

**Standards regarding engine department**

**Section A-III/1**

***Mandatory minimum requirements for certification of officers in charge of an engineering watch in a manned engine-room or as designated duty engineers in a periodically unmanned engine-room***

**Applicable from 2012-01-01, see IMO-Vega Note**

**Training**

1 The education and training required by paragraph 2.4 of regulation III/1 shall include training in mechanical and electrical workshop skills relevant to the duties of an engineer officer.

**Onboard training**

2 Every candidate for certification as officer in charge of an engineering watch in a manned engine-room or as designated duty engineer in a periodically unmanned engine-room of ships powered by main propulsion machinery of 750 kW or more whose seagoing service, in accordance with paragraph 2.2 of regulation III/1, forms part of a training programme approved as meeting the requirements of this section shall follow an approved programme of onboard training which:

- .1 ensures that, during the required period of seagoing service, the candidate receives systematic practical training and experience in the tasks, duties and responsibilities of an officer in charge of an engine-room watch, taking into account the guidance given in section B-III/1 of this Code;
- .2 is closely supervised and monitored by a qualified and certificated engineer officer aboard the ships in which the approved seagoing service is performed; and
- .3 is adequately documented in a training record book.

**Standard of competence**

3 Every candidate for certification as officer in charge of an engineering watch in a manned engine-room or as designated duty engineer in a periodically unmanned engine-room on a seagoing ship powered by main propulsion machinery of 750 kW propulsion power or more shall be required to demonstrate ability to undertake, at the operational level, the tasks, duties and responsibilities listed in column 1 of table A-III/1.

4 The minimum knowledge, understanding and proficiency required for certification is listed in column 2 of table A-III/1.

5 The level of knowledge of the material listed in column 2 of table A-III/1 shall be sufficient for engineer officers to carry out their watchkeeping duties. \*

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

6 Training and experience to achieve the necessary theoretical knowledge, understanding and proficiency shall be based on section A-VIII/2, part 4-2 – Principles to be observed in keeping an engineering watch, and shall take into account the relevant requirements of this part and the guidance given in part B of this Code.

7 Candidates for certification for service in ships in which steam boilers do not form part of their machinery may omit the relevant requirements of table A-III/1. A certificate awarded on such a basis shall not be valid for service on ships in which steam boilers form part of a ship's machinery until the engineer officer meets the standard of competence in the items omitted from table A-III/1. Any such limitation shall be stated on the certificate and in the endorsement.

8 The Administration may omit knowledge requirements for types of propulsion machinery other than those machinery installations for which the certificate to be awarded shall be valid. A certificate awarded on such a basis shall not be valid for any category of machinery installation which has been omitted until the engineer officer proves to be competent in these knowledge requirements. Any such limitation shall be stated on the certificate and in the endorsement.

9 Every candidate for certification shall be required to provide evidence of having achieved 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-III/1.

**Near-coastal voyages**

10 The requirements of paragraphs 2.2 to 2.5 of regulation III/1 relating to level of knowledge, understanding and proficiency required under the different sections listed in column 2 of table A-III/1 may be varied for engineer officers of ships powered by main propulsion machinery of less than 3,000 kW propulsion power engaged on near-coastal voyages, as considered necessary, bearing in mind the effect on the safety of all ships which may be operating in the same waters. Any such limitation shall be stated on the certificate and in the endorsement.

*Table A-III/1*

**Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room**

**Function: Marine engineering at the operational level**

<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>
Maintain a safe engineering watch	Thorough knowledge of Principles to be observed in keeping an engineering watch, including: .1 duties associated with taking over and accepting a watch .2 routine duties	Assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training	The conduct, handover and relief of the watch conforms with accepted principles and procedures  The frequency and extent of monitoring of engineering equipment and systems conforms

	<p>undertaken during a watch</p> <p>.3 maintenance of the machinery space logs and the significance of the readings taken</p> <p>.4 duties associated with handing over a watch</p> <p>Safety and emergency procedures; change-over of remote/automatic to local control of all systems</p> <p>Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems</p>	<p>ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>to manufacturers' recommendations and accepted principles and procedures, including Principles to be observed in keeping an engineering watch</p> <p>A proper record is maintained of the movements and activities relating to the ship's engineering systems</p>
<p>Maintain a safe engineering watch (continued)</p>	<p><i>Engine-room resource management</i></p> <p>Knowledge of engine-room resource management principles, including:</p> <p>.1 allocation, assignment, and prioritization of resources</p> <p>.2 effective communication</p> <p>.3 assertiveness and leadership</p> <p>.4 obtaining and maintaining situational awareness</p> <p>.5 consideration of team experience</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved training</p> <p>.2 approved in-service experience</p> <p>.3 approved simulator training</p>	<p>Resources are allocated and assigned as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Questionable decisions and/or actions result in appropriate challenge and response</p> <p>Effective leadership behaviours are identified</p> <p>Team member(s) share accurate understanding of current and predicted engine-room and associated systems state, and of external environment</p>
<p>Use English in written and oral form</p>	<p>Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties</p>	<p>Examination and assessment of evidence obtained from practical instruction</p>	<p>English language publications relevant to engineering duties are correctly interpreted</p> <p>Communications are clear and understood</p>
<p>Use internal communication systems</p>	<p>Operation of all internal communication systems on board</p>	<p>Examination and assessment of evidence obtained</p>	<p>Transmission and reception of messages are consistently</p>

		<p>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, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ul>	<p>successful</p> <p>Communication records are complete, accurate and comply with statutory requirements</p>
Operate main and auxiliary machinery and associated control systems	<p>Basic construction and operation principles of machinery systems, including:</p> <ul style="list-style-type: none"> <li>.1 marine diesel engine</li> <li>.2 marine steam turbine</li> <li>.3 marine gas turbine</li> <li>.4 marine boiler</li> <li>.5 shafting installations, including propeller</li> <li>.6 other auxiliaries, including various pumps, air compressor, purifier, fresh water generator, heat exchanger, refrigeration, air-conditioning and ventilation systems</li> <li>.7 steering gear</li> <li>.8 automatic control systems</li> <li>.9 fluid flow and characteristics of lubricating oil, fuel oil and cooling systems</li> <li>.10 deck machinery</li> </ul> <p>Safety and emergency procedures for operation of propulsion plant machinery, including control systems</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 laboratory equipment training</li> </ul>	<p>Construction and operating mechanisms can be understood and explained with drawings/instructions</p>
Operate main and auxiliary machinery and associated control systems (continued)	<p>Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:</p> <ul style="list-style-type: none"> <li>.1 main engine and associated auxiliaries</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> </ul>	<p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations and avoid pollution of</p>

	<p>.2 steam boiler and associated auxiliaries and steam systems</p> <p>.3 auxiliary prime movers and associated systems</p> <p>.4 other auxiliaries, including refrigeration, air-conditioning and ventilation systems</p>	<p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>the marine environment</p> <p>Deviations from the norm are promptly identified</p> <p>The output of plant and engineering systems consistently meets requirements, including bridge orders relating to changes in speed and direction</p> <p>The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the ship and the plant, having regard to the prevailing circumstances and conditions</p>
Operate fuel, lubrication, ballast and other pumping systems and associated control systems	<p>Operational characteristics of pumps and piping systems, including control systems</p> <p>Operation of pumping systems:</p> <p>.1 routine pumping operations</p> <p>.2 operation of bilge, ballast and cargo pumping systems</p> <p>Oily-water separators (or-similar equipment) requirements and operation</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, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations and avoid pollution of the marine environment</p> <p>Deviations from the norm are promptly identified and appropriate action is taken</p>

**Function: Electrical, electronic and control engineering at the operational level**

<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>
Operate electrical, electronic and control systems	<p>Basic configuration and operation principles of the following electrical, electronic and control equipment:</p> <p>.1 electrical equipment:</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-</p>	<p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure</p>

	<p>.a generator and distribution systems</p> <p>.b preparing, starting, paralleling and changing over generators</p> <p>.c electrical motors including starting methodologies</p> <p>.d high-voltage installations</p> <p>.e sequential control circuits and associated system devices</p> <p>.2 electronic equipment:</p> <p>.a characteristics of basic electronic circuit elements</p> <p>.b flowchart for automatic and control systems</p> <p>.c functions, characteristics and features of control systems for machinery items, including main propulsion plant operation control and steam boiler automatic controls</p> <p>.3 control systems:</p> <p>.a various automatic control methodologies and characteristics</p> <p>.b Proportional-Integral-Derivative (PID) control characteristics and associated system devices for process control</p>	<p>service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>safety of operations</p> <p>Electrical, electronic and control systems can be understood and explained with drawings/instructions</p>
Maintenance and repair of electrical and electronic equipment	<p>Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment</p> <p>Maintenance and repair of electrical system equipment, switchboards,</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p>	<p>Safety measures for working are appropriate</p> <p>Selection and use of hand tools, measuring instruments, and testing equipment are appropriate and interpretation of results is accurate</p> <p>Dismantling,</p>

	<p>electric motors, generator and DC electrical systems and equipment</p> <p>Detection of electric malfunction, location of faults and measures to prevent damage</p> <p>Construction and operation of electrical testing and measuring equipment</p> <p>Function and performance tests of the following equipment and their configuration:</p> <p>.1 monitoring systems</p> <p>.2 automatic control devices</p> <p>.3 protective devices</p> <p>The interpretation of electrical and simple electronic diagrams</p>	<p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>inspecting, repairing and reassembling equipment are in accordance with manuals and good practice</p> <p>Reassembling and performance testing is in accordance with manuals and good practice</p>
--	--	--	--

**Function: Maintenance and repair at the operational level**

<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>
<p>Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board</p>	<p>Characteristics and limitations of materials used in construction and repair of ships and equipment</p> <p>Characteristics and limitations of processes used for fabrication and repair</p> <p>Properties and parameters considered in the fabrication and repair of systems and components</p> <p>Methods for carrying out safe emergency/temporary repairs</p> <p>Safety measures to be taken to ensure a safe working environment and</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>Identification of important parameters for fabrication of typical ship-related components is appropriate</p> <p>Selection of materials is appropriate</p> <p>Fabrication is to designated tolerances</p> <p>Use of equipment and hand tools, machine tools and measuring instruments is appropriate and safe</p>

	<p>for using hand tools, machine tools and measuring instruments</p> <p>Use of hand tools, machine tools and measuring instruments</p> <p>Use of various types of sealants and packings</p>		
Maintenance and repair of shipboard machinery and equipment	<p>Safety measures to be taken for repair and maintenance, including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment</p> <p>Appropriate basic mechanical knowledge and skills</p> <p>Maintenance and repair, such as dismantling, adjustment and reassembling of machinery and equipment</p> <p>The use of appropriate specialized tools and measuring instruments</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>Safety procedures followed are appropriate</p> <p>Selection of tools and spare gear is appropriate</p> <p>Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice</p> <p>Re-commissioning and performance testing is in accordance with manuals and good practice</p>
	<p>Design characteristics and selection of materials in construction of equipment</p> <p>Interpretation of machinery drawings and handbooks</p> <p>The interpretation of piping, hydraulic and pneumatic diagrams</p>		<p>Selection of materials and parts is appropriate</p>

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

<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>
Ensure compliance with pollution-prevention requirements	<p><i>Prevention of pollution of the marine environment</i></p> <p>Knowledge of the precautions to be taken to prevent pollution of the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p>



	<p>Anti-pollution procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Actions to ensure that a positive environmental reputation is maintained</p>
<p>Maintain seaworthiness of the ship</p>	<p><i>Ship stability</i></p> <p>Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment</p> <p>Understanding of the fundamentals of watertight integrity</p> <p>Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy</p> <p><i>Ship construction</i></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts</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, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The stability conditions comply with the IMO intact stability criteria under all conditions of loading</p> <p>Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice</p>
<p>Prevent, control and fight fires on board</p>	<p><i>Fire prevention and fire-fighting appliances</i></p> <p>Ability to organize fire drills</p> <p>Knowledge of classes and chemistry of fire</p> <p>Knowledge of fire-fighting systems</p> <p>Action to be taken in the event of fire, including fires involving oil systems</p>	<p>Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3, paragraphs 1 to 3</p>	<p>The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</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>Operate</p>	<p><i>Life-saving</i></p>	<p>Assessment of evidence</p>	<p>Actions in responding</p>

life-saving appliances	Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids	obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	<i>Medical aid</i> Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship	Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea, security and protection of the marine environment are correctly identified
Application of leadership and teamworking skills	Working knowledge of shipboard personnel management and training  A knowledge of related international maritime conventions and recommendations, and national legislation  Ability to apply task and workload management, including:  .1 planning and co-ordination  .2 personnel assignment  .3 time and resource constraints  .4 prioritization	Assessment of evidence obtained from one or more of the following:  .1 approved training  .2 approved in-service experience  .3 practical demonstration	The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned  Training objectives and activities are based on assessment of current competence and capabilities and operational requirements.  Operations are demonstrated to be in accordance with applicable rules
Application of leadership and teamworking skills	Knowledge and ability to apply effective resource		Operations are

<i>(continued)</i>	<p>management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication on board and ashore</li> <li>.3 decisions reflect consideration of team experiences</li> <li>.4 assertiveness and leadership, including motivation</li> <li>.5 obtaining and maintaining situational awareness</li> </ul> <p>Knowledge and ability to apply decision-making techniques:</p> <ul style="list-style-type: none"> <li>.1 situation and risk assessment</li> <li>.2 identify and consider generated options</li> <li>.3 selecting course of action</li> <li>.4 evaluation of outcome effectiveness</li> </ul>		<p>planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel state and operational status and external environment</p> <p>Decisions are most effective for the situation</p>
--------------------	--	--	---

<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 safety of personnel and ship	<p>Knowledge of personal survival techniques</p> <p>Knowledge of fire prevention and ability to fight and extinguish fires</p> <p>Knowledge of elementary first aid</p> <p>Knowledge of personal safety and social responsibilities</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/1, paragraph 2	<p>Appropriate safety and protective equipment is correctly used</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Procedures designed to safeguard the environment are observed at all times</p> <p>Initial and follow-up actions on becoming aware of an emergency conform with established emergency response</p>

## IMO-Vega Guide

The STCW Code comprises two parts:

Part A - Mandatory standards regarding provisions of the Annex to the 1978 STCW Convention, as amended, and

Part B - Recommended guidance regarding provisions of the 1978 STCW Convention, as amended.

Each section of the STCW Code refers to each regulation annexed to the Convention.

## IMO-Vega Note

The 2010 amendments to the STCW Code, as adopted by Resolution 2 to the Final Act of the Manila Conference, will enter into force 2012-01-01. See corresponding section applicable to 2012-01-01.

\* \* \*

The STCW Code Part A is made mandatory in the STCW Convention Reg. I/1 paragraph 2.

Document id: SC10A0301AB

## The 2010 Manila Amendments to the Seafarers' Training, Certification and Watchkeeping (STCW) Code

3 August 2010

### PART A

#### Mandatory standards regarding provisions of the annex to the STCW Convention

#### CHAPTER III

#### Standards regarding engine department

#### Section A-III/2

#### *Mandatory minimum requirements for certification of chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more*

Applicable from 2012-01-01, see IMO-Vega Note

#### Standard of competence

1 Every candidate for certification as chief engineer officer and second engineer officer of seagoing ships powered by main propulsion machinery of 3,000 kW power or more shall be required to demonstrate ability to undertake, at the management level, the tasks, duties and responsibilities listed in column 1 of table A-III/2.

2 The minimum knowledge, understanding and proficiency required for certification is