U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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COMDTCHANGENOTE 16721
NVIC 23-14
May 7, 2020

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 23-14, CH-2

Subj: CHANGE 2 TO GUIDELINES ON QUALIFICATION FOR STCW ENDORSEMENTS AS ELECTRO-TECHNICAL OFFICER ON VESSELS POWERED BY MAIN PROPULSION MACHINERY OF 750 kW/1,000 HP OR MORE, NVIC 23-14, COMDTPUB 16721

Ref: (a) Guidelines on Qualification for STCW Endorsements as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More, NVIC 23-14, COMDTPUB 16721

1. PURPOSE. This Commandant Change Notice publishes CH-2 to NVIC 23-14.

2. ACTION. The Coast Guard will use NVIC 23-14 and 46 CFR 11.335 to establish whether mariners are qualified to hold STCW endorsements as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More. Officers in Charge, Marine Inspection (OCMIs) should bring this notice to the attention of the maritime industry within their zones of responsibility.

3. DIRECTIVES AFFECTED. With the release of this Commandant Change Notice, NVIC 23-14 is updated.

4. DISCUSSION. The Coast Guard has extended the date for acceptance of assessments of mariner competence that are not signed by a Coast Guard approved Qualified Assessor. This change notice revises NVIC 23-14 to reflect this extension.

5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a regulation. It is not intended to, nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and is issued for guidance purposes to outline methods of best practice for compliance with applicable law. You can use an alternative approach if the approach satisfies the requirements of the applicable statutes and regulations.

6. MAJOR CHANGES. This Commandant Change Notice revises NVIC 23-14 to extend the date for acceptance of assessments that were not signed by a Coast Guard approved Qualified Assessor.

DISTRIBUTION – SDL No. 170

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A																										
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NON-STANDARD DISTRIBUTION:

7. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS.

   a. The development of this Commandant Change Notice and the general policies contained within it have been thoroughly reviewed under Department of Homeland Security Directive 023-01 and Environmental Planning COMDTINST 5090.1 (series) by the originating office, and are categorically excluded (CE) from further environmental analysis under paragraph #A3 in Table 3-1 of U.S. Coast Guard Environmental Planning Implementing Procedures 5090.1. Because this Commandant Change Notice implements, without substantive change, the applicable Commandant Instruction or other federal agency regulations, procedures, manuals, and other guidance documents, Coast Guard categorical exclusion #A3 is appropriate.

   b. This Commandant Change Notice will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment. All future specific actions resulting from the general policies in this Commandant Change Notice must be individually evaluated for compliance with the National Environmental Policy Act (NEPA), DHS and Coast Guard NEPA policy, and compliance with all other environmental mandates.

8. DISTRIBUTION. No paper distribution will be made of this Commandant Change Notice. An electronic version will be located at https://www.dco.uscg.mil/Our-Organization/NVIC/.

9. PROCEDURE. Remove and insert the following pages of NVIC 23-14:

Remove	Insert
Enclosure (2), Page 1 CH-1	Enclosure (2), Page 1 CH-2
Enclosure (3), Page 8 CH-1	Enclosure (3), Page 8 CH-2

10. RECORDS MANAGEMENT CONSIDERATIONS. This Commandant Change Notice has been thoroughly reviewed during the directives clearance process, and it has been determined there are no further records scheduling requirements, in accordance with the Federal Records Act (44 U.S.C. 3101 et seq.), NARA requirements, and the Information and Life Cycle Management Manual, COMDTINST M5212.12 (series). This policy does not create significant or substantial change to existing records management requirements.

11. FORMS/REPORTS. None.

12. REQUEST FOR CHANGES. All requests for changes or questions regarding implementation of Reference (a) and this Commandant Change Notice should be directed to the Mariner Credentialing Program Policy Division (CG-MMC-2), at (202) 372-2357 or MMCPolicy@uscg.mil. To obtain approval for a course or training program, contact the NMC at (888) 427-5662 or IAskNMC@uscg.mil.

/s/
R. V. TIMME
Rear Admiral, U. S. Coast Guard
Assistant Commandant for Prevention Policy

U.S. Department of Homeland Security
United States Coast Guard

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COMDTCHANGENOTE 16721
NVIC 23-14
April 1, 2019

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 23-14, CH 1

Subj: CH-1 TO GUIDELINES FOR QUALIFICATION FOR STCW ENDORSEMENTS AS ELECTRO-TECHNICAL OFFICER ON VESSELS POWERED BY MAIN PROPULSION MACHINERY OF 750 kW/1,000 HP OR MORE, NVIC 23-14, COMDTPUB 16721

Ref: (a) Guidelines for Qualification for STCW Endorsements as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More, NVIC 23-14, COMDTPUB 16721

1. PURPOSE. This Commandant Change Notice publishes CH-1 to reference (a).

2. ACTION. The Coast Guard will use reference (a) and 46 CFR 11.335 to establish whether mariners are qualified to hold national officer and STCW endorsements as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More (ETO). Officers in Charge, Marine Inspection (OCMIs) should also bring this notice to the attention of the maritime industry within their zones of responsibility.

3. DIRECTIVES AFFECTED. With the release of this Commandant Change Notice, reference (a) is updated.

4. DISCUSSION. After publication of Reference (a), the Coast Guard extended the date for acceptance of assessments of mariner competence that are not signed by a Coast Guard approved Qualified Assessor. This Commandant Change Notice revises Enclosures (1) and (2) of Reference (a) to reflect this extension.

5. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a regulation. It is not intended to, nor does it impose legally binding requirements on any party. It represents the Coast Guard's current thinking on this topic and is issued for guidance purposes to outline methods of best practice for compliance with applicable law. You can use an alternative approach if the approach satisfies the requirements of the applicable statutes and regulations.

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NON-STANDARD DISTRIBUTION:

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS.

   a. The development of this NVIC and the general policies contained within it have been thoroughly reviewed by the originating office, and are categorically excluded (CE) under current CE #A3 from further environmental analysis, in accordance with Section 2.B and Appendix A, DHS Instruction Manual 023-01-001-01, Revision 01, Implementation of the National Environmental Policy Act (NEPA). Because this NVIC implements, without substantive change, the applicable Commandant Instruction or other federal agency regulations, procedures, manuals, and other guidance documents, Coast Guard categorical exclusion #A3 is appropriate.

   b. This NVIC will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment. All future specific actions resulting from the general policies in this NVIC must be individually evaluated for compliance with the National Environmental Policy Act (NEPA), DHS and Coast Guard NEPA policy, and compliance with all other environmental mandates.

7. DISTRIBUTION. No paper distribution will be made of this Commandant Change Notice. An electronic version will be located at https://www.dco.uscg.mil/Our-Organization/NVIC/.

8. PROCEDURE. Remove and insert the following pages of Enclosure (1) to Reference (a):

Remove	Insert
Enclosure (2), Page 1	Enclosure (2), Page 1 CH-1
Enclosure (3), Pages 8 and 9	Enclosure (3), Page 8 CH-1

9. RECORDS MANAGEMENT CONSIDERATIONS. This NVIC has been thoroughly reviewed during the directives clearance process, and it has been determined there are no further records scheduling requirements, in accordance with the Federal Records Act (44 U.S.C. 3101 et seq.), NARA requirements, and the Information and Life Cycle Management Manual, COMDTINST M5212.12 (series). This policy does not create significant or substantial change to existing records management requirements.

10. FORMS/REPORTS. None.

11. REQUEST FOR CHANGES. All requests for changes or questions regarding implementation of Reference (a) and this Commandant Change Notice should be directed to the Mariner Credentialing Program Policy Division (CG-MMC-2), at (202) 372-2357 or MMCPolicy@uscg.mil. To obtain approval for a course or training program, contact the NMC at (888) 427-5662 or IAskNMC@uscg.mil.

J. P. NADEAU
Rear Admiral, U. S. Coast Guard
Assistant Commandant for Prevention Policy

U.S. Department of Homeland Security
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COMDTPUB P16721
NVIC 23-14
August 25, 2014

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 23-14

Subj: GUIDELINES FOR QUALIFICATION FOR STCW ENDORSEMENTS AS ELECTRO-TECHNICAL OFFICER ON VESSELS POWERED BY MAIN PROPULSION MACHINERY OF 750 kW/1,000 HP OR MORE

Ref: (a) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW), Regulation III/6 and Section A-III/6 of STCW Code, incorporated into regulations at 46 Code of Federal Regulations (CFR) 11.102

1. PURPOSE. This Navigation and Vessel Inspection Circular (NVIC) provides guidance on qualification for and revalidation of STCW endorsements as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More (ETO).

2. ACTION. The Coast Guard will use this NVIC and 46 CFR 11.335 to establish whether mariners are qualified to hold STCW endorsements as ETO. Officers in Charge, Marine Inspection (OCMIs) should bring this NVIC to the attention of the maritime industry within their zones of responsibility. This NVIC is available on the World Wide Web at http://www.uscg.mil/hq/cg5/nvic/. The Coast Guard will distribute it by electronic means only.

3. DIRECTIVES AFFECTED. None.

4. BACKGROUND.

   a. The STCW Convention and STCW Code set forth standards for training and certification for merchant mariners. The International Maritime Organization (IMO) amended the STCW Convention and STCW Code on June 25, 2010. These amendments entered into force for all ratifying countries, including the United States, on January 1, 2012, and established certain new endorsements, including ETO.

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A																										
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NON-STANDARD DISTRIBUTION:

b. The Convention is not self-implementing; therefore, the U.S., as a signatory to the STCW Convention, initiated regulatory changes to ensure full implementation of the amendments to the STCW Convention and STCW Code. The U.S. implements these provisions under the Convention and under the authority of United States Code (U.S.C.), Titles 33 and 46. The Coast Guard published a final rule in the Federal Register on December 24, 2013, (78 FR 77796) that implements the STCW Convention and STCW Code, including the 2010 amendments. This rule became effective on March 24, 2014. The Coast Guard is publishing this NVIC to provide guidance on complying with the new regulations.

5. DISCUSSION.

a. Policy regarding STCW endorsements as ETO is located in this NVIC. Enclosure (1) discusses specific qualification requirements for the endorsement. Enclosure (2) contains the national assessment guidelines. Enclosure (3) may be used to record the completion of assessments. Enclosure (4) provides relevant excerpts from the STCW Convention and STCW Code, these are provided for information only.

b. Qualified Assessors (QAs) are encouraged to use the guidelines in Enclosure (2) or an approved alternative. Shipboard QAs may make minor changes to the assessments in Enclosure (2) to reflect differences in equipment and operating procedures. QAs may not make other changes unless prior approval is given by the National Maritime Center (NMC) (46 CFR 11.301(a)(1)(i)).

c. A training institution applying for approval of a course or program that leads to an endorsement as ETO should either state that the guidelines in Enclosure (2) will apply, or provide the alternative guidelines it proposes to use. However, under 46 CFR 10.402(e), a training institution must submit any deviations from these guidelines to the Coast Guard for approval before use

d. When applying for an ETO endorsement, mariners need only submit the completed Enclosure (3), Record of Assessment, or an equivalent evidence of demonstration of competency, to the Coast Guard**.** The Coast Guard recommends that the applicant retain a copy of Enclosure (3), or equivalent evidence of demonstration of competency, for his or her records.

6. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a regulation. It is not intended to nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and is issued for guidance purposes to outline methods of best practice for compliance with the applicable law. You can use an alternative approach if the approach satisfies the requirements of the applicable statutes and regulations.

7. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS.

   a. The development of this NVIC and the general policies contained within it have been thoroughly reviewed by the originating office, and are categorically excluded (CE) under current USCG CE # 33 from further environmental analysis, in accordance with Section 2.B.2. and Figure 2-1 of the National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts, COMDTINST M16475.1 D. Because this NVIC implements, without substantive change, the applicable Commandant Instruction or other federal agency regulations, procedures, manuals, and other guidance documents, Coast Guard categorical exclusion #33 is appropriate.

   b. This NVIC will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment.

8. RECORDS MANAGEMENT CONSIDERATIONS. This NVIC has been thoroughly reviewed during the directives clearance process, and it has been determined there are no further records scheduling requirements, in accordance with the Federal Records Act, 44 U.S.C. 3101 et seq., National Archives and Records Administration requirements, and the Information and Life Cycle Management Manual, COMDTINST M5212.12 (series). This policy does not create a significant or substantial change to existing records management requirements.

9. QUESTIONS. All questions regarding implementation of this NVIC should be directed to the Mariner Credentialing Program Policy Division (CG-CVC-4), at (202) 372-2357 or MMCPolicy@uscg.mil. To obtain approval for an alternative to the assessments described in Enclosure (2), contact the NMC at (888) 427-5662 or IAskNMC@uscg.mil.

P. F. THOMAS
Rear Admiral, U. S. Coast Guard
Assistant Commandant for Prevention Policy

Encl: (1) Discussion of Qualification Requirements for Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More
(2) Assessment Guidelines for Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More
(3) Record of Assessment for Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More
(4) Excerpts from the STCW Convention and the STCW Code

DISCUSSION OF QUALIFICATION REQUIREMENTS FOR ELECTRO-TECHNICAL OFFICER ON VESSELS POWERED BY MAIN PROPULSION MACHINERY OF 750 kW/1,000 HP OR MORE

1. GENERAL. This enclosure provides guidance to qualify for an International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW) endorsement as Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More (ETO) as specified in Section A-III/6 of the STCW Code and 46 Code of Federal Regulations (CFR) 11.335.

2. SEA SERVICE, TRAINING, AND DEMONSTRATIONS.

   a. In accordance with 46 CFR 11.335(a), a candidate for an endorsement as ETO must:

      1) Provide evidence of either:

         i) Not less than 36 months combined workshop skills training and approved seagoing service of which not less than 30 months must be seagoing service in the engine department of vessels. Experience gained in the deck department may be creditable for up to 3 months of the service requirements; or

         ii) Completion of an approved training program that includes a combination of workshop skill training and seagoing service of not less than 12 months, and which meets the requirements of Section A-III/6 of the STCW Code;

      2) Meet the standard of competence specified in Section A-III/6 of the STCW Code. This may be done by completing the assessment in Enclosure (2) or an approved alternative; and

      3) Satisfactorily complete approved training in:

         i) Medical First Aid Provider;

         ii) Basic and Advanced Fire Fighting as specified in 46 CFR 11.303;

         iii) Proficiency in Survival Craft and Rescue Boats Other than Fast Rescue Boats;

         iv) Onboard Computer Networking and Security;

         v) Radio Electronics;

         vi) Integrated Navigation Equipment;

         vii) Ship Propulsion and Auxiliary Machinery;

         viii) Instrumentation and Control Systems; and

         ix) High-Voltage Power Systems.

b. The total days of workshop skills training in paragraph (2)(a)(1)(i) of this enclosure should not exceed 180 days. Workshop skills training may include, but is not limited to, shore-based laboratories, in-port watchkeeping and/or maintenance, engine room simulator and/or internships in an appropriate field of study (shipyards, power generating station, or facilities where mechanical and electrical systems have to be operated, maintained, and managed).

c. For purposes of qualifying for an ETO endorsement, seagoing service is considered to be service on board a vessel that is relevant to qualification for ETO. The Coast Guard will accept service in the engine department of ocean, near-coastal, Great Lakes, or inland vessels of at least 750 kW/1,000 HP as being relevant to the qualification of ETO. Mariners may also qualify using service on vessels of less than 750 kW/1,000 HP propulsion power by providing evidence that their service included duties relevant to the ETO endorsement.

d. As specified in 46 CFR 11.335(b), a mariner who has served in a relevant capacity onboard a vessel may qualify for an endorsement as ETO if they provide evidence of:

   1) Seagoing service of not less than 12 months within the last 60 months; and

   2) Meeting the standards of competence specified in Section A-III/6 of the STCW Code. This may be done by providing evidence of the following:

      i) Successful completion of the assessments in Enclosure (2) or an approved alternative;

      ii) Completion of approved or accepted training for Basic and Advanced Firefighting and Medical First Aid Provider; and

      iii) Holding or qualifying for an endorsement for Proficiency in Survival Craft and Rescue Boats Other Than Fast Rescue Boats or Proficiency in Survival Craft and Rescue Boats Other Than Lifeboats and Fast Rescue Boats-Limited.

   Service in a relevant capacity may include service in a position that has provided the mariner with experience in the areas identified in paragraphs (2)(a)(3)(iv) through (ix) of this enclosure.

e. To qualify for an STCW endorsement as ETO, mariners must provide evidence of meeting the standard of competence for Basic Training (46 CFR 11.302).

f. As specified in 46 CFR 11.335(d), a mariner who does not hold any other national or STCW endorsements may be issued an ETO endorsement upon completion of the requirements described above without holding or qualifying for a corresponding national endorsement.

3. ASSESSMENTS. As noted above, mariners must provide evidence of meeting the standard of competence specified in Section A-III/6 of the STCW Code by completion of the assessments in Enclosure (2), or an approved equivalent alternative. Applicants may

document their assessment using Enclosure (3) or they may use any other format that shows equivalent information.

4. RENEWAL OF ENDORSEMENT. In order to renew an endorsement as ETO, an applicant must have currently valid basic training and meet the general requirements for renewal of a merchant mariner credential found in 46 CFR 10.227.

Assessment Guidelines for Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

Standard of Competence

Each candidate for an endorsement as Electro-Technical Officer (ETO) on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More must provide evidence of having achieved the standard of competence specified in Table A-III/6 of the STCW Code (46 CFR 11.335(a)(2)). The table in this enclosure is adopted from Table A-III/6 of the STCW Code (found in Enclosure (4)) to assist the candidate and assessor in the demonstration of competency.

Practical Skill Demonstrations

These assessment guidelines establish the conditions under which the assessment will occur, the performance or behavior the candidate is to accomplish, and the standards against which the performance is measured. In addition, for the assessments in this enclosure, the unique requirements of different manufacturers for operating, maintenance, and repair; the different generations and configurations of systems; and the specific nature of the shipboard installation do not permit the development of detailed performance criteria. As a result, many of the criteria in these guidelines call for direct reference to the manufacturers' instructions, recommendations, and specifications or the ship's standard operating procedures to determine whether the candidate's actions were appropriate, complete, timely, and executed in the proper sequence.

Qualified Assessors

A shipboard Qualified Assessor (QA) who witnesses a practical demonstration may sign the appropriate blocks and pages in the Record of Assessment in Enclosure (3) or an equivalent record. All assessments must be signed by a qualified assessor approved by the Coast Guard in accordance with 46 CFR 10.405. In order to facilitate the transition to this new requirement, the Coast Guard will accept assessments that have been demonstrated in the presence of and signed by an assessor who has not been Coast Guard approved until December 31, 2021, provided that the assessor meets the professional requirements in 46 CFR 10.405(a)(3) to assess competence for the specific endorsement. Assessors must be in possession of the level of endorsement, or other professional credential, which provides proof that he or she has attained a level of experience and qualification equal or superior to the relevant level of knowledge, skills, and abilities to be assessed (46 CFR 10.405(a)(3)). Until June 30, 2022, the Coast Guard will accept assessments signed before January 1, 2022, by mariners who have at least 1 year of experience as Chief Engineer and/or Second Engineer Officer (national First Assistant Engineer) on vessels of the applicable propulsion mode(s) of at least 750 kW/1,000 HP. For assessments signed on a military vessel, the assessor should have experience as Chief Engineering Officer on seagoing vessels of at least 750 kW (1,000 HP) or more. Military assessors should only conduct assessments that are within their personal experience and are relevant to the vessel on which they are conducted. After December 31, 2021, QAs must be approved by the National Maritime Center (46 CFR 10.405). Qualified military personnel need not be approved QAs to continue to sign assessments on military vessels after December 31, 2021.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/6 of the STCW Code. Use of these guidelines is not mandatory and alternative means of having achieved the standards of competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative guidelines must approved by the National Maritime Center before use.

Assessment Guidelines for Electro-Technical Officer on Ships Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.1.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including prime movers including main propulsion plant Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and interprets shipboard electrical, electronic, and control systems operations, as related to main propulsion systems and machinery.	The candidate: 1. Confirms that a. Operations of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Analog and digital alarm and automatic control functions for proper operation in accordance with the manufacturer's specifications; and b. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.1.B	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including prime Movers including main propulsion plant Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel with diesel or turbo-electric main propulsion, or on a simulator, or in a laboratory or workshop,	the candidate monitors and interprets shipboard electrical, electronic, and control systems operations, as related to diesel or turbo-electric main propulsion systems and machinery.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer's specifications.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.2.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including engine room auxiliary machinery Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as related to auxiliary and ancillary machinery.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Confirms that all instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with manufacturer specifications. Operational parameters should include: • Pressure; • Temperature; • Flow; • Level; • RPM; • Vibration; • Position; • Motion; and • Direction.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.3.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including steering systems Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as related to vessel steering systems and machinery	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer's specifications. System types used in this assessment should include: • Ram Type; • Rotary Vane; • Azipod Drive; and • Directional Water-Jet.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.4.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including cargo handling systems Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and analyzes the operations of control system components and electrically controlled or driven machinery associated with the cargo handling system.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer specifications. Equipment used in this assessment should include: • Cargo winches or derricks; • Cranes; • Ramps; and • Variable and constant speed pumps.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.5.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including deck machinery Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as related to deck systems and machinery.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components is in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer specifications. Equipment used in this assessment should include: • Tension winches; • Windlass; • Capstans; • Hatch covers; • Ramp controls; and • Segregation doors.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.6.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems including hotel systems Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as related to hotel systems and machinery.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer specifications. Equipment used in this assessment should include: • Vent dampers; • Accommodation heating; • Air conditioning and ventilation; • Sanitary systems and equipment; • Potable systems and equipment; • Sewage treatment systems and equipment; • Galley equipment; • Laundry equipment; • Communication devices; and • Entertainment systems.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.7.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems Basic knowledge of heat transmission, mechanics, and hydromechanics *Knowledge of*: Electro technology and electrical machine theory Fundamental Electronics and power electronics Electrical power distribution and electrical equipment Fundamentals of automation, automatic control systems and control technology Instrumentation, alarm, and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control system	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as related to bridge operations, and navigation systems and equipment.	The candidate: 1. Confirms that: a. Operation of the remote and local control systems and related components are in accordance with the manufacturer's recommended specifications; and b. Instrumentation components are functional and operating within recommended technical specifications; and 2. Tests: a. Operation of electro-hydraulic and electro-pneumatic control system components in accordance with technical specifications; and b. Alarm and automatic control functions for proper operation in accordance with the manufacturer specifications. Equipment should include: • Remote propulsion controls; • Steering controls and feedback systems; • Communications systems, including GMDSS; • Recorders; • Radars and ARPA; • Fire detection and suppression; • Remote system controls; • AIS; and • ECDIS.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.8.A	Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering systems *Knowledge of*: Hazards and precautions required for the operation of power systems above 1,000 volts	On board a vessel, or in a laboratory or workshop,	the candidate monitors and assesses shipboard electrical, electronic, and control systems operations, as relate to high voltage power systems and machinery.	The candidate: 1. Identifies the hazards associated with high voltage systems and equipment; 2. Describes the precautions taken when operating and performing maintenance on high voltage systems and equipment; and 3. Demonstrates the proper use of specialized tools, protective gear and procedures associated with the operation and maintenance of high voltage power systems and machinery.
2.1.A	Monitor the operation of automatic control systems of propulsion and auxiliary machinery	Preparation of control systems of propulsion and auxiliary machinery for operation	On board a vessel, or in a laboratory or workshop,	the candidate monitors and assesses the main propulsion and auxiliary machinery control systems sufficient to maintain safe operating conditions.	The candidate: 1. Performs scheduled tests of automatic control devices in accordance with the manufacturer's guidelines and vessel operational requirements; and 2. Observes all automatic control functions and takes appropriate actions to ensure continued vessel and personnel safety if the operations are outside of the manufacturer's guidelines.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.1.A	Operate generators and distribution systems	Coupling, load sharing, and changing over generators.	On board a vessel, or in a laboratory or workshop,	the candidate plans and conducts operation of electrical generation and distribution systems.	The candidate develops a prioritized plan and schedule of tasks and operates the power generation control system for the following: 1. Synchronizing and connecting offline generators to the main bus, ensuring all operating parameters remain within manufacturer's specifications; 2. Paralleling and equalizing load distribution between on-line generators, ensuring all operating parameters remain within the manufacturer's specifications; and 3. Shifting load distribution and the disconnection of generators from the main bus, ensuring all operating parameters remain within the manufacturer's specifications.
3.1.B	Operate generators and distribution systems	Coupling and breaking connection between switchboards and distribution panels	On board a vessel, or on a simulator, or in a laboratory or workshop, using manufacturer's drawings, schematics and instructions for coupling and disconnecting switchboards and distribution panels;	the candidate describes and demonstrates the proper operation of electrical distribution control systems under the supervision of the cognizant engineer.	The candidate describes and then connects and releases load sources to switchboards and distribution panels in accordance with the manufacturer's guidelines and vessel operational requirements.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
4.1.A	Operate and maintain power systems in excess of 1,000 volts	*Theoretical knowledge* High-voltage technology Safety precautions and procedures	On board a vessel, or in a laboratory or workshop, or in approved course,	the candidate identifies and describes safety precautions for a high voltage power system.	The candidate's description includes: 1. Safety precautions to be observed when performing operations or maintenance on or in the vicinity of electrical machinery utilizing a system voltage of 1,000 volts or greater; and 2. Procedures to be followed prior to, during and immediately following maintenance and start up or shutdown of machinery utilizing a system voltage of 1,000 volts or greater.
4.1.B	Operate and maintain power systems in excess of 1,000 volts	*Theoretical knowledge* Electrical propulsion, electric motors and control systems	On board a vessel, or in a laboratory or workshop, or in an approved course,	the candidate describes the operation of a high voltage main propulsion power system.	The candidate's description includes: 1. Construction and operating parameters of main propulsion components and support machinery associated with electric propulsion utilizing a system voltage of 1,000 volts or greater; and 2. Procedures for the start up, use and securing of main propulsion system components and control systems utilizing a system voltage of 1,000 volts or greater.
4.1.C	Operate and maintain power systems in excess of 1,000 volts	*Theoretical knowledge* Electrical propulsion, electric motors and control systems	On board a vessel, or on a simulator, or in a laboratory or workshop, or in an approved course,	the candidate operates and maintains high voltage power systems in accordance with manufacturer's technical specifications and established rules and procedures.	The candidate: 1. Describes the scheduled and preventive maintenance on system components with a system voltage of 1,000 volts or greater, including all relative safety precautions and procedures; and 2. Properly uses specialized equipment and machinery associated with high voltage electric propulsion plants in excess of 1,000 volts.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
5.1.A	Operate computers and computer networks on ships	Understanding of: .1 Main features of data processing; .2 Construction and use of computer networks on ships; and .3 Bridge based, Engine-room based and commercial computer use	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate initializes, and operates shipboard data processing systems, computer networks.	The candidate: 1. Installs and initializes software for data communications and data processing systems; 2. Installs hardware and performs system initiation on shipboard computer networks; and 3. Operates computers and networks used during bridge, engine room, and other commercial ship operations.
6.1.A	Use English in written and oral form	Adequate knowledge of the English language, in: written forms and oral forms to enable the officer to use engineering publications and to perform officer's duties	On board a vessel, or in a laboratory or workshop, given technical manuals and engineering publications,	the candidate uses technical publications written in English, and communicates orally in English.	The candidate demonstrates efficient and correct: 1. Use of technical manuals and engineering publications for the performance of prescribed shipboard duties; and 2. Oral communications regarding the performance of prescribed duties.
7.1.A	Use internal communication systems	Operation of all internal communication components and systems on board	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate correctly operates shipboard communications systems.	The candidate clearly transmits and correctly receives messages and keeps communication records that are complete, accurate, and comply with statutory requirements.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
8.1 A	Maintenance and repair of electrical and electronic equipment	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	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate demonstrates safety procedures performed on electrical machinery and equipment prior to, during and after maintenance and relative operations.	The candidate: 1. Isolates machinery prior to the performance of maintenance tasks in accordance with the manufacturer's guidelines and vessel operational requirements; and 2. Performs test and verification procedures to ensure acceptable machinery operations and integrity after maintenance tasks are completed. Procedures demonstrated should include: • Lock Out / Tag Out Procedures; • Procedures to obtain and fill out work permits; • Proper communications; and • Use of appropriate personal protective equipment.
8.2.A	Maintenance and repair of electrical and electronic equipment	Maintenance and repair of AC electrical systems equipment, switchboards, electric motors, generators, and DC electrical systems, equipment and motors	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate demonstrates the correct selection and safe use of tools and instruments related to the maintenance and repair of electrical and electronic equipment.	The candidate correctly selects and uses tools, measuring instruments, and test equipment, and ensures that: 1. Inspection and repairs of electrical equipment and machinery will be conducted in the most efficient and accepted manner; 2. Electrical schematics and technical drawings are interpreted and used correctly in the maintenance and repair procedures; 3. Inspection, maintenance and repairs of electrical equipment and machinery are effective and are conducted in the safest and most efficient manner in accordance with the manufacturer's guidelines; and 4. Electrical equipment functions properly after maintenance and repair tasks are completed.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
8.2.B	Maintenance and repair of electrical and electronic equipment	Maintenance and repair of AC electrical systems equipment, switchboards, electric motors, generators, and DC electrical systems, equipment and motors	On board a vessel, or in a laboratory or workshop, given an electrical component or piece of electronic equipment,	the candidate dismantles, inspects, repairs and reassembles the unit.	The candidate: 1. Disassembles, inspects, repairs, and re-assembles the equipment within manufacturer's specifications; and 2. Ensures that the procedures for the inspection and repair of electrical equipment and machinery are appropriate and are performed correctly to ensure that all parameters remain within the manufacturer's specifications.
8.2.C	Maintenance and repair of electrical and electronic equipment	Maintenance and repair of AC electrical systems equipment, switchboards, electric motors, generators, and DC electrical systems, equipment and motors	On board a vessel, or in a laboratory or workshop, given an electrical component or piece of electronic equipment,	the candidate performs testing procedures to ensure proper condition and operation.	The candidate: 1. Tests the performance of electrical equipment and machinery after a maintenance procedure has been completed using good practices to ensure that all parameters remain within the manufacturer's specifications; and 2. Correctly uses and interprets electrical schematics and technical drawings associated with the maintenance and repair of shipboard electrical equipment and machinery.
8.3.A	Maintenance and repair of electrical and electronic equipment	Detection of electrical malfunctions, location of faults, and measures to prevent damage	On board a vessel, or in a laboratory or workshop, given an electrical component, a piece of electronic equipment, or a distribution switchboard,	the candidate troubleshoots malfunctions and corrects faults.	The candidate: 1. Detects (troubleshoots) faults indicated by operations outside normal parameters; 2. Locates faults indicated by operations outside normal parameters; and 3. Eliminates faults and correctly follows accepted repair procedure and protocols.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
8.4.A	Maintenance and repair of electrical and electronic equipment	Construction and operation of electrical testing and measuring equipment	On board a vessel, or in a laboratory or workshop, given an electrical component, a piece of electronic equipment, or a distribution switchboard,	the candidate properly uses electrical testing and measuring equipment.	The candidate: 1. Identifies the construction details and operating parameters of electrical test and measuring equipment; and 2. Properly uses testing and measuring equipment as a part of an electrical and electronic equipment troubleshooting or maintenance operation.
8.5.A	Maintenance and repair of electrical and electronic equipment	Function and performance tests of the following equipment and their configuration: .1 Monitoring systems .2 Automatic control devices .3 Protective devices	On board a vessel, or in a laboratory or workshop, given an electrical component, a piece of electronic equipment, or a distribution switchboard,	the candidate tests the functionality and performance of automatic control, parameter measuring, and system protective devices and equipment.	The procedures followed by the candidate ensure that: 1. Monitoring system and equipment are within manufacturer's operating parameters and technical specifications; 2. Automatic control systems and equipment are within manufacturer's operating parameters and technical specifications; and 3. System protective devices and equipment are within manufacturer's operating parameters and technical specifications.
8.6.A	Maintenance and repair of electrical and electronic equipment	The interpretation of schematics and electronic diagrams	On board a vessel, or in a laboratory or workshop, given an electrical or electronic circuit and appropriate documentation,	the candidate interprets electrical schematics, and electronic controls and logic diagrams.	The candidate correctly interprets and uses shipboard electrical schematics, shipboard electronic controls diagrams, and shipboard controls logic diagrams.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
9.1.A	Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery	Appropriate electrical and mechanical knowledge and skills *Safety and emergency procedures* Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant equipment	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate demonstrates the safe procedures for maintenance and repair of automation and control systems of main propulsion and auxiliary equipment.	The candidate: 1. Isolates machinery prior to the performance of maintenance tasks in accordance with the manufacturer's guidelines and vessel operational requirements; and 2. Performs test and verification procedures to ensure acceptable machinery operations and integrity after maintenance tasks are completed. Procedures in this assessment should include: • Lock Out/Tag Out; • Obtaining and filling out work permits; • Proper communications; and • Use of personal protective equipment.
9.2.A	Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery	Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	On board a vessel, or on a simulator, or in a laboratory or workshop,	the candidate troubleshoots and repairs automation and control systems for main propulsion and auxiliary machinery equipment.	The candidate demonstrates: 1. Tests and detects faults to determine the correct repair procedures to initiate under the existing circumstances and conditions; 2. Performs maintenance required by existing circumstances and conditions necessary to restore electrical and electronic control equipment to normal operating condition; and 3. Eliminates faults through the application of correct and accepted repair procedure and protocols.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
10.1.A	Maintenance and repair of bridge navigation equipment and ship communication systems	Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems *Theoretical knowledge:* Electrical and electronic systems operating in flammable areas	On board a vessel, or in a laboratory or workshop,	the candidate describes the operation and maintenance of bridge communication and navigational equipment.	The candidate's description includes: 1. Operation of shipboard navigational equipment and systems in accordance with the manufacturer's technical specifications and guidance; 2. Maintenance and repair of shipboard navigational equipment and systems in accordance with the manufacturer's technical specifications and guidance; 3. Operation of shipboard communication equipment and systems in accordance with the manufacturer's technical specifications and guidance; 4. Maintenance and repair of shipboard communication equipment and systems in accordance with the manufacturer's technical specifications and guidance; and 5. Requirements for intrinsically safe operations of electrical and electronic equipment operating in flammable areas.
10.2.A	Maintenance and repair of bridge navigation equipment and ship communication systems	Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems *Practical knowledge:* Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage	On board a vessel, or in a laboratory or workshop,	the candidate detects faults and isolates, dismantles, and reassembles navigation and communication systems equipment.	The candidate: 1. Safely maintains and repairs shipboard navigational systems and equipment; shipboard internal and external communications systems and equipment in accordance with the manufacturer's guidelines and industry standards; and 2. Detects faults and identifies causes of malfunction of shipboard navigational systems and equipment; and internal and external communications systems and equipment.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
11.1.A	Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo handling equipment	Appropriate electrical and mechanical knowledge and skills *Safety and emergency procedures* Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	On board a vessel, or in a laboratory or workshop,	the candidate safely isolates, maintains, and repairs automation and control systems of deck and cargo handling machinery in accordance with manufacturer's guidelines and industry standards.	The candidate: 1. Restores shipboard deck machinery and cargo handling equipment to normal functionality; 2. Isolates electrical, electronic, and control systems of deck machinery and cargo handling equipment prior to the commencement of maintenance procedures; 3. Identifies and uses appropriate test and fault detection procedures to determine the correct repair procedures on deck machinery and cargo handling equipment; and 4. Maintains and restores electrical and electronic control equipment of deck machinery and cargo handling equipment to normal operating condition.
12.1.A	Maintenance and repair of control and safety systems of hotel equipment.	*Theoretical knowledge:* Electrical and electronic systems operating in flammable areas *Practical knowledge:* Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage	On board a vessel, or in a laboratory or workshop,	the candidate safely isolates, maintains, and repairs control and safety systems of hotel equipment.	The candidate performs the following in accordance with the manufacturer's guidelines and industry standards: 1. Restores shipboard hotel equipment to normal functionality; 2. Identifies and uses appropriate test and fault detection procedures to determine the correct repair procedures on shipboard hotel equipment; and 3. Maintains and restores electrical and electronic control equipment of shipboard hotel equipment to normal operating condition.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
13.1.A	Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Knowledge of the precautions to be taken to prevent pollution of the marine environment	On board a vessel, or in a laboratory or workshop, when asked to describe pollution prevention procedures,	the candidate describes appropriate pollution prevention procedures.	The candidate's description includes procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed;
13.1.B	Ensure compliance with pollution prevention requirements.	*Prevention of pollution of the marine environment and anti-pollution procedures* Anti-pollution procedures and all associated equipment	On board a vessel, or in a laboratory or workshop,	the candidate describes appropriate pollution prevention procedures and equipment.	The candidate's description includes procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements, including those applicable to: 1. Sewage waste treatment plant; 2. Oily water separator; and 3. Oil-content monitor.
13.1.C	Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Importance of proactive measures to protect the marine environment	When asked by a qualified assessor to describe compliance with pollution prevention procedures,	the candidate describes appropriate pollution prevention procedures.	The candidate's description includes the importance of proactive measures to protect the marine environment.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
14.1.A	Prevent, control and fight fire on board.	Fire prevention and fire fighting appliances. Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire fighting systems Actions to be taken in the event of a fire, including fires involving oil systems	This competence and associated KUPs are demonstrated by successful completion of approved or accepted training in Basic and Advanced Firefighting, or if the candidate holds an STCW endorsement as Officer in Charge of an Engineering Watch, Chief Engineer Officer, or Second Engineer Officer.		
15.1.A	Operate life-saving appliances	*Life-saving* 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	This KUP is demonstrated by successful completion of approved or accepted training for Proficiency in Survival Craft and Rescue Boats, other than Fast Rescue Boats (PSC) or Proficiency in Survival Craft and Rescue Boats, other than Lifeboats and Fast Rescue Boats (PSC-Limited) or by holding an endorsement for PSC or PSC-Limited.		
16.1.A	Apply medical first aid on board ship	*Medical aid* 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	This KUP is demonstrated by successful completion of an approved or accepted Medical First Aid Provider or Medical Care Provider course.		

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
17.1.A	Application of leadership and team working skills	Working knowledge of shipboard personnel management and training	On board a vessel, or in a laboratory or workshop,	the candidate describes the basic duties and responsibilities of vessel personnel.	The candidate describes the duties and responsibilities of: 1. The Master; 2. Deck department including: a. Chief Mate; b. Second Mate; c. Third Mate; d. Bosun; e. Able Seamen; and f. Entry Level Deck; 3. Engine department including: a. Chief Engineer; b. First Assistant Engineer; c. Second Assistant Engineer; d. Third Assistant Engineer; e. QMEDs; and f. Entry Level Engine; and 4. Steward's department including: a. Chief Steward; b. Chief Cook; and c. Entry Level Steward's Department.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
17.1.B	Application of leadership and team working skills	Ability to apply task and workload management	On board a vessel, or in a laboratory or workshop,	the candidate generates a work plan for the electrical and electronic maintenance aboard ship.	The candidate: 1. Obtains: a. Preventative maintenance plan for the ship's electrical and electronic equipment; b. Work list of any needed repairs of electrical or electronic equipment; and c. Manual for each piece of electrical or electronics equipment onboard; 2. Determines: a. Personnel availability; b. Material available; c. Equipment available; d. What repairs and maintenance can be done concurrently; e. Current voyage planning, such as anticipated port calls, drills, weather, etc.; and f. Projected shipboard needs for individual pieces of electrical and/or electronics equipment; and 3. Develops a work plan for shipboard electrical and electronic equipment that complies with national, international, and classification society requirements, and includes: a. Work list with personnel assignments; b. Material and equipment list including a breakdown by equipment repair and a summary; c. Daily work list with personnel assignments and estimated work times; d. Material and equipment list for each task; e. Requisition to replace material and equipment consumed; and f. Lock-out / tag out procedures.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
17.1.C	Application of leadership and team working skills	Knowledge and ability to apply effective resource management	On board a vessel or in approved training,	the candidate executes a work plan for the electrical and electronic maintenance aboard ship.	The candidate: 1. Assigns personnel and equipment to individual tasks based upon the following: a. Team members' skill level; b. Team members' abilities; c. Equipment needed; and d. Material needed; 2. Lays out the equipment, as needed; 3. Communicates the tasks to be completed to those individuals who are to perform the tasks, including the: a. Task to be performed; b. Expected time to complete the task; c. Equipment and material to be used; d. Safety and hazard information; e. Standards used to determine if the task was performed satisfactorily; 4. Motivates team members; and 5. Checks on work status on a regular basis, including: a. The use of safety equipment; b. Work completion; c. Timeliness of repairs and maintenance; d. Satisfactory completion or progress of task; and e. Adaptations as needed to accomplish unplanned repairs.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
17.1.D	Application of leadership and team working skills	Knowledge and ability to apply decision making techniques	On board a vessel or in approved training, during a fire or emergency simulation,	the candidate supervises an emergency team.	The candidate: 1. Briefs the team on the situation, the approach to remedying the simulated emergency, and the procedures to be executed; 2. Delegates tasks to each of the assigned crewmembers, briefing them about any special procedures or events that may concern them; 3. Checks the assigned crewmembers to ensure that they are using personal protective equipment (PPE) correctly and appropriately; 4. Checks the assigned crewmembers to ensure that they have made available any equipment that will be needed to accomplish the assigned tasks, both team and individual; 5. Executes the generated plan to handle the emergency simulation; and 6. Participates in the post-simulation critique and presents the positive results of the simulation, the negative findings of the simulation, and makes recommendations to improve procedures, equipment availability, and personnel training.
18.1.A	Contribute to the safety of personnel and ship	Knowledge of personal survival techniques Knowledge of fire prevention and ability to fight and extinguish fires Knowledge of elementary first aid Knowledge of personal safety and social responsibilities	This competence and its associated KUPs are satisfied by successful completion of approved or accepted Basic Training or presents evidence of maintaining the standards of competence in Basic Training.		

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence in Section A-III/6 of the STCW Code. Use of these Guidelines is not mandatory and alternative means of achieving the competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

Record of Assessment

for

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

Candidate's Name	*Candidate's Signature*	*Mariner Reference No.*

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

NOTE TO QUALIFIED ASSESSOR(S): In performing your function as a qualified assessor, you may use your initials to indicate that you have personally witnessed the demonstration of skill or ability by the person being assessed. The Assessment Guidelines in Enclosure (2) will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/6 of the STCW Code. The use of these Assessment Guidelines is not mandatory and alternative means of having achieved the standards of competence in the STCW Code will be considered. In accordance with 46 CFR 11.301(a)(1)(i), alternative Assessment Guidelines must be approved by the National Maritime Center before use.

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Monitor the operation of electrical, electronic and control systems	Basic understanding and knowledge of the operation of mechanical engineering including prime movers including main propulsion plant	1.1.A	Monitor electrical, electronic, and control systems related to diesel, steam, or gas turbine propulsion		
		1.1.B	Monitor electrical, electronic, and control systems related to turbo-electric propulsion		
	Basic understanding and knowledge of the operation of mechanical engineering systems including engine room auxiliary machinery	1.2.A	Monitor electrical, electronic, and control systems operations, related to auxiliary and ancillary machinery		
	Basic understanding and knowledge of the operation of mechanical engineering systems including steering systems	1.3.A	Monitor electrical, electronic, and control systems operations, related to steering systems		
	Basic understanding and knowledge of the operation of mechanical engineering systems including cargo handling systems	1.4.A	Monitor electrical, electronic, and control systems operations, related to cargo handling systems		
	Basic understanding and knowledge of the operation of mechanical engineering systems including deck machinery	1.5.A	Monitor electrical, electronic, and control systems operations, related to deck machinery		
	Basic understanding and knowledge of the operation of mechanical engineering systems including hotel systems	1.6.A	Monitor electrical, electronic, and control systems operations, related to hotel systems		
	Basic understanding and knowledge of the operation of mechanical engineering systems	1.7.A	Monitor electrical, electronic, and control systems operations, related to bridge navigation equipment and systems		
	Knowledge of hazards and precautions required for operation of power systems above 1,000 volts	1.8.A	Monitor electrical, electronic, and control systems operations, related to high voltage power systems		

Candidate's Name _____ *Candidate's Mariner Reference No.* _____

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Monitor operation of automatic control systems of propulsion and auxiliary machinery	Preparation of control systems of propulsion and auxiliary machinery for operation	2.1.A	Surveillance of the main propulsion and auxiliary machinery control systems		
Operate generators and distribution systems	Coupling, load sharing, and changing over generators.	3.1.A	Operation of electrical generation and distribution systems		
	Coupling and breaking connection between switchboards and distribution panels	3.1.B	Operation of electrical distribution control systems		
Operate and maintain power systems in excess of 1,000 volts	Theoretical knowledge of high-voltage technology and safety precautions and procedures	4.1.A	Describe the technology and safety precautions of a high-voltage power system		
	Theoretical knowledge of electrical propulsion, electric motors and control systems	4.1.B	Describe the operation of a high-voltage main propulsion power system		
		4.1.C	Operation and maintenance of high-voltage systems		
Operate computers and computer networks on ships	Understanding of main features of data processing; construction and use of computer networks on ships; and bridge based, Engine room based and commercial computer use	5.1.A	Data processing, computer networks and specialized applications of computer use onboard ships		
Use English in written and oral form	Adequate knowledge of the English language, in written forms and oral forms to enable the officer to use engineering publications and to perform officer's duties	6.1.A	Use and understand the English language in performance of shipboard duties		
Use internal communication systems	Operation of all internal communication components and systems on board	7.1.A	Operate shipboard communications components and systems		
Maintenance and repair of electrical and electronic equipment	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	8.1.A	Safety procedures performed on electrical machinery and equipment prior to, during and after maintenance operations		

Candidate's Name *Candidate's Mariner Reference No.*

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Maintenance and repair of electrical and electronic equipment	Maintenance and repair of AC electrical systems equipment, switchboards, electric motors, generators, and DC electrical systems, equipment and motors	8.2.A	Safe use of tools and instruments related to the maintenance and repair of electrical and electronic equipment		
		8.2.B	Dismantle, inspect, repair, and reassemble electronic equipment		
		8.2.C	Electronic equipment testing procedures		
	Detection of electrical malfunctions, location of faults, and measures to prevent damage	8.3.A	Troubleshooting and fault detection		
	Construction and operation of electrical testing and measuring equipment	8.4.A	Use of electrical testing and measuring equipment		
	Function and performance tests of monitoring systems; automatic control devices; and protective devices	8.5.A	Test automatic control, parameter measuring, and system protective devices		
	The interpretation of schematics and electronic diagrams	8.6.A	Interpret electrical schematics, and electronic controls and logic diagrams		
Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery	Appropriate electrical and mechanical knowledge and skills Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant equipment	9.1.A	Procedures prior to work and during maintenance and repair of automation and control systems of main propulsion and auxiliary machinery and equipment		
	Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	9.2.A	Troubleshooting, fault location and actions for repair of automation and control systems for main propulsion and auxiliary machinery equipment		

Candidate's Name _____ *Candidate's Mariner Reference No.* _____

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Maintenance and repair of bridge navigation equipment and ship communication systems	Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems Knowledge of electrical and electronic systems operating in flammable areas	10.1.A	Operation and maintenance of bridge communication and navigational equipment.		
	Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage	10.2.A	Fault detection and isolation, dismantling, and reassembly of navigation and communication systems equipment.		
Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo handling equipment	Appropriate electrical and mechanical knowledge and skills Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	11.1.A	Maintain and repair automation and control systems of deck and cargo handling machinery		
Maintenance and repair of control and safety systems of hotel equipment.	*Theoretical knowledge of* electrical and electronic systems operating in flammable areas Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage	12.1.A	Maintain and repair automation and control systems of hotel equipment		

Candidate's Name *Candidate's Mariner Reference No.*

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Ensure compliance with pollution prevention requirements	Knowledge of the precautions to be taken to prevent pollution of the marine environment	13.1.A	Precautions to be taken to prevent pollution of the marine environment		
	Anti-pollution procedures and all associated equipment	13.1.B	Anti-pollution procedures and all associated equipment		
	Importance of proactive measures to protect the marine environment	13.1.C	Pollution prevention procedures and equipment		
Prevent, control and fight fire on board	Fire prevention and fire fighting appliances. Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire fighting systems Actions to be taken in the event of a fire, including fires involving oil systems	14.1.A	Firefighting	COURSE	
Operate 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 equipment, including radio life saving appliances, satellite EPIRBS, SARTs, immersion suits, and thermal protective aids	15.1.A	Life-saving	COURSE	
Apply medical first aid on board ship	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	16.1.A	Medical First Aid	COURSE	
Application of leadership and team working skills	Working knowledge of shipboard personnel management and training	17.1.A	Duties and responsibilities of vessel personnel		
	Ability to apply task and workload management	17.1.B	Generate a work plan.		
	Knowledge and ability to apply effective resource management	17.1.C	Execute a work plan		
	Knowledge and ability to apply decision making techniques	17.1.D	Supervise an emergency team		

Candidate's Name *Candidate's Mariner Reference No.*

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

STCW Competence	Knowledge, Understanding, and Proficiency	Task No.	Task	Assessor's Initials	Date
Contribute to the safety of personnel and ship	Knowledge of personal survival techniques Knowledge of fire prevention and ability to fight and extinguish fires Knowledge of elementary first aid Knowledge of personal safety and social responsibilities	18.1.A	Basic training	COURSE	

Candidate's Name

Candidate's Mariner Reference No.

RECORD OF ASSESSMENT

Electro-Technical Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More

Qualified Assessors (QAs) witnessing the successful demonstrations noted in this record should provide the information below relative to their service with the candidate. Prospective QAs should have at least 1 year of experience as Chief Engineer or Second Engineer Officer (national First Assistant Engineer) on seagoing vessels of at least 750 kW (1,000 HP). For assessments signed on a military vessel, the assessor should have experience as Chief Engineering Officer on seagoing vessels of at least 750 kW/1,000 HP or more. Military assessors should only conduct assessments that are within their personal experience and are relevant to the vessel on which they are conducted. After December 31, 2021, QAs must be approved by the National Maritime Center (46 CFR 10.107). Qualified military personnel will not need to be approved as QAs and may continue to sign assessments on military vessels after December 31, 2021.

Vessel Name and Propulsion Mode	Propulsion Power	Dates of Service		Assessor Name	Assessor Signature	Sample Assessor Initials	Assessor Mariner Reference No.	Assessor Shipboard Position
		From	To					
M/V Handy Boy Motor	9,876 HP	7/7/2018	11/14/2018	Ignatius J. Reilly	Ignatius J. Reilly	IJR	1234567	Chief Engineer

Print Name of Candidate

Candidate's Mariner Reference No.

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 pf 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 III
Standards regarding the engine department

Regulation III/6
Mandatory minimum requirements for certification of electro-technical officers

1 Every electro-technical officer serving on a seagoing ship powered by main propulsion machinery of 750 kW propulsion power or more shall hold a certificate of competency.

2 Every candidate for certification shall:

.1 be not less than 18 years of age;

.2 have completed not less than 12 months of combined workshop skills training and approved seagoing service of which not less than 6 months shall be seagoing service as part of an approved training programme which meets the requirements of section A-III/6 of the STCW Code and is documented in an approved training record book, or otherwise not less than 36 months of combined workshop skills training and approved seagoing service of which not less than 30 months shall be seagoing service in the engine department;

.3 have completed approved education and training and meet the standard of competence specified in section A-III/6 of the STCW Code; and

.4 meet the standard of competence specified in section A-VI/1, paragraph 2, section A-VI/2, paragraphs 1 to 4, section A-VI/3, paragraphs 1 to 4 and section A-VI/4, paragraphs 1 to 3 of the STCW Code.

3 Every Party shall compare the standard of competence which it required of electro-technical officers for certificates issued before 1 January 2012 with those specified for the certificate in section A-III/6 of the STCW Code, and shall determine the need for requiring those personnel to update their qualifications.

4 Seafarers may be considered by the Party to have met the requirements of this regulation if they have served in a relevant capacity on board a ship for a period of not less than 12 months within the last 60 months preceding the entry into force of this regulation for that Party and meet the standard of competence specified in section A-III/6 of the STCW Code.

5 Notwithstanding the above requirements of paragraph 1 to 4, a suitably qualified person may be considered by a Party to be able to perform certain functions of section A-III/6.

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.

[*] 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.

* * * * *

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[*]

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.

Chapter III

Standards regarding the engine department

Section A-III/6

Mandatory minimum requirements for certification of electro-technical officers

Training

1 The education and training required by paragraph 2.3 of regulation III/6 shall include training in electronic and electrical workshop skills relevant to the duties of electro-technical officer.

[*] 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.

Onboard training

2 Every candidate for certification as electro-technical officer 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 electro-technical officer;

.2 is closely supervised and monitored by qualified and certificated officers 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 electro-technical officer shall be required to demonstrate the ability to undertake the tasks, duties and responsibilities listed in column 1 of table A-III/6.

4 The minimum knowledge, understanding and proficiency required for certification is listed in column 2 of table A-III/6 and it shall take into account the guidance given in part B of this Code.

5 Every candidate for certification shall be required to provide evidence of having achieved the required standard of competence tabulated in columns 3 and 4 of table A-III/6.

Table A-III/6

Specification of minimum standard of competence for electro-technical officers

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

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Monitor the operation of electrical, electronic and control systems	Basic understanding of the operation of mechanical engineering systems, including: .1 prime movers, including main propulsion plant .2 engine-room auxiliary machinery .3 steering systems .4 cargo handling systems .5 deck machinery .6 hotel systems Basic knowledge of heat transmission, mechanics and hydromechanics *Knowledge of:* Electro-technology and electrical machines theory Fundamentals of electronics and power electronics Electrical power distribution boards and electrical equipment Fundamentals of automation, automatic control systems and technology	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, where appropriate .4 approved laboratory equipment training	Operation of equipment and system is in accordance with operating manuals Performance levels are in accordance with technical specifications

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Monitor the operation of electrical, electronic and control systems (*continued*)	Instrumentation, alarm and monitoring systems Electrical drives Technology of electrical materials Electro-hydraulic and electro-pneumatic control systems Appreciation of the hazards and precautions required for the operation of power systems above 1,000 volts		
Monitor the operation of automatic control systems of propulsion and auxiliary machinery	Preparation of control systems of propulsion and auxiliary machinery for operation	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, where appropriate .4 approved laboratory equipment training	Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation condition
Operate generators and distribution systems	Coupling, load sharing and changing over generators Coupling and breaking connection between switchboards and distribution panels	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, where appropriate .4 approved laboratory equipment training	Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations Electrical distribution systems can be understood and explained with drawings/instructions

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Operate and maintain power systems in excess of 1,000 volts	*Theoretical knowledge* High-voltage technology Safety precautions and procedures Electrical propulsion of the ships, electrical motors and control systems *Practical knowledge* Safe operation and maintenance of high-voltage systems, including knowledge of the special technical type of high-voltage systems and the danger resulting from operational voltage of more than 1,000 volts	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, where appropriate .4 approved laboratory equipment training	Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations
Operate computers and computer networks on ships	Understanding of: .1 main features of data processing .2 construction and use of computer networks on ships .3 bridge-based, engine-room-based and commercial computer use	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, where appropriate .4 approved laboratory equipment training	Computer networks and computers are correctly checked and handled
Use English in written and oral form	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform the officer's duties	Examination and assessment of evidence obtained from practical instructions	English language publications relevant to the officer's duties are correctly interpreted Communications are clear and understood

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Use internal communication systems	Operation of all internal communication systems on board	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, where appropriate .4 approved laboratory equipment training	Transmission and reception of messages are consistently successful Communication records are complete, accurate and comply with statutory requirements

Function: Maintenance and repair at the operational level

Column 1 **Competence**	Column 2 **Knowledge, understanding and proficiency**	Column 3 **Methods for demonstrating competence**	Column 4 **Criteria for evaluating competence**
Maintenance and repair of electrical and electronic equipment	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 Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment Detection of electric malfunction, location of faults and measures to prevent damage Construction and operation of electrical testing and measuring equipment Function and performance tests of the following equipment and their configuration: .1 monitoring systems .2 automatic control devices .3 protective devices The interpretation of electrical and electronic diagrams	Examination and assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests .3 approved in-service experience .4 approved training ship experience	Safety measures for working are appropriate Selection and use of hand tools, measuring instruments, and testing equipment are appropriate and interpretation of results is accurate Dismantling, inspecting, repairing and reassembling equipment are in accordance with manuals and good practice Reassembling and performance testing is in accordance with manuals and good practice
Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery	Appropriate electrical and mechanical knowledge and skills *Safety and emergency procedures*	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience	The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
	Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	.2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Isolation, dismantling and reassembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions and legislative and safety specifications. Action taken leads to the restoration of automation and control systems by the method most suitable and appropriate to the prevailing circumstances and conditions
Maintenance and repair of bridge navigation equipment and ship communication systems	Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems *Theoretical knowledge:* Electrical and electronic systems operating in flammable areas *Practical knowledge:* Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage		The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of bridge navigation equipment and ship communication systems by the method most suitable and appropriate to the prevailing circumstances and conditions

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo-handling equipment	Appropriate electrical and mechanical knowledge and skills *Safety and emergency procedures* Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment Practical knowledge for the testing, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition	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, where appropriate .4 approved laboratory equipment training	The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of deck machinery and cargo-handling equipment by the method most suitable and appropriate to the prevailing circumstances and conditions
Maintenance and repair of control and safety systems of hotel equipment	*Theoretical knowledge:* Electrical and electronic systems operating in flammable areas *Practical knowledge:* Carrying out safe maintenance and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage		The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of control and safety systems of hotel equipment by the method most suitable and appropriate to the prevailing circumstances and conditions

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

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Ensure compliance with pollution-prevention requirements	*Prevention of pollution of the marine environment* Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measures to protect the marine 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 training	Procedures for monitoring shipboard operations and ensuring compliance with pollution-prevention requirements are fully observed Actions to ensure that a positive environmental reputation is maintained
Prevent, control and fight fire on board	*Fire prevention and fire-fighting appliances* Ability to organize fire drills Knowledge of classes and chemistry of fire Knowledge of fire-fighting systems Action to be taken in the event of fire, including fires involving oil systems	Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3, paragraphs 1 to 3	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly 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

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Operate life-saving appliances	*Life-saving* 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	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding 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	*Medical aid* 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
Application of leadership and teamworking skills	Working knowledge of shipboard personnel management and training 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.

Column 1	Column 2	Column 3	Column 4
Competence	**Knowledge, understanding and proficiency**	**Methods for demonstrating competence**	**Criteria for evaluating competence**
Application of leadership and teamworking skills *(continued)*	Knowledge and ability to apply effective resource management: .1 allocation, assignment, and prioritization of resources .2 effective communication on board and ashore .3 decisions reflect consideration of team experiences 4 assertiveness and leadership, including motivation .5 obtaining and maintaining situational awareness Knowledge and ability to apply decision-making techniques: .1 Situation and risk assessment .2 Identify and consider generated options .3 Selecting course of action .4 Evaluation of outcome effectiveness		Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks Communication is clearly and unambiguously given and received Effective leadership behaviours are demonstrated Necessary team member(s) share accurate understanding of current and predicted vessel state and operational status and external environment Decisions are most effective for the situation
Contribute to the safety of personnel and ship	Knowledge of personal survival techniques Knowledge of fire prevention and ability to fight and extinguish fires Knowledge of elementary first aid Knowledge of personal safety and social responsibilities	Assessment of evidence obtained from approved training and experience as set out in section A-VI/1, paragraph 2	Appropriate safety and protective equipment is correctly used Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times Procedures designed to safeguard the environment are observed at all times Initial and follow-up actions on becoming aware of an emergency conform with established emergency response procedures

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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Section B-I/12

Guidance regarding the use of simulators

1 When simulators are being used for training or assessment of competency, the following guidelines should be taken into consideration in conducting any such training or assessment.

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

Recommended performance standards for non-mandatory types of simulation

67 Performance standards for non-mandatory simulation equipment used for training and/or assessment of competence or demonstration of skills are set out hereunder. Such forms of simulation include, but are not limited to, the following types:

.1 navigation and watchkeeping;

.2 ship handling and manoeuvring;

.3 cargo handling and stowage;

.4 reporting and radiocommunications; and

.5 main and auxiliary machinery operation.

*** * * * ***

Main and auxiliary machinery operation simulation

73 Engine-room simulation equipment should be capable of simulating a main and auxiliary machinery system and incorporate facilities to:

.1 create a real-time environment for seagoing and harbour operations, with communication devices and simulation of appropriate main and auxiliary propulsion machinery equipment and control panels;

.2 simulate relevant sub-systems that should include, but not be restricted to, boiler, steering gear, electrical power general and distribution systems, including emergency power supplies, and fuel, cooling water, refrigeration, bilge and ballast systems;

.3 monitor and evaluate engine performance and remote sensing systems;

.4 simulate machinery malfunctions;

.5 allow for the variable external conditions to be changed so as to influence the simulated operations: weather, ship's draught, seawater and air temperatures;

.6 allow for instructor-controlled external conditions to be changed: deck steam, accommodation steam, deck air, ice conditions, deck cranes, heavy power, bow thrust, ship load;

.7 allow for instructor-controlled simulator dynamics to be changed: emergency run, process responses, ship responses; and

.8 provide a facility to isolate certain processes, such as speed, electrical system, diesel oil system, lubricating oil system, heavy oil system, seawater system, steam system, exhaust boiler and turbo generator, for performing specific training tasks.[*]

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

Chapter III

Guidance regarding the engine department

Section B-III/6

Guidance regarding training and certification for electro-technical officers

In addition to the requirements stated in table A-III/6 of this Code, Parties are encouraged to take into account resolution A.702(17) concerning radio maintenance guidelines for the Global Maritime Distress and Safety System (GMDSS) within their training programmes.