

Assessment Guidelines for Chief Engineer Officer and Second Engineer Officer on Vessels Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More and Less Than 3,000 kW / 4,000 HP Propulsion Power

Standard of Competence

Mariners who began training or service for endorsements as Chief Engineer Officer (CEO) and Second Engineer Officer (2EO) on Ships Powered by Main Propulsion Machinery of 750 kW/1,000 HP or More and Less Than 3,000 kW/4,000 HP Propulsion Power before March 24, 2014, will not be required to provide assessments until January 1, 2017. Mariners who began the service or training for their endorsement after March 24, 2014, must provide evidence of meeting the standard of competence specified in Section A-III/2 of the STCW Code by completion of the assessments in this enclosure, or an approved equivalent alternative. After December 31, 2016, all mariners must meet the standards of competence in Section A-III/3 and Table A-III/3 of the STCW Code (46 CFR 11.331 and 11.333). The table below is adopted from Table A-III/3 of the STCW Code (found in Enclosure (4)) to assist the candidate and assessor in the demonstration of competency.

Practical Demonstrations of Skills

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, 2016, 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)). In the interim, the Coast Guard will accept assessments signed by mariners who hold an appropriate national endorsement and 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). After December 31, 2016, QAs must be approved by the National Maritime Center (46 CFR 10.405).

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/3 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 Assessment Guidelines must be approved by the National Maritime Center before use.

Notes

The following notes are used in the “Task No.” column of the assessment table that follows:

- All* The assessment is required for all propulsion modes.
- Motor* The assessment is required for an endorsement valid for motor propelled vessels.
- Steam* The assessment is required for an endorsement valid for steam propelled vessels.
- GT* The assessment is required for an endorsement valid for gas turbine propelled vessels.

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Assessment Guidelines for Chief Engineer Officer and Second Engineer Officer on Vessels Powered by Main Propulsion Machinery of Between 750 kW / 1,000 HP and 3,000 kW / 4,000 HP Propulsion Power

Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.1.A <i>Motor</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Diesel Engine Propulsion Plant	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be prepared for service.	The candidate directs that the main propulsion plant be made ready for seagoing operations by: <ol style="list-style-type: none"> 1. Operating auxiliary machinery within manufacturer's specifications; 2. Contacting the bridge watch officer and arranging for the testing of steering gear and main engine; 3. Testing the main propulsion engine(s) for proper start and direction. 4. Performing pre-operational checks with satisfactory results; 5. Transferring control of the propulsion engines to the Bridge (if fitted for Bridge control); 6. Preparing the plant for start-up using the most appropriate methods and in accordance with manufacturer specifications; 7. Ensuring that propulsion plant performance is verified and checked in relation to bridge commands and technical specifications; and 8. Complying with international and domestic regulatory requirements.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/3 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 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 <i>Motor</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Diesel Engine Propulsion Plant	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated in maneuvering mode.	The candidate directs that the main propulsion plant maneuvering operations to be performed as directed by the Bridge, including: 1. Operating auxiliary machinery within acceptable limits and parameters; 2. Ensuring that the main propulsion engine(s) react properly to requests for changes in speed and direction; 3. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications; and 4. Plant performance is verified and checked for adherence to bridge commands and technical specifications.
1.1.C <i>Motor</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Diesel Engine Propulsion Plant	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated at full sea speed.	The candidate directs the main propulsion plant to be brought to full sea speed operations, including: 1. Ensuring that the main propulsion engine(s) speed is increased at a rate in accordance with manufacturer's specifications upon receiving direction from the Bridge Watch Officer; 2. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications; 3. Ancillary equipment such as distillers are brought on line in accordance with manufacturer's directions and operational requirements; and 4. Propulsion plant performance is verified and checked in relation to bridge commands and technical specifications.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/3 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 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.D <i>Motor</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Diesel Engine Propulsion Plant	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be prepared for shutdown and secured.	The candidate directs the main propulsion plant to be secured from seagoing or maneuvering operations to port operations, including: <ol style="list-style-type: none"> 1. Transferring engine control to the engine room upon the Bridge's signal for Finished With Engines (FWE); 2. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications for port operations; 3. Main propulsion machinery is secured safely in accordance with manufacturer's instructions and company procedures; 4. Ancillary and auxiliary equipment are secured in accordance with manufacturer's directions and operational requirements; and 5. Preparing the plant for shut-down using the most appropriate methods and in accordance with manufacturer specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.2.A <i>Steam</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Steam Propulsion Plant	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be prepared for service.	The candidate directs that the main propulsion plant be made ready for seagoing operations, including: <ol style="list-style-type: none"> 1. Main boiler(s) have the appropriate firing capabilities and are at recommended temperature(s) and pressure(s); 2. Operating auxiliary machinery is within manufacturer's specifications; 3. Contacting the Bridge Watch Officer and arranging for the testing of gear and the main engine; 4. Testing the main propulsion engine(s) for proper start and direction. 5. Performing pre-operational checks with satisfactory results; 6. Transferring control of the propulsion engines to the Bridge (if fitted for bridge control); 7. Preparing the plant for start-up using the most appropriate methods and in accordance with manufacturer specifications; 8. Ensuring that propulsion plant performance is verified and checked in relation to bridge commands and technical specifications; and 9. Complying with international and domestic regulatory requirements.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/3 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 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.B <i>Steam</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Steam Propulsion Plant	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated in maneuvering mode.	The candidate directs that the main propulsion plant maneuvering operations be performed as directed by the Bridge, including: <ol style="list-style-type: none"> 1. Operating auxiliary machinery within acceptable limits and parameters; 2. Ensuring that the main propulsion engine(s) react properly to requests for changes in speed and direction; 3. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications; 4. Main boiler(s) operating pressure(s) and water level(s) are maintained within recommended operational limits; and 5. Ensuring that propulsion plant performance is verified and checked for adherence to bridge commands and technical specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.2.C <i>Steam</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Steam Propulsion Plant	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated at full sea speed.	The candidate directs that the main propulsion plant to be brought to full sea speed operations, including: <ol style="list-style-type: none"> 1. Operating the main boiler(s) at the appropriate firing rate(s), pressure(s), and efficiency as required by operational necessity; 2. Ensuring that the main propulsion engine(s) speed is/are increased at a rate in accordance with manufacturer's specifications upon receiving direction from the Bridge Watch Officer; 3. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications; 4. Ancillary equipment such as distillers are brought on line in accordance with manufacturer's directions and operational requirements; and 5. Ensuring that propulsion plant performance is verified and checked for adherence to bridge commands and technical specifications.

Successful completion of these Assessment Guidelines will provide satisfactory evidence of meeting the standard of competence specified in Section A-III/3 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 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.D <i>Steam</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Marine Steam Propulsion Plant	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be prepared for shutdown and secured.	The candidate directs that the main propulsion plant be secured from seagoing or maneuvering operations to port operations, including: <ol style="list-style-type: none"> 1. Operating the main boiler(s) at the appropriate firing rate(s), pressure(s), and efficiency as required by operational necessity; 2. Transferring engine control to the engine room upon Bridge signal for FWE; 3. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications for port operations; 4. Securing main propulsion machinery safely in accordance with manufacturer's instructions and company protocols; and 5. Securing ancillary and auxiliary equipment in accordance with manufacturer's directions and operational requirements.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.3.A <i>GT</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Gas Turbine Propulsion Plant	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be prepared for service.	The candidate directs that the main propulsion plant be made ready for seagoing operations by: <ol style="list-style-type: none"> 1. Operating auxiliary machinery within manufacturer's specifications; 2. Contacting the Bridge Watch Officer and arranging for the testing of gear and the main engine; 3. Testing the main propulsion engine(s) for proper start and direction; 4. Performing pre-operational checks with satisfactory results; 5. Transferring control of the propulsion engines to the Bridge (if fitted for bridge control); 6. Preparing the plant for start-up using the most appropriate methods and in accordance with manufacturer specifications 7. Ensuring that propulsion plant performance is verified and checked for adherence to Bridge commands and technical specifications; and 8. Complying with international and domestic regulatory requirements.

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1.3.B <i>GT</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Gas Turbine Propulsion Plant	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated in maneuvering mode.	The candidate directs that main propulsion plant maneuvering operations be performed as directed by the Bridge, including: <ol style="list-style-type: none"> 1. Operating auxiliary machinery within acceptable limits and parameters; 2. Ensuring that the main propulsion engine(s) react properly to requests for changes in speed and direction; 3. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications ensuring plant performance is verified; and 4. Plant performance is verified and checked in relation to bridge commands and technical specifications.
1.3.C <i>GT</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Gas Turbine Propulsion Plant	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant be operated at full sea speed.	The candidate directs that the main propulsion plant be brought to full sea speed operations, including ensuring that: <ol style="list-style-type: none"> 1. Main propulsion engine(s) speed is/are increased at a rate in accordance with manufacturer's specifications upon receiving direction from the Bridge Watch Officer; 2. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications; 3. Ancillary equipment such as distillers are brought on line in accordance with manufacturer's directions and operational requirements; and 4. Propulsion plant performance is verified and checked in relation to bridge commands and technical specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
1.3.D <i>GT</i>	Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries: Gas Turbine Propulsion Plant	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates the management of operations by directing the engineering plant prepared for shutdown and secured.	The candidate directs that the main propulsion plant be secured from seagoing or maneuvering operations to port operations by: <ol style="list-style-type: none"> 1. Transferring engine control to the engine room upon Bridge's signal for FWE; 2. Temperatures, pressures, flows, and other measured operating parameters are within manufacturer's specifications for port operations; 3. Securing main propulsion machinery safely in accordance with manufacturer's instructions and company protocols; 4. Securing ancillary and auxiliary equipment in accordance with manufacturer's directions and operational requirements; and 5. Preparing the plant for shut-down using the most appropriate methods and in accordance with manufacturer specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
2.1.A <i>All</i>	Plan and schedule operations	Thermodynamics and heat transmission Mechanics and hydromechanics Propulsive characteristics of diesel engines, steam and gas turbines, including speed, output and fuel consumption Heat cycle, thermal efficiency and heat balance of the following: .1 Marine diesel engine .2 Marine steam turbine .3 Marine gas turbine .4 Marine steam boiler Refrigerators and refrigeration cycle Physical and chemical properties of fuels and lubricants Technology of materials Naval architecture and ship construction, including damage control	On a vessel powered by main propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate demonstrates planning and preparation of operations suited to the design parameters of the power installation and to the requirements of the voyage.	The candidate creates a plan and schedule for vessel operations, including: <ol style="list-style-type: none"> 1. Plant Operations: <ul style="list-style-type: none"> • Maneuvering; • Arrival; • Departure; and 2. Bunkering Operations: <ul style="list-style-type: none"> • Pre-Bunker Preparations; • Loading Plan; • Securing; and 3. Port Stay: <ul style="list-style-type: none"> • Scheduled Maintenance; and • Watch Functions; and 4. Voyage Calculations: <ul style="list-style-type: none"> • Fuel consumption; • FOB; • Fuel Order; • Propeller slip; and 5. Engine Room Emergency Drills: <ul style="list-style-type: none"> • Blackout; • Fire; • Man Down; and • Damage Control; and 6. FO and LO Sampling and Testing: <ul style="list-style-type: none"> • Viscosity; • Density; • Water Content; and • Ph.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.1.A <i>Motor</i>	Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p>Start up and shut down main propulsion and auxiliary machinery, including associated systems</p> <p>Operating limits of propulsion plant</p> <p>The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</p> <p>Functions and mechanism of automatic control for main engine</p>	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate uses methods of measuring and calculating propulsion plant load and heat distribution that are the most appropriate and in accordance with manufacturer specifications.	<p>The candidate directs the operations of the propulsion plant so that performance levels and plant loads are maintained within specified ranges, operating parameters and manufacturer prescribed limits by:</p> <ol style="list-style-type: none"> 1. Evaluating all propulsion plant operating parameters against recommended levels and adjusting plant operations to ensure they remain within recommended ranges and technical specifications; 2. Ensuring that the execution and recording of propulsion plant performance analysis and determining the immediate condition of the propulsion system and leads to the most efficient operation possible; 3. Measuring and calculating plant loads, heat distribution and heat transfer efficiency; 4. Monitoring the main propulsion plant operating parameters sufficient to maintain safe operating conditions; and 5. Ensuring that performance levels are within recommended operating parameters and technical specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.2.A <i>Steam</i>	Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p>Start up and shut down main propulsion and auxiliary machinery, including associated systems</p> <p>Operating limits of propulsion plant</p> <p>The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</p> <p>Functions and mechanism of automatic control for main engine</p>	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate uses methods of measuring and calculating propulsion plant load and heat distribution that are the most appropriate and in accordance with manufacturer specifications.	<p>The candidate directs the operations of the propulsion plant so that performance levels and plant loads are maintained within specified ranges, operating parameters and manufacturer prescribed limits by:</p> <ol style="list-style-type: none"> 1. Evaluating propulsion plant operating parameters against recommended levels and adjusting plant operations to ensure they remain within recommended ranges and technical specifications; 2. Ensuring that the execution and recording of propulsion plant performance analysis and determining the immediate condition of the propulsion system and leads to the most efficient operation possible; 3. Measuring and calculating plant loads, heat distribution and heat transfer efficiency; 4. Monitoring the main propulsion plant operating parameters is sufficient to maintain safe operating conditions; and 5. Ensuring that performance levels are within recommended operating parameters and technical specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.3.A <i>GT</i>	Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p>Start up and shut down main propulsion and auxiliary machinery, including associated systems</p> <p>Operating limits of propulsion plant</p> <p>The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</p> <p>Functions and mechanism of automatic control for main engine</p>	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate uses methods of measuring and calculating propulsion plant load and heat distribution that are the most appropriate and in accordance with manufacturer specifications.	<p>The candidate directs the operations of the propulsion plant so that performance levels and plant loads are maintained within specified ranges, operating parameters and manufacturer prescribed limits by:</p> <ol style="list-style-type: none"> 1. Evaluating all propulsion plant operating parameters against recommended levels and adjusting plant operations to ensure they remain within recommended ranges and technical specifications; 2. Ensuring that the execution and recording of propulsion plant performance analysis and determining the immediate condition of the propulsion system and leads to the most efficient operation possible; 3. Measuring and calculating plant loads, heat distribution and heat transfer efficiency; 4. Monitoring the main propulsion plant operating parameters is sufficient to maintain safe operating conditions; and 5. Ensuring that performance levels are within recommended operating parameters and technical specifications.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.4.A <i>All</i>	Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p>Functions and mechanism of automatic control for auxiliary machinery including but not limited to:</p> <ol style="list-style-type: none"> .1 Generator distribution systems .2 Steam boilers .3 Oil purifier .4 Refrigeration system .5 Pumping and piping systems .6 Steering gear system .7 Cargo-handling equipment and deck machinery 	On a vessel powered by main propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions and systems, or during approved laboratory equipment training,	the candidate uses methods of measuring and calculating plant load and heat distribution that are the most appropriate and in accordance with manufacturer specifications.	<p>The candidate directs the operations of auxiliary and ancillary machinery and systems so that performance levels and plant loads are maintained within specified ranges, operating parameters and manufacturer prescribed limits by:</p> <ol style="list-style-type: none"> 1. Performing a thorough inspection and evaluation of all auxiliary and ancillary systems, machinery and equipment operations; and 2. Comparing operational data to manufacturer's recommended technical specifications and operational limits. <p>System operations should include:</p> <ol style="list-style-type: none"> 1. Electrical generation and distribution system and machinery; 2. Liquid centrifugal purification system and machinery; 3. Refrigeration systems and machinery; 4. Bilge and ballast transfer system and machinery; 5. Vessel steering system and machinery; 6. Cargo handling system and machinery; and 7. Auxiliary boiler and steam system and machinery.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
3.5.A <i>All</i>	Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p>The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery</p> <p>Functions and mechanism of automatic control for auxiliary machinery</p>	On a vessel powered by main propulsion machinery of 1,000 HP or more, or in an engineering laboratory using equipment commonly fitted aboard ship,	the candidate uses methods of measuring and calculating plant load and heat distribution that are the most appropriate and in accordance with manufacturer specifications.	<p>The candidate directs the operations of auxiliary and ancillary machinery and systems for hotel operations so that performance levels and plant loads are maintained within specified ranges, operating parameters and manufacturer prescribed limits by:</p> <ol style="list-style-type: none"> 1. Performing a thorough inspection and evaluation of all auxiliary and ancillary systems, machinery and equipment operations; and 2. Comparing operational data to manufacturer's recommended technical specifications and operational limits. <p>System operations should include:</p> <ol style="list-style-type: none"> 1. Fire fighting systems and equipment; 2. Accommodation heating; 3. Air conditioning and ventilation; 4. Sanitary systems and equipment; 5. Potable systems and equipment; 6. Sewage treatment systems and equipment; 7. Galley equipment, vent dampers; 8. Laundry equipment; 9. Communication systems and devices; and 10. Entertainment systems and equipment.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
4.1.A <i>All</i>	Manage fuel, lubrication and ballast operations	Operation and maintenance of machinery, including pumps and piping systems	On a vessel powered by main propulsion machinery of 1,000 HP or more, or a suitable liquid cargo simulator,	the candidate manages and directs the transfer of fuels, liquid lubricants in bulk and bilge and ballast water.	The candidate directs fuel and lubrication, ballast water, and bilge water transfer operations so as to ensure prevention of pollution of the marine environment, adhering to domestic and international laws, and meeting operational requirements.
5.1.A <i>Motor</i>	Manage the operation of electrical, electronic and control equipment	Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices Design features and system configurations of automatic control equipment and safety devices	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, instrumentation, and control devices, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course,	the candidate directs the operation of electrical and electronic equipment and systems relative to a diesel propulsion plant.	The candidate ensures that electrical, electronic and automatic instrumentation and control devices are operating within manufacturer's guidelines and technical specifications by testing: 1. Emergency action input devices for proper operation at appropriate set-points; 2. Remote and local controls for proper operation; and 3. Alarm functions and input devices for proper operation at appropriate set-points. Equipment used for this assessment should include: 1. Remote and local controls; 2. Automatic shutdowns; 3. Automatic slowdowns; 4. Starting permissives; 5. Override functions; and 6. Alarm functionality.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
5.1.B <i>Steam</i>	Manage the operation of electrical, electronic and control equipment	Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices Design features and system configurations of automatic control equipment and safety devices	On a vessel powered by steam propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, instrumentation, and control devices, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course,	the candidate directs the operation of electrical and electronic equipment and systems relative to a steam propulsion plant.	The candidate ensures electrical, electronic and automatic instrumentation and control devices are operating within manufacturer's guidelines and technical specifications by testing: 1. Emergency action input devices for proper operation at appropriate set-points; 2. All remote and local controls for proper operation; and 3. Alarm functions and input devices for proper operation at appropriate set-points. Equipment used for this assessment to include but not be limited to: 1. Remote and local controls; 2. Automatic shutdowns; 3. Burner management system; 4. Light-off permissives; 5. Override functions; and 6. Alarm functionality.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
5.1.C <i>GT</i>	Manage the operation of electrical, electronic and control equipment	<p>Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices</p> <p>Design features and system configurations of automatic control equipment and safety devices</p>	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, instrumentation, and control devices, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course,	The candidate directs the operation of electrical and electronic equipment and systems relative to a gas turbine propulsion plant.	<p>The candidate ensures electrical, electronic and automatic instrumentation and control devices are operating within manufacturer's guidelines and technical specifications by testing:</p> <ol style="list-style-type: none"> 1. Emergency action input devices for proper operation at appropriate set-points; 2. Remote and local controls for proper operation; and 3. Alarm functions and input devices for proper operation at appropriate set-points. <p>Equipment used for this assessment should include:</p> <ol style="list-style-type: none"> 1. Remote and local controls; 2. Automatic shutdowns; 3. Fuel supply and ignition sequencing; 4. Start permissives; 5. Override functions; and 6. Alarm functionality.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
5.1.D <i>All</i>	Manage the operation of electrical, electronic and control equipment	<p>Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices</p> <p>Design features and system configurations of automatic control equipment and safety devices</p>	On a vessel powered by main propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, instrumentation, and control devices, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course	the candidate directs the operation of electrical and electronic equipment and systems relative to power generation.	<p>The candidate ensures that electrical, electronic and automatic instrumentation and control devices for power generation, distribution and management systems are operating within manufacturer's guidelines and technical specifications by testing:</p> <ol style="list-style-type: none"> 1. Emergency action input devices for proper operation at appropriate set-points; 2. Remote and local controls for proper operation; and 3. Alarm functions and input devices for proper operation at appropriate set-points. <p>Equipment used for this assessment should include:</p> <ol style="list-style-type: none"> 1. Remote and local controls; 2. Automatic shutdowns; 3. Generator protection; 4. High voltage system equipment and controls; 5. Operating modes; 6. Power management functions; and 7. Alarm functionality.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
5.1.E <i>All</i>	Manage the operation of electrical, electronic and control equipment	Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices Design features and system configurations of automatic control equipment and safety devices	On a vessel powered by main propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, instrumentation, and control devices, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course,	the candidate directs the operation of electrical and electronic equipment relative to electro-hydraulic and electro-pneumatic control systems.	The candidate ensures that electrical, electronic and automatic instrumentation and control devices for electro-hydraulic and electro-pneumatic systems are operating within manufacturer's guidelines and technical specifications by testing: 1. Emergency action input devices for proper operation at appropriate set-points; 2. Remote and local controls for proper operation; and 3. Alarm functions and input devices for proper operation at appropriate set-points. Equipment used for this assessment should include: 1. Remote and local valve controls 2. Remote sensing instrumentation 3. Alarm functionality; and 4. Propulsion control equipment.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
6.1.A <i>All</i>	Manage troubleshooting, restoration of electrical and electronic control equipment to operating condition	<p>Troubleshooting of electrical and electronic control equipment</p> <p>Function test of electrical, electronic control equipment and safety devices</p> <p>Troubleshooting of monitoring systems</p> <p>Software version control</p>	On a vessel powered by main propulsion machinery of 1,000 HP or more, or as part of an approved course in a laboratory with electrical equipment capable of replicating the troubleshooting process, or in an approved <i>Management of Electrical and Electronic Control Equipment</i> course.	the candidate directs that personnel demonstrate safe working practices relative to shipboard electrical systems; and that test equipment and tools are properly selected, and that proper repair and maintenance procedures are implemented.	<p>The candidate:</p> <ol style="list-style-type: none"> 1. Troubleshoots electrical and electronic control equipment with the proper use of test equipment leading to the restoration of normal functionality; 2. Performs proper functionality tests on electrical, electronic control equipment and safety devices, as part of a troubleshooting procedure and restoration protocol; 3. Troubleshoots monitoring system and equipment with the proper use of test equipment leading to the restoration of normal functionality; and 4. Properly operates electrical, and electronic control equipment and safety devices for to computer application and software version control.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
7.1.A <i>Motor</i>	Manage safe and effective maintenance and repair procedures	Management techniques of maintenance and repair procedures related to main propulsion and auxiliary / ancillary machinery and equipment	On a vessel powered by diesel propulsion machinery of 1,000 HP or more, or in a laboratory, or on a simulator capable of replicating all maintenance and repair functions,	the candidate demonstrates the management of maintenance procedures by directing that engineering plant repairs are performed properly.	<p>The candidate ensures that the maintenance procedures employed on motor vessel propulsion and supporting auxiliary equipment are performed in the safest, most efficient way by:</p> <ol style="list-style-type: none"> 1. Utilizing instruction manuals and manufacturer publications related to repair and maintenance procedures; 2. Performing repairs in accordance with manufacturer's guidelines and technical specifications; and 3. Performing repairs using correct tools and spare parts. <p>Procedures for this assessment should include:</p> <ol style="list-style-type: none"> 1. Turbo charger maintenance; 2. Timing of fuel injection pumps; 3. Cylinder head appurtenance overhaul; 4. Intake / exhaust valve overhaul; 5. Working piston overhaul; and 6. Main bearing replacement.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
7.1.B <i>Steam</i>	Manage safe and effective maintenance and repair procedures	Management techniques of maintenance and repair procedures related to main propulsion and auxiliary / ancillary machinery and equipment	On a vessel powered by steam propulsion machinery of 1,000 HP or more, of in a laboratory, or on a simulator capable of replicating all maintenance and repair functions,	the candidate demonstrates the management of maintenance procedures by directing that engineering plant repairs are performed properly.	<p>The candidate ensures that the maintenance procedures employed on steam vessel propulsion and supporting auxiliary equipment are performed in the safest, most efficient way by:</p> <ol style="list-style-type: none"> 1. Utilizing instruction manuals and manufacturer publications related to repair and maintenance procedures; 2. Performing repairs in accordance with manufacturer's guidelines and technical specifications; and 3. Performing repairs using the correct tools and spare parts. <p>Procedures for this assessment should include:</p> <ol style="list-style-type: none"> 1. Burner maintenance 2. Firesides maintenance 3. Steam drum appurtenance overhaul 4. Water treatment 5. Reduction gear inspection 6. Axial position of the hp/lp turbines

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
7.1.C <i>GT</i>	Manage safe and effective maintenance and repair procedures	Management techniques of maintenance and repair procedures related to main propulsion and auxiliary / ancillary machinery and equipment	On a vessel powered by gas turbine propulsion machinery of 1,000 HP or more, in a laboratory, or on a simulator capable of replicating all maintenance and repair functions,	the candidate demonstrates the management of maintenance procedures by directing that engineering plant repairs are performed properly.	<p>The candidate ensures that the maintenance procedures employed on gas turbine vessel propulsion and supporting auxiliary equipment are performed in the safest, most efficient way by:</p> <ol style="list-style-type: none"> 1. Utilizing instruction manuals and manufacturer publications related to repair and maintenance procedures; 2. Performing repairs in accordance with manufacturer's guidelines and technical specifications; and 3. Performing repairs using the correct tools and spare parts. <p>Procedures for this assessment should include:</p> <ol style="list-style-type: none"> 1. Compressor borescope inspection 2. Turbine borescope inspection 3. Accessory gear box appurtenance overhaul 4. Main fuel control performance calculations or replacement 5. Variable stator vane positioner replacement 6. Demister cleaning / inspection

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
7.1.D <i>All</i>	Manage safe and effective maintenance and repair procedures	Planning maintenance, and repairs including statutory and class verifications	On a vessel powered by propulsion machinery of 1,000 HP or more, or in a laboratory and given technical specifications and manufacturer's manuals for shipboard equipment,	the candidate plans scheduled maintenance and corrective repairs while utilizing all available assets.	<p>The candidate plans and schedules maintenance procedures in accordance with technical specifications and operational requirements by:</p> <ol style="list-style-type: none"> 1. Identifying the appropriate statutory and classification requirement for each maintenance procedure performed.(if applicable); and 2. Developing a work plan describing the assets involved and steps performed to accomplish maintenance and repairs tasks leading to restored functionality of propulsion plant components. <p>The candidate's plan should include:</p> <ol style="list-style-type: none"> 1. Personnel; 2. Tools; 3. Spare parts / supplies; 4. Time; 5. Safety precautions / considerations; 6. Lock Out / Tag Out procedures; 7. Communications; 8. Restoration processes; and 9. System testing / verification.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
8.1.A <i>All</i>	Detect and identify the cause of machinery malfunctions and correct faults	Detection of machinery malfunction, location of faults and action to prevent damage Inspection and adjustment of equipment Non-destructive examination	On a vessel powered by main propulsion machinery of 1,000 HP or more, or an engine room simulator capable of replicating all propulsion plant functions, or from the assessment of evidence obtained from approved laboratory equipment training,	the candidate demonstrates methods to detect the abnormal operation of plant machinery, causes of the abnormalities and the actions taken to prevent damage	The candidate demonstrates the procedures utilized to detect, locate and prevent damage by faults and malfunctions of propulsion and auxiliary machinery associated with the relevant propulsion plants by: <ol style="list-style-type: none"> 1. Determining machinery malfunctions through comparison of machinery performance data to the standards associated with a specific operating scenario; 2. Using performance indicating and testing devices and equipment to locate faults in machinery operation; and 3. Performing the procedures necessary to prevent damage by machinery faults and malfunctions in accordance with manufacture guidelines and technical specifications.
9.1.A <i>All</i>	Ensure Safe Working Practices	Safe Working Practices	On a vessel powered by main propulsion machinery of 1,000 HP or more, in a laboratory, or on a simulator capable of replicating all maintenance and repair functions,	the candidate directs the use of safe working practices in all phases of maintenance, troubleshooting, and repair scenarios.	The candidate performs work practices safely and in compliance with all industry requirements, codes, permissions and environmental concerns, including identifying and describing: <ol style="list-style-type: none"> 1. Vessel permit requirements by reviewing preventive and scheduled maintenance lists; 2. Machinery preparation and isolation requirements as related to safe working practices; and 3. Maintenance procedures that inherently relate to environmental concerns and procedures.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
10.1.A <i>All</i>	Control trim, stability and stress	<p>Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability.</p> <p>Knowledge of the effect on trim and stability of a ship in the event of damage to, and consequent flooding of a compartment and countermeasures to be taken.</p> <p>Knowledge of IMO recommendations concerning ship's stability</p>	On a vessel powered by main propulsion machinery of 1,000 HP or more,	the candidate ensures that stability and stress conditions are maintained within safety limits at all times.	<p>The candidate directs engine department operations in order to maintain safe vessel trim, stability, and stress by:</p> <ol style="list-style-type: none"> 1. Providing before and after tank level measurements the bridge team; 2. Coordinates liquid transfers with the bridge team; 3. Locates of and records the maintenance and testing of watertight compartment doors; 4. Identifies possible vessel flooding countermeasure procedures and effects thereof; and 5. Complying with rules, regulations and codes pertinent to vessel stability and trim.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
11.1.A <i>All</i>	Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of the marine environment	<p>Knowledge of international maritime law in international agreements and conventions:</p> <p>Responsibilities under the relevant requirements of</p> <ul style="list-style-type: none"> • International Convention on Load Lines • International Convention for the Safety of Life at Sea, 1974 (SOLAS) • International Convention for the Prevention of Pollution from Ships (MARPOL) • Maritime Declarations of Health and Int'l Health Regulations • International Instruments Affecting the Safety of Ships, Passengers, Crew and Cargo • Methods and Aids to Prevent Pollution <p>Knowledge of National legislation for implementing international agreements and conventions</p>	In an approved <i>Leadership and Managerial Skills</i> course, or when asked by a Qualified Assessor on a vessel powered by main propulsion machinery of 1,000 HP or more,	the candidate describes the procedures for monitoring operations and maintenance to comply with legislative requirements; that potential non-compliance is promptly and fully identified; and that requirements for renewal and extension of certificates are acted upon to ensure continued validity of survey items and equipment	<p>The candidate identifies and describes compliance with domestic and international regulations, rules and conventions relative to safety, security and protection of the marine environment, including:</p> <ol style="list-style-type: none"> 1. Vessel operations and maintenance procedures relative to compliance with legislative requirements for safety of life at sea, vessel security, and protection of the marine environment; 2. Procedures to identify and eliminate potential non-compliance in a timely and efficient manner; and 3. Certificates and survey items that require renewal and requirements for the continued validity of each. <p>The candidate's description should include:</p> <ol style="list-style-type: none"> 1. International Convention of Load Lines; 2. SOLAS; 3. MARPOL; 4. STCW; 5. Maritime Declarations of Health; 6. ISM Code; 7. OPA 90; 8. U. S. Code; and 9. Code of Federal Regulations

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
12.1.A <i>All</i>	Maintain safety and security of the vessel, crew and passengers and the operational condition of lifesaving, firefighting and other safety systems	<p>A thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)</p> <p>Organization of fire and abandon ship drills</p> <p>Maintenance of operational condition of life-saving, firefighting and other safety systems</p> <p>Actions to be taken to protect and safeguard all persons on board in emergencies</p> <p>Actions to limit damage and salve the ship following fire, explosion, collision or grounding</p>	In an approved <i>Leadership and Managerial Skills</i> course, or when asked by a Qualified Assessor, or on a vessel powered by main propulsion machinery of 1,000 HP or more,	the candidate describes the procedures for monitoring fire detection and safety systems and ensures that all alarms are detected promptly and acted upon in accordance with established emergency procedures.	<p>The candidate's description includes:</p> <ol style="list-style-type: none"> 1. Identification of all shipboard emergency procedures applicable to maintaining safety and security; 2. Actions taken in response to fire detection and safety related alarms; 3. Inspecting all lifesaving, fire fighting, and emergency response equipment for correct operation; and 4. Maintenance and use of safety, security and life saving related equipment. <p>Equipment described should include:</p> <ol style="list-style-type: none"> 1. Two way vhf radios; 2. Survival craft engines and maintenance; 3. Onboard training and drills; 4. Emergency planning; 5. Fire and smoke monitoring apparatus'; 6. Alarm systems and equipment; 7. Fixed CO₂ and foam systems; 8. Damage control equipment; and 9. Firefighting equipment.

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
13.1.A <i>All</i>	Develop emergency and damage control plans and handle emergency situations	Ship construction, including damage control	On board a ship of at least 200 GRT or 500 GT or in a laboratory given a particulars for a vessel of at least 200 GRT or 500 GT,	The candidate develops a damage control plan in accordance with the established plans for emergency situations for damage control.	The candidate develops a damage control plan that includes: <ol style="list-style-type: none"> 1. Vessel construction; 2. Investigation procedures; 3. Dewatering equipment; 4. Shoring; 5. Pipe patching; 6. Bulkhead plugging; 7. Emergency hull repairs; and 8. Flooding countermeasures.
13.1.B <i>All</i>	Develop emergency and damage control plans and handle emergency situations	Methods and aids for fire prevention, detection and extinction	This KUP is demonstrated by successfully completing the approved or accepted <i>Advanced Fire Fighting</i> course specified in 46 CFR 11.303.		
13.1.C <i>All</i>	Develop emergency and damage control plans and handle emergency situations	Functions and use of lifesaving appliances	This KUP is demonstrated by successfully completing the approved or accepted <i>Advanced Fire Fighting</i> course specified in 46 CFR 11.303.		

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Task No.	STCW Competence	Knowledge, Understanding, and Proficiency	Performance Condition	Performance Behavior	Performance Standard
14.1.A <i>All</i>	Use of leadership and managerial skill	Knowledge of shipboard personnel management and training	This competence and associated KUPs are satisfied by successfully completing the approved or accepted <i>Leadership and Managerial Skills</i> course specified in 46 CFR 11.331 and 11.333.		

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