



JOB FAMILY CONCEPT

This family consists of seven levels of Marine Engineering work. Levels are distinguished based on complexity, level of supervision received, and the level of autonomy. Positions in the Marine job families are required to be at sea for long periods of time on ocean-going vessels and require a U.S. Coast Guard Merchant Marine Credential with the appropriate endorsements. This job family is distinguished from the Marine Deck and Steward families in that it is responsible for providing support in engineering, mechanical, and computer machinery and equipment on a vessel. It is distinguished from the Research Technician Family in that marine positions are primarily responsible for providing support for vessel operations rather than research. The Marine Engineering job family addresses responsibility for the following functions:

- Support engineering facilities and operations
- Perform maintenance and repair of vessel systems
- Stand watch
- Staff Supervision

Incumbents may perform one or more of these functions in support of a wide range of equivalent marine engineering activities.

This job family covers several functional areas of marine engineering support and ship operations including:

- Wiper
- Qualified Member of the Engine Department
- Qualified Member of the Engine Department with Electrical Rating
- Third Assistant Engineer
- Second Assistant Engineer
- First Assistant Engineer
- First Assistant Engineer/Relief Chief Engineer
- Chief Engineer

TYPICAL FUNCTIONS

[Note: A single position may involve one or more of the functions listed, and may include functions not listed.]

- Operate, troubleshoot and perform preventive/corrective maintenance and repair for a variety of mechanical machinery including main propulsion and auxiliary equipment including, but not limited to: Diesel engines, electrical components, control units, pumps, refrigeration units, pneumatics, hydraulic, HVAC, boilers, evaporators, fuel transfer pumps, sanitation devices, air compressor, crane/winch, and deck machinery.
- Plan, order, purchase, fabricate and maintain inventory of engineering equipment and supplies



- Follow vessel stability requirements by shifting fuel and ballast as needed.
- Load and unload engineering cargo, equipment and supplies
- Ensure engineering equipment facilities are clean and organized
- Inspect vessel machinery and equipment
- Monitor engineering plant
- Develop, plan, and schedule preventive maintenance, upgrades and modifications
- Oversee fueling operations
- Stand engineering watch
- Review and maintain engineering documentation
- Operate a wide variety of main propulsion and auxiliary equipment including
- Assist in rescue operations as member of emergency response team
- Prepare vessel for mission
- Oversee shipyard installation and repair of vessel equipment and machinery
- Responsible for ship machine shop and equipment
- Ensure repairs are made in accordance with American Bureau of Shipping and United States Coast Guard standards
- Supervise and train staff
- Perform other duties as otherwise directed by a supervisor

LEVELS AND COMPETENCIES

The primary distinction between levels is reflected in the Level Descriptors. As levels increase, scope, complexity and degree of independence increase. **As vessel horsepower increases, the degree of responsibility and required education/certification/licensing also increases.**

Higher levels may perform duties of lower levels. Education and experience are stated at the minimum threshold for the level. Additional education or experience may be desirable for some positions.

Level 1

PCLS: 04841

Grade 74

Marine Exempt - Hourly

Descriptors

Work is performed under direct supervision and works within well-defined guidelines. This is the entry level position and the most junior in the engine room of a vessel. Sweep and clean engine/mechanical machinery rooms and equipment. Perform repair and preventive maintenance that is limited in complexity* AND scope*. Perform routine technical tasks requiring application of standard techniques, procedures, and criteria as instructed. The typical position in this level would be a **Wiper**.

Knowledge, Skills, and Abilities

Working knowledge of cleaning methodology and techniques. Knowledge of basic mechanical marine operational safety principles. Knowledge of safe operation of equipment and tools. Ability to perform heavy labor and lifting. Ability to lubricate machinery, take readings of machinery and keep appropriate records.



Education and Experience

High school graduation or equivalent. Professional license required commensurate with U.S. Coast Guard Merchant Mariner Credential for entry level as a wiper. First aid and CPR certification. Additional license or certification may be required.

Level 2

PCLS: 04842

Grade 75

Marine Exempt - Hourly

Descriptors

Work is performed under general supervision and works within guidelines that are generally defined. Perform maintenance of vessel machinery and equipment that is of moderate complexity* OR scope*. Make minor repairs to vessel mechanical equipment and stand engineering watch. This level is distinguished from the previous level by the increased responsibility to make minor repairs, stand watch, and responsibility to repair more complex equipment. The typical position in this level would be a **Qualified Member of the Engineering Department (QMED)**.

Knowledge, Skills, and Abilities

Same as level 1, plus: Knowledge of basic and routine maintenance of vessels and equipment. Ability to maintain vessel, engines and auxiliary equipment in well-organized and clean condition. Ability to make minor repairs to vessel mechanical equipment and hull. Ability to monitor operation of propulsion and auxiliary machinery to ensure proper and safe operation. Ability to track and document engineering activities.

Education and Experience

High school graduation or equivalent and the appropriate level of professional license to work as engineering watch stander. Professional license commensurate with U.S. Coast Guard Merchant Mariner Credential with QMED endorsement and Rating Forming Part of an Engineering Watch (RFPEW), STCW, marine firefighting, first aid, and CPR certification. Additional license or certification may be required.

Level 3

PCLS: 04843

Grade 76

Marine Exempt - Hourly

Descriptors

Work is performed under intermittent supervision. Assist in maintaining the vessel engineering machinery and equipment in operating. Perform maintenance, replenish supplies. Oversee engineering stores and assist with fueling activities. Load and unload engineering cargo. Perform preventive and corrective maintenance on machinery and equipment that is moderate in complexity* AND scope*. Operate and maintain all engine room machinery. Stand engineering watch. This level is distinguished from lower levels by the increased responsibility to perform vessel maintenance and oversight of engineering activities and performance of more complex functions that requires a greater breadth of knowledge. The typical position in this level would be a **Qualified Member of the Engineering Department (QMED) with an electrical rating**.



Knowledge, Skills, and Abilities

Same as level 2, plus: Knowledge of maritime USCG regulations and safety procedures. Moderate knowledge in troubleshooting, repair and maintenance of vessel equipment to include electrical equipment and controllers. Knowledge and experience in operating cranes, winches, and use of various portable and fixed machine and hand tools.

Education and Experience

High school graduation or equivalent and work experience as a marine electrician that meets the U.S. Coast Guard rating requirements for a QMED with and Electrical rating. Professional license commensurate with U.S. Coast Guard Merchant Mariner Credential with QMED endorsement, Electrical rating, RFPEW rating, STCW, survival craft, marine firefighting, first aid, and CPR certification. Additional license or certification may be required.

Level 4

PCLS: 04844

Grade 78

Marine Exempt - Hourly

Descriptors

Work is performed under administrative supervision. Oversee and manage the operation and maintenance of main propulsion, machinery and auxiliary equipment. Perform troubleshooting and repair for all mechanical equipment aboard vessel that is large in complexity* AND scope*. Stand engineering watch. Inspect vessel machinery and equipment. Responsible for identifying abnormalities in operations, and recommend course of action. Lead** lower level employees as a primary function. This level is distinguished from lower levels by the responsibility for leading employees, recommending course of action and additional licensing requirement. The typical position in this level would be a **Third Assistant Engineer**.

Knowledge, Skills, and Abilities

Same as level 3, plus: Advanced knowledge of main propulsion, electrical and auxiliary equipment. Knowledge of a variety of electronic, electrical, and engineering equipment, computers and cable splicing. Knowledge of Coast Guard, American Bureau of Shipping, and OSHA hazardous materials regulations. Ability to operate, repair, maintain, install and upgrade engineering computers and related equipment. Ability to lead**.

Education and Experience

High school graduation or equivalent and work experience that meets the U.S. Coast Guard Unlimited Horsepower Third Assistant Engineer licensing requirements. Professional license commensurate with the U.S. Coast Guard Merchant Mariner Credential with an Unlimited Horsepower Third Assistant Engineer endorsement for motor vessels, STCW, survival craft, HAZWOPER, advanced marine firefighting, universal refrigerant technician, first aid, and CPR certification. Additional license or certification may be required.



Level 5

PCLS: 04845

Grade 79

Marine Exempt - Hourly

Descriptors

Work is performed under administrative supervision. Assist the Chief Engineer in the operation, maintenance, and repair of main propulsion and auxiliary mechanical and electrical equipment. Perform regular maintenance; assists in the repair of machinery and equipment; replaces broken parts as required to keep equipment operational. Fuel and waters the vessel and records fuel and water usage to monitor consumption; operates shipboard equipment. Stand watch as the roving engineer; assume responsibility for the operation and maintenance of the engineering plant, including monitoring pressure and temperature, fuel consumption and conditions of operating machinery, to ensure economical, safe and efficient operation; maintain engineering logs and records. Lead** lower level employees. This level is distinguished from the lower levels by greater independence, watch duties, responsibility of engineering operations and requirement for greater knowledge of engineering operations. The typical position in this level would be a **Second Assistant Engineer**.

Knowledge, Skills, and Abilities

Same as level 4, plus: Expert knowledge and operation of main propulsion and auxiliary mechanical and electrical equipment. Advanced knowledge of a variety of electronic, electrical, computers and equipment. Knowledge of fuel and other consumables management. Knowledge of generally accepted engineering practices. Knowledge of U. S. Coast Guard, American Bureau of Shipping, and OSHA hazardous materials regulations.

Education and Experience

High school graduation or equivalent and work experience that meets the U.S. Coast Guard Unlimited Horsepower Second Assistant Engineer licensing requirements. Professional license commensurate with U.S. Coast Guard Merchant Mariner Credential with an Unlimited Horsepower Second Assistant Engineer endorsement for motor vessels, STCW, survival craft, HAZWOPER, advanced marine firefighting, universal refrigerant technician, first aid, and CPR certification. Additional license or certification may be required.

Level 6

PCLS: 04846

Grade 80

Marine Exempt - Salary

Descriptors

Work is performed under general direction. Assists the Chief Engineer in the overall operation, maintenance, repair, and inventory of machinery, parts, and engineering equipment on board. May serve as Relief Chief Engineer when Chief Engineer is not on board. In that capacity this position will fulfill Chief Engineer duties. Assist in the overall maintenance and repair of main propulsion, auxiliary mechanical and electrical equipment. Maintain an inventory of supplies and spare parts necessary to keep equipment operating while at sea. Updates maintenance history and equipment repair logs to monitor incidence of repairs. Stand watch as the roving engineer; assumes responsibility for the operation and maintenance of the engineering plant. Lead** staff.



This level is distinguished from the lower levels by the greater responsibility for leading a more diverse staff, maintaining engineering logs, inventory records, supplies/spare parts, and additional licensing requirements. The typical position in this level would be a **First Assistant Engineer or where appropriate, Relief Chief Engineer.**

Knowledge, Skills, and Abilities

Same as level 5, plus: Ability to maintain equipment, repair and fuel logs. Ability to repair or replaces broken parts using precision and hand tools and arc or gas welders. Ability to maintain inventory of parts and supplies. Ability to supervise** when operating as Relief Chief Engineer.

Education and Experience

High school graduation or equivalent and work experience that meets the U.S. Coast Guard Unlimited Horsepower First Assistant Engineer licensing requirements or where appropriate Unlimited Horsepower Chief Engineer licensing requirements. Professional license required commensurate with U.S. Coast Guard Merchant Mariner Credential with an Unlimited Horsepower First Assistant Engineer or where appropriate Unlimited Horsepower Chief Engineer endorsement for motor vessels, STCW, Survival Craft, HAZWOPER, advanced marine firefighting, universal refrigerant-technician, first aid, and CPR certification. Additional license or certification may be required.

Level 7

PCLS: 04847

Grade 81

Marine Exempt - Salary

Descriptors

Work is performed under long-range administrative supervision. Serve as a supervisor** of shipboard engineering employees, operations, maintenance and logistics. Oversee and manage the marine maintenance and repair of vessel equipment/machinery. Develop, perform, and direct preventive maintenance schedule, upgrades, and modifications. Acquire equipment/parts/supplies, and coordinate logistics in support of vessel mission. Studies and evaluates regulatory and safety aspects of fleet. May assess and recommend programs, plans, and changes. May perform budget management and/or development. Serve as chief advisor to scientific personnel. Is a specialist or expert resource. This level is distinguished from the lower levels by the direct supervision over all aspects of the vessel's engineering operations and engineering staff, scheduling of watches, and is on call 24 hours per day, seven days per week for emergencies and major engineering problems. The typical position in this level would be a **Chief Engineer.**

Knowledge, Skills, and Abilities

Same as level 6, plus: Expert knowledge of ship engine rooms and all engineering and ship mechanical equipment. Expert knowledge in vessel modification, repair and maintenance. Ability to interface with scientific and navigational equipment with computers into a single integrated data collection network. Ability to supervise**.



Education and Experience

High school graduation or equivalent, 2 years experience sailing as an Unlimited Horsepower Chief Engineer, and work experience that meets the U.S. Coast Guard Unlimited Horsepower Chief Engineer licensing requirements. Professional license required commensurate with U.S. Coast Guard Merchant Mariner Credential with an Unlimited Horsepower Chief Engineer license for motor vessels, STCW, Survival Craft, HAZWOPER, advanced marine firefighting, universal refrigerant technician, first aid, and CPR certification. Additional license or certification may be required.

* **Complexity**: Refers to the diversity of rules and regulations (e.g. federal, state, and university regulations, US Coast Guard (USCG), American Bureau of Shipping (ABS), OSHA, and hazardous materials). Complexity increases as the application, interpretation and frequency of working with these rules, regulations increases.

* **Scope**: Refers to the size of the vessel, scale of operations on a vessel, or the impact the mission of the vessel has on an organization or unit.

** **Lead**: Provide day-to-day guidance, training and direction for staff in addition to other duties. Regularly assign and review work. Is fluent in assigned area of responsibility.

** **Supervise**: Hire, train, evaluate performance and initiate corrective action.

[2013 revisions include formatting document for consistency. Document was revised with comments and suggestions from work team.]