Federal Wage System Job Grading Standard for Marine Machinery Mechanic, 5334

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WORK COVERED

This standard covers nonsupervisory work involving the dismantling, repairing, relocating, modifying, maintaining, aligning, and installing of a wide variety of marine machinery, equipment, and systems such as propulsion machinery, propellers, rudders, cargo handling machinery, lifeboat davits, anchor handling gear, and missile tube equipment that are located aboard submarines, ships, and other floating craft.

The work requires a practical knowledge of the mechanical, hydraulic, and pneumatic systems and components of diverse marine machinery and their attachments. This includes detailed knowledge of the operating characteristics of the involved machinery, equipment, and systems; their functional relationships; the applicable installation and repair procedures, methods, and trade practices; and the unique environmental conditions under which work is performed aboard marine craft, for example, the lack of space between bulkheads and decks and the proximity of one type of machinery to another.

WORK NOT COVERED

This standard does not cover work that primarily involves:

- Installation, maintenance, repair, and modification of production machinery, equipment, and systems such as standard and numerically controlled machine tools, woodworking and metalworking machines used in the production of goods (see Job Grading Standard for Production Machinery Mechanic, 5350);

- Installation, maintenance, and repair of general nonproduction industrial plant machinery and equipment such as bridge cranes, conveyor systems, compressors, pumps, and aircraft test block equipment (see Job Grading Standard for Industrial Equipment Mechanic, 5352);

- Installation, maintenance, and repair of various fixed, semi-fixed, ground, airborne, and marine electronic equipment such as radar, radio, sonar, navigational aids and related devices (see Job Grading Standard for Electronics Mechanic, 2604);

- Installation, maintenance, and repair of electrical wiring systems, fixtures, controls, and equipment such as generators, electric motors, and transformers, requiring an in depth knowledge of circuitry, theories, and their practical application (see Job Grading Standard for Electrician, 2805 or Electrical Equipment Repairing, 2854);

- Manufacture and repair of parts and items of equipment using various types of standard and special machine tools, and their attachments, to machine metals, metal alloys, and other materials. (see Job Grading Standard for Machining, 3414);

- Welding metals and alloys when such trade skills are paramount and constitute the primary purpose of the position (see Job Grading Standard for Welding, 3703);

- Fabrication, repair, assembly, and installation of boilers, tanks, condensers, uptakes, stacks, and other heavy-pressure vessels (see Job Grading Standard for Boilermaking, 3808);

- Modification, fabrication, repair, and installation of various metal structural parts of ships and other vessels (see Job Grading Standard for Shipfitting, 3820);

- Installation, maintenance, and repair of water, air, steam, gas, oil, and sewer pipelines and systems (see Job Grading Standard for Pipefittering, 4204 or Plumbing, 4206);

- Construction and repair of aluminum, fiberglass, and plywood hulls of small craft and vessels (see Boat Building and Repairing Series, 4717);

- Selection, installation, and use of cables, ropes, chains, and other weight handling gear to lift, move, and position heavy loads (see Job Grading Standard for Rigging, 5210);

- Repair and modification of a variety of refrigeration and air conditioning equipment and systems that achieve regulated climatic conditions (see Job Grading Standard for Air Conditioning Equipment Mechanic, 5306);

- Installation, maintenance, repair, and modification of equipment such as coal, gas, oil fired heaters and hot air furnaces, high and low pressure steam boilers, hot water boilers, power generating equipment, and similar systems (see Job Grading Standard for Heating and Boiler Plant Equipment Mechanic, 5309);

- Installation, repair, and alteration of commercial kitchen and/or bakery equipment such as gas and electric ranges, fryers, steam tables, potato peelers, dishwashers, and other food equipment used in cafeterias, hospitals, etc. (see Kitchen/Bakery Equipment Repairing Series, 5310);

- Repair of laundry, dry cleaning, and related equipment (see Laundry and Dry Cleaning Equipment Repairing Series, 5317);

- General mechanical work in making a variety of repairs to powered ground and similar support equipment used for aircraft ground servicing; missile, aircraft, air control, and radar installations' powered support; and general utilities, including standby and emergency power generating systems (see Job Grading Standard for Powered Support Systems Mechanic, 5378);

- Repair and modification of mounted, motorized, or shipboard artillery (see Artillery Repairing, 6605);

- Repair and modification of ordnance systems and equipment such as missiles, torpedoes, mines, and associated handling, launching, erecting, and test systems (see Job Grading Standard for Ordnance Equipment Mechanic, 6641);

- Modification, maintenance, and repair of hydraulic and/or pneumatic systems and components that actuate mechanisms or produce, control, and regulate fluid flow (see Job Grading Standard for Pneudraulic Systems Mechanic, 8255);

- Repairing and testing small gasoline and diesel engines such as those found on motor boats, lawn mowers, power saws, and other similar equipment (see Small Engine Mechanic Series, 8610).

TITLES

Jobs covered by this standard at the grade 10 level and above are to be titled *Marine Machinery Mechanic*.

Jobs covered by this standard below the grade 10 level (other than Helper and Intermediate jobs) are to be titled *Marine Machinery Repairer*.

GRADE LEVELS

This standard does not describe all possible levels at which jobs may be established. If jobs differ substantially from the skill, knowledge, or other work requirements of the grade levels described in this standard, they may warrant grading either above or below these grades based on the application of sound job grading methods.

HELPER AND INTERMEDIATE JOBS

Helper jobs are graded by the Office of Personnel Management Job Grading Standard for Trades Helper Jobs. The grade 8 level in this standard does not apply to jobs that are part of a planned program of training and development of skills for advancement to a higher grade. Such trainee jobs are covered by the Office of Personnel Management Job Grading Standard for Intermediate Jobs. (Grade 10 in this standard is to be used as the "journey level" in applying the Intermediate Job Grading Table).

NOTES TO USERS

Coverage -- marine machinery mechanics, covered by this standard, may also repair, install, and maintain kitchen and bakery (galley) equipment, laundry and dry cleaning equipment, elevators, missile handling and launch systems, ordnance machinery, air conditioning and refrigerating plants, steam turbines, oil and water pumps, and other equipment located aboard floating craft, reflecting the multi-faceted nature of this occupation. However, jobs specializing only in any one of these or other types of specialized work specifically recognized in Part II of the Handbook of Occupational Groups and Families as a separate occupation are graded to the particular occupations involved.

Incidental Work -- In addition, marine machinery mechanics may perform incidental work operations such as machining parts using portable and fixed machine tools, checking and replacing electrical wiring and connections, and welding. Therefore, such work operations are mentioned at

different grade levels in this standard. However, this standard is not directly applicable to such incidental work. If such incidental work operations are the primary function of a position, it should he graded by the appropriate specialized standard or by cross-series comparison using sound job grading methods. Similarly, the presence or absence of such incidental duties in a job covered by this standard does not affect the grade level of the marine machinery mechanic work performed.

MARINE MACHINERY REPAIRER, GRADE 8

General: Grade 8 marine machinery repairers apply specific maintenance and repair procedures to install, maintain, and repair marine machinery and equipment such as cargo handling machinery, forced raft blowers, galley and laundry equipment, anchor handling gear, and other equipment of similar complexity. They also install and repair foundations for marine machinery; bolt down parts and accessories to foundations; and connect steam lines, air hose couplings, fuel lines; lubricating systems, and any other power source prior to operation.

Grade 8 marine machinery repairers may assist higher grade marine mechanics on assignments involving major systems or machinery of greater complexity by disassembling and assembling the simpler components and assemblies, locating and repairing or replacing defective parts and components.

Skill and Knowledge: Grade 8 marine machinery repairers are skilled in the use of test equipment and measuring devices such as levels, feeler gauges, dial indicators, micrometers, tachometers, and calipers to repair, adjust, and test shipboard equipment and machinery such as cargo handling machinery, fire fighting equipment, lifeboat davits, evaporators, catwalks, ladders, small lathes and other machine ship equipment. They are also skilled in the use of various portable machine and hand tools, for example, flange facing machines, drills, grinders, small boring bars, and cutting machines to make routine cuts, shapes, bores, and grinds in the installation and repair of these and other equipment and machinery of similar complexity. Repair operations involve the removal of old or damaged parts and rematching, boring, realigning, and refitting. The work requires the ability to interpret blueprints, diagrams, and other drawings, and the use of arithmetic and standard handbook formulas in performing dimensional measurements and maintaining required tolerances. Grade 8 marine machinery repairers are knowledgeable of the mechanical, pneumatic and hydraulic operating characteristics of a variety of equipment and machinery and are familiar with the various metals needed for a given repair job as specified in the job order or bill of materials.

Incidental to their work, repairers also may machine small parts using portable or fixed machine tools such as small lathes or milling machines, check and replace electrical wiring and connections, and spot weld.

Responsibility: Grade 8 marine machinery repairers receive assignments from their immediate supervisor, either orally or in writing. They work from simple plans, sketches, and detailed specifications and are held responsible for completion of routine tasks and adherence to

instructions and accepted trade practices. On routine work, they determine the proper standardized methods, techniques, and procedures required; tools to use; and complete assignments that are subject to review in progress and upon completion. On new or unusual assignments, the supervisor explains in detail the steps to follow and checks frequently for adherence to instructions. In contrast to grade 10 marine machinery mechanics who have responsibility for independently troubleshooting, diagnosing, planning, and completing projects or work orders involving major systems, grade 8 marine machinery repairers are subject to close supervision on such assignments or are usually responsible for only specified segments of major systems.

Physical Effort: Grade 8 marine machinery repairers frequently handle objects weighing up to 20 kilograms (45 pounds) and occasionally carry objects weighing 20 kilograms (45 pounds) and over for considerable distances. They are required to push, pull, reach, walk, stand, crawl, kneel, bond, and work in cramped positions over and under machinery of all types for sustained periods of time. Some work involves ascending and descending narrow vertical ladders or stagings, often while carrying tools and equipment.

Work Condition: Grade 8 marine machinery repairers usually perform work inside and outside exposing them to the prevailing weather conditions, noise, and intermittent slippery or uneven surfaces. Frequently, work is performed in cramped areas of ships and submarines with minimum light and ventilation, and in areas with high temperatures such as often exist in ships' boiler and laundry rooms. Some work is performed on or near nuclear reactor systems. They are constantly exposed to moving objects, elevations, and sharp edges with the possibility of cuts and bruises, and to noise and vibration from machines. They are also exposed to the possibility of an electric shock when working on wet surfaces and of serious injury from slipping and falling while working on masts, in the drydock, and from ladders and stagings. Some propulsion machinery such as 600/1200 p.s.i. boilers and main feed pumps is potentially explosive, especially when in a "down" condition. Dirt, grease, dampness, and chemical fumes are frequently encountered. Various protective devices such as safety shoes and glasses, gloves, and hard hats are used.

MARINE MACHINERY MECHANIC, GRADE 10

General: Grade 10 marine machinery mechanics apply a variety of methods, procedures, and techniques to layout, install, align, overhaul, repair, and maintain numerous types of marine machinery, equipment, and systems that are technically more complex than types described at the grade 8 level, i.e., the equipment and machinery have complex interrelationships among components and diagnosis of trouble is more difficult due to various possible causes and combinations of factors that may be the source of trouble.

Grade 10 marine machinery mechanics disassemble and make onsite repairs to marine equipment and machinery such as main propulsion machinery[1], auxiliary engines, speed reduction and acceleration mechanisms, and derating feed tanks; and marine systems such as steering systems, aircraft launching systems, and bridle arresting systems. They determine the nature and extent of repairs necessary and make needed repairs by replacing, reworking, or refinishing worn or damaged parts and components. Equipment or machinery that requires the use of highly precise heavy shop machine tools are sent to the appropriate repair or machine shop. Marine mechanics reassemble and install the equipment, connect the power sources, perform operational and functional tests, and make required adjustments in order to ensure proper operation of the entire system. They also install, replace, adjust, and set various regulating or safety devices such as meters, gauges, governors, and automatic alarms.

Skill and Knowledge: In comparison with grade 8 marine machinery repairers, grade 10 Marine Machinery Mechanics apply a greater knowledge of installation and repair of more complex marine equipment and machinery such as steering assemblies, main shafting, power drives, main propulsion reduction gears, lubricating and control systems, and catapult retraction systems. Depending on the specific nature of the equipment and machinery, grade 10 marine machinery mechanics examine and troubleshoot to determine the extent of repairs required, materials, or parts needed, and to estimate the time required to complete repairs. They disassemble, repair, and rebuild components and assemblies such as shafts, propellers, rudders, engines, and sea valves; operating machinery and equipment for launching and arresting gear systems, missile handling and launch systems, torpedo tubes, periscopes, antennas, sonar, and radar equipment; and other shipboard equipment such as air compressors, feed pumps, condensers, and air ejectors. The work requires the ability to interpret and apply the requirements contained in technical manuals, shop directives, multiview blueprints, and other documents in determining critical dimensions and key reference points. Defects in electrical or electronic devices, requiring in depth knowledge of electricity or electronic principles are referred to other personnel, e.g., electricians and electronic industrial control mechanics. Marine mechanics at this level independently dismantle, move, and relocate various types of submarine and shipboard

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[1] Main propulsion machinery includes steam turbines, reciprocating and centrifugal steam engines, reduction gears, transmission, shafts, propellers, and various accessories such as pumps, compressors, condensers, and auxiliary engines which may be gasoline or diesel.

machinery such as turbines, generators, diesel engines, and their accessories or install new machinery. They anchor machinery to foundations, assemble, and connect accessory or auxiliary components including steel ladders, catwalks, and guard rails; make precision alignment and adjustments for balance; and conduct operational tests of the entire system. They also defuel and refuel nuclear reactor plants and make repairs and adjustments to various systems associated with the reactor.

Grade 10 marine machinery mechanics are more skilled than grade 8 marine machinery repairers in the use and application of standard formulas, shop mathematics, trade theories, and industry practices in calculating needed materials and problem solving; and in the use of various test equipment and measuring devices such as alignment scopes, verniers, micrometers, precision levels, transits, strobe tachometers, bearing bridge gauges, flow meters, hydrostatic testers, and vibration analyzers. They make the necessary templates, jigs, and other fixtures required for repair or installation utilizing a knowledge of materials and their versatility.

Incidental to their work, mechanics at this level may be skilled in setting up and operating machine tools such as small lathes, milling machines, drill presses, and precision grinders to manufacture component parts or remachine existing parts such as bushings, bearings, seals, couplings, and pistons. They are also skilled in the independent use of machine tools for onsite milling, grinding, boring, facing, and drilling, and the use of various other portable machine tools to accomplish repairs.

Responsibility: Grade 10 marine machinery mechanics work alone or as part of a team under general supervision of the immediate supervisor, who makes assignments orally or in writing. They trouble-shoot equipment to determine the area of difficulty; what parts or materials are required; and the methods, techniques, and procedures to use in completing repairs. They plan and layout their work using blueprints, sketches, work orders, and other specifications. The supervisor reviews work for adherence to specifications and accepted trade practices. Grade 10 marine machinery mechanics have the responsibility for independently diagnosing, planning, and completing projects or work orders involving major systems in their entirety, whereas grade 8 marine machinery repairers are subject to closer supervision on such projects or are responsible for only specified segments of major systems.

Physical Effort: Physical effort at this level is the same as that described at the grade 8 level.

Working Conditions: Working conditions at this level are the same as those at the grade 8 level.