



United States  
Office of Personnel Management

**FWS Job Grading  
for  
Heavy Mobile  
Equipment Mechanic**

**5803**

TS-59, 1/91

Workforce Compensation and Performance Service  
Classification Programs Division  
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[Main Menu](#)   [Help Screen](#)

## COVERAGE OF STANDARD

This standard covers nonsupervisory work involved in the maintenance, repair, and modification of heavy duty vehicles and mobile equipment which have utility systems or special hydraulic, pneumatic, mechanical, electrical, or electronic systems, features, or controls designed for such purposes as construction, combat, earth moving, ship loading, firefighting, and comparable industrial or special applications. Examples of heavy duty equipment covered by this series include bulldozers, road graders, crawler tractors, power shovels, locomotives, combat tanks, cranes, large missile transporters, and fire trucks. The repair of major systems (such as diesel, gasoline, multifuel, and turbine engines; automatic, standard, and cross-drive transmissions; heavy duty drive line systems; and hydraulic, electrical, and mechanical utility systems) is included, whether accomplished as part of or apart from repair of the total piece of heavy mobile equipment involved.

The work requires knowledge of how heavy duty machinery, engines, parts, and systems work; ability to detect faulty items, determine causes of malfunction, and determine best repair methods; and skill to assemble, disassemble, repair, or modify components and systems.

## WORK NOT COVERED

This standard does not cover work which primarily involves:

- Maintaining and repairing automobiles, semitrailer truck tractors and other over-the-road trucks, warehouse tractors, forklifts, and light combat vehicles such as jeeps, and other vehicles having major systems similar to those of passenger vehicles and over-the-road trucks. (See [Job Grading Standard for Automotive Mechanic, 5823](#).)
- Repairing specialized electrical and electronic parts, components, accessories, or systems included on heavy mobile equipment and vehicles (e.g., rewinding electric motors and repairing electronic fire control systems). Work in this series requires only a basic knowledge of troubleshooting techniques and test equipment sufficient to locate the problem, replace standard parts or components (e.g., sensors and printed circuit cards), and refer more complicated repairs to mechanics in the electrical or electronic series. (See series definition and appropriate job grading standards under [Electrical Installation and Maintenance Family, 2800](#); [Wire Communications, Equipment Installation and Maintenance Family, 2500](#); and [Electronic Equipment Installation and Maintenance Family, 2600](#).)
- Servicing mobile equipment, such as changing oil, adding fuel, steam cleaning vehicles and parts, and changing a limited range of parts, such as tires, wiper blades, filters, or similar functions. (See [Job Grading Standard for Mobile Equipment Servicing, 5806](#).)
- Repairing artillery systems and components, such as gun tubes, mounts, turrets, and carriages. (See [Job Grading Standard for Artillery Repairer, 6605](#).)

- Repairing, relocating, modifying, maintaining, and installing marine machinery, equipment, and systems (e.g., propulsion machinery, propellers, rudders, cargo handling machines, lifeboat davits, anchor handling gear, and missile tube equipment) that are located aboard submarines, ships, and other floating craft. (See [Job Grading Standard for Marine Machinery Mechanic, 5334.](#))

## TITLES

Jobs covered by this standard at grade 10 and above are to be titled *Heavy Mobile Equipment Mechanic*. Jobs below grade 10 are to be titled *Heavy Mobile Equipment Repairer*.

## GRADE LEVELS

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

## HELPER AND INTERMEDIATE JOBS

Helper jobs are graded by the U.S. Office of Personnel Management [Job Grading Standard for Trades Helper Jobs](#). The grade 8 level described 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 U.S. 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.

**5803-8****Heavy Mobile Equipment Repairer, Grade 8****5803-8**

*General:* The work at this grade level involves making repairs that can be accomplished by removing, adjusting, or replacing defective or worn parts and components; or assisting higher level heavy mobile equipment mechanics in disassembling, repairing, and assembling major systems, components, and operating mechanisms. For example, grade 8 heavy mobile equipment repairers replace seals and shaft sealing rings, horns, wiring harnesses, starting switches, ignition distributors, sensors, fuel pumps, and water pumps; adjust voltage and current control units, engine idle, brakes, and transmission linkages; and clean or replace filters, battery cables, engine components, and injector nozzles. They assist heavy mobile equipment mechanics in the complete overhaul and repair of major systems, such as engines, transmissions, drive lines, and hydraulic utility systems.

*Skill and Knowledge:* At this grade level, heavy mobile equipment repairers must have a working knowledge of various techniques for removing, adjusting, replacing, cleaning, and installing a variety of parts, components, and accessories such as filters, radiators, bearings, springs, shock absorbers, wheel cylinders, starter motors, mufflers, and other items of similar complexity. They are able to determine when parts should be cleaned and adjusted, or replaced with standard parts. They have a basic understanding of mechanical, electrical, and hydraulic theory applying to heavy duty vehicles; and skill to replace, fit, install, and make adjustments, such as performing engine tuneups, timing distributors, and adjusting brakes. They are able to use basic tools common to the occupation (e.g., wrenches, sockets, torque wrenches, brake tools, and screwdrivers) and a small variety of test and measurement devices (e.g., feeler gauges, depth gauges, circuit testers, micrometers, and dial indicators). They have an understanding of the makeup and operation of the various individual systems maintained and their interrelationships. They can analyze test results in order to locate improperly functioning parts for repair or replacement. They are able to read and interpret parts lists, manufacturers' repair manuals, diagrams, and electrical schematics.

*Responsibility:* A higher-grade worker or supervisor assigns work orally or through work orders, indicating the nature of the problem. On new assignments or complex repairs involving portions of major assemblies or systems, such as engines or transmissions, the supervisor provides instruction and demonstrates the techniques, methods, and procedures to be followed.

On routine assignments, heavy mobile equipment repairers perform work independently, selecting tools, deciding on techniques to use, and carrying out assignments with minimal review during progress. They obtain standard parts, such as water pumps, tailpipes, thermostats, batteries, brake shoes, and shock absorbers, by looking up replacement information in parts manuals or by making comparison with samples. They make adjustments and settings in accordance with specifications in manufacturers' manuals, and test the completed product. Completed work is subject to functional tests and final inspection for quality of workmanship and compliance with accepted trade practices, technical manuals, specifications, and instructions.

**5803-8****5803-8**

*Physical Effort:* Heavy mobile equipment repairers at the grade 8 level work in tiring or uncomfortable positions for long periods. The work requires frequent standing, bending, reaching, stretching, climbing, and crouching. They work on top of, under, and in tight compartments of vehicles in cramped or awkward positions. They perform strenuous work while standing, lying, or sitting. They frequently lift and carry items, unassisted, weighing up to 18 kilograms (40 pounds), and often exert similar effort in pushing, pulling, and positioning parts, assemblies, and equipment. They frequently lift and move heavier items with the assistance of other workers or with lifting devices such as jacks, hoists, and cranes. They are sometimes required to work from ladders or work platforms at varying heights.

*Working Conditions:* Heavy mobile equipment repairers at the grade 8 level work both inside and outside. When inside, they are frequently exposed to drafts, changing temperatures, and noise which is difficult to talk above. When outside, they sometimes work in bad weather, in mud or snow, and in wet or icy areas. Both inside and outside, workers are exposed to irritations and discomfort from dust, grease, heat, and fumes. They typically work on parts and systems which are dirty, oily, or greasy. They are subject to cuts, burns, chemical irritations, bruises, electrical shock, and injuries from falls while repairing, positioning, and moving equipment. They follow prescribed safety practices and use safety equipment such as protective ear devices, hard hats, hard-toe shoes, gloves, respirators, and protective clothing. Some of these safety items may be uncomfortable to wear or use, and may be worn or used for long periods.

**5803-10                      Heavy Mobile Equipment Mechanic, Grade 10                      5803-10**

*General:* The work at the grade 10 level involves determining the cause of malfunctions and making repairs to a variety of heavy mobile equipment and vehicles, such as bulldozers, road graders, rollers, and similar heavy construction and earth moving vehicles; front-end loaders, backhoes, and similar power shovels; mobile cranes; heavy combat equipment; and heavy special purpose vehicles such as large runway snow removal vehicles, missile transporters, fire engine and pump trucks, ladder trucks, and similar equipment which have mechanical, hydraulic, pneumatic, and electric systems, controls, or features not commonly found on automobiles and ordinary transport trucks and buses. In comparison with grade 8 heavy mobile equipment repairers who replace or adjust parts in accordance with oral instructions or work orders, grade 10 level mechanics have a greater knowledge of how the various mechanical, hydraulic, pneumatic, electrical, electronic, and fuel systems work together. They have greater skill than grade 8 level workers in using a wider variety of test procedures and equipment in tracing hard-to-locate problems, and they complete major repairs, overhauls, and modifications with little or no technical advice. They conduct functional and performance tests on completed work assignments.

The work may involve one of the following kinds of assignments:

- (1) troubleshooting and repairing the full range of systems on the vehicles or equipment;
- (2) overhauling one type of major system, such as engines or transmissions, on a wide range of vehicles and equipment of the kind described above; or
- (3) repairing one type of major system on one of the vehicles described at the next higher level, such as crossdrive transmissions.

*Skill and Knowledge:* In order to diagnose, repair, overhaul, and modify heavy mobile equipment, systems, and vehicles, grade 10 level mechanics have a thorough knowledge of the mechanical makeup, operation, and working relationships of heavy duty systems, assemblies, and parts, including such major systems as diesel, multifuel, and gasoline engines, including supercharged and turbocharged engines; turbine engines; automatic and manual transmissions and gear reduction systems, including those with torque converters, planetary gears, and power take offs; drive line assemblies including differentials, power dividers, and dual speed axles; electrical and electronic systems and accessories, including ignition systems, charging and starting systems, and wiring and lighting systems; carbureted and fuel injection systems; and emission control systems. Mechanics at this level are knowledgeable of electrical, electronic, hydraulic, pneumatic, and other nonmechanical systems which have a functional relationship and effect on the operation of mechanical systems. They have a thorough knowledge of hydraulic lifting, loading, turning, and positioning systems and their mechanical, hydraulic, pneumatic, electrical, and electronic controls. They have a basic knowledge of electronics sufficient to identify and replace defective components, such as sensors, diodes, and circuit boards, and they refer more complex problems to electronics mechanics.

**5803-10****5803-10**

Heavy mobile equipment mechanics at this level are able to trace and locate defects which cause hydraulic and other major systems to fail or not perform up to specifications regarding power output, lifting capacity, speed, and pressure. They analyze malfunctions and determine the extent of repairs necessary by visual and auditory examinations and by the use of a wide variety of test equipment, such as engine analyzers, dynamometers, exhaust analyzers, vacuum and fuel pump testers, injector testers, ignition timers, tachometers, voltmeters and gauges, micrometers, calipers, and dial indicators. Grade 10 level mechanics are able to select and comply with technical manuals, illustrations, specifications, diagrams, schematics, and similar guides to make repairs and modifications according to specifications and procedures. For example, some of these guides describe and show the complete assembly of engines and transmissions, and the layout of hydraulic systems with related pneumatic, electrical, and mechanical connections and controls. Mechanics at this level have skill in measuring, fitting, and installing components, such as pistons, valves, bearings, gears, and cylinders, to specified clearances. They can connect, mesh, align, and adjust parts and systems to assure proper operation of the complete system or vehicle. For example, they adjust pumps, power boosters, drive chains, and tension devices; synchronize remote or manual electrical and hydraulic controls; and set timing of magnetos, distributors, injectors, and injection pumps to engine specifications.

*Responsibility:* Unlike grade 8 level repairers who receive assistance on more complicated repairs, grade 10 level mechanics make independent judgments and decisions within the framework of accepted trade practices and oral and written instructions by the supervisor. They use judgment in determining the extent of repairs needed, based on analysis performed, user reports, inspection reports, and vehicle records. They select work methods, tools, and manuals, to complete work assignments. Work at this level is accomplished with little or no review during progress or upon completion.

*Physical Effort:* Physical effort required at this grade is the same as that described at the [grade 8 level](#).

*Working Conditions:* Working conditions at this grade are the same as those described at the [grade 8 level](#).

**5803-11****Heavy Mobile Equipment Mechanic, Grade 11****5803-11**

*General:* In comparison with heavy mobile equipment mechanics at grade 10, mechanics at this level repair, overhaul, or modify vehicles and equipment that are clearly more complex, involve more complicated and varied systems, or entail unusually difficult problems because available guidelines do not apply. Vehicles and equipment at this level contain more numerous, interconnected, and complex mechanical and nonmechanical systems than those described at the grade 10 level, and are found in such vehicles as tank retrievers, attack tanks, large missile carrying tanks, locomotives, locomotive cranes, portal or dock and floating cranes, aircraft crash cranes, and diesel electric floating derricks. These vehicles have a variety of interconnected systems. Examples include: (1) integrated electric, air, and hydraulic systems; (2) complex state-of-the-art electrical and electronic systems requiring a substantial amount of training and specialized diagnostic equipment to identify problems for replacement of standard components or for referral to electronics mechanics; (3) intricate timing requirements such as dual engines or complex fuel injections systems, e.g., those with several injectors which have precise timing sequences; (4) numerous interconnected gear-reduction systems; or (5) other similarly complex systems.

Mechanics at this grade level have overall responsibility for a variety of systems or for the entire vehicle involving the repair, overhaul, or modification of engines, transmissions, or other major systems which are more complex than those described at the grade 10 level. For example, systems may require difficult and unusually precise fitting and adjusting of moving parts; or more systems may be combined into a single, complex, mechanical assembly, such as crossdrive transmissions or similar multisystem transmissions. On a regular and recurring basis, they diagnose difficult performance problems and improvise replacement, assembly, repair, and troubleshooting techniques when standard procedures do not suffice. They modify components for use or placement into systems for which they were not specifically designed.

*Skill and Knowledge:* Mechanics at the grade 11 level apply greater skill and knowledge than mechanics at grade 10 in the repair, overhaul, and modification of vehicles and equipment which are substantially more complex than those described at the grade 10 level. For example, interconnected systems can present greater difficulty in determining the cause of the problem and in isolating the malfunction. Grade 11 level mechanics apply greater knowledge of the principles behind the various operational systems of the heavy vehicles and equipment in diagnosing and troubleshooting malfunctions when standard procedures and existing methods do not suffice. They exercise a greater level of skill in the use of diagnostic equipment, including computer-controlled test equipment, to identify problems which are difficult to locate and repair. They develop or improvise methods, alter parts, and make repairs in the absence of technical guidelines. For example, they modify parts to fit and mesh into systems for which the parts were not

**5803-11****5803-11**

designed; improvise modifications to equipment to correct recurring malfunctions; or design modifications to meet special test requirements or other special needs. They are able to use specialized diagnostic equipment to diagnose problems in complex state-of-the-art electric and electronic systems to identify and replace defective components such as chips, sensors, and printed circuit boards, or to refer more complex problems to electronics mechanics.

Grade 11 level mechanics regularly apply an intensive knowledge of the characteristics of various major mechanical and nonmechanical systems more complex than those typical of the grade 10 level. For example, they overhaul transmissions which have braking, steering, and differential systems mechanically integrated with the transmission; engines such as 12-cylinder and 1,000 horsepower engines, large engines with pistons which directly power multiple hydraulic and pneumatic systems, or other large multiple and interconnected engine systems; and systems which require great skill in making difficult, precise fittings and adjustments of moving parts to clearances of one ten-thousandth of an inch or closer, such as intricate fuel injection systems.

*Responsibility:* Heavy mobile equipment mechanics at the grade 11 level exercise significantly more judgment and independence in determining the methods and techniques required to solve unusually complex maintenance and repair problems. For example, they plan and improvise repair procedures, find ways to mechanically and physically adapt or alter items to fit and mesh into systems for which the items were not specifically designed, or find ways to diagnose and correct defects when existing methods and procedures do not give the desired results. Some mechanics may recommend modifications to engineers who have final approval authority over significant design changes. The supervisor assigns work orally or through work orders or schedules. The employee independently determines work methods, sequences, tools, and equipment to use in making the extensive and complex repairs to the vehicles and equipment described at this level.

*Physical Effort:* The physical effort required at this grade is similar to that described at the [grade 8 level](#).

*Working Conditions:* Working conditions at this grade are similar to those described at the [grade 8 level](#).