



United States
Office of Personnel Management

**FWS Job Grading Standard
for
Ordnance Equipment Mechanic**

6641

**Workforce Compensation and Performance Service
Office of Classification Programs
December 1997, HRCD-4**

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WORK COVERED

This standard covers nonsupervisory work involved in maintaining and overhauling major items and assemblies of ordnance systems and equipment. The work requires the knowledge and application of mechanical and electrical principles and the skill to perform intricate repair and adjustment of hydraulic and pneumatic components and devices. The work also requires skill in such processes as troubleshooting, repairing, modifying, rebuilding, assembling, testing, and installing a variety of equipment such as missiles, torpedoes, mines, depth charges, and associated testing equipment and transporting, handling, erecting, and launching devices.

WORK NOT COVERED

This standard does not cover the following work:

- Inspection of repaired mechanical, hydraulic, pneumatic, and other systems, components and devices related to guided missiles. (See [Job Grading Standard for Inspectors](#));
- Troubleshooting, installation, repairing, modification, testing and adjustment of aircraft ordnance systems and components. (See [Job Grading Standard for Aircraft Ordnance Systems Mechanic, 6652](#).)

TITLES

Jobs graded by this standard at the grade-10 level and above are to be titled *Ordnance Equipment Mechanic*. Jobs graded by this standard below the grade-10 level are to be titled *Ordnance Equipment Worker*.

GRADES

This standard describes work at the grade 8 and 10 levels. It does not describe all possible grade levels or in any way limit the authority of agencies to assign work or particular duties to positions. If the jobs differ substantially from the skill, knowledge, responsibility and other work requirements described in the standard, they may be graded at levels other than those described, based upon the application of sound job grading methods.

HELPER AND INTERMEDIATE JOBS

Helper and Intermediate Ordnance Equipment Mechanic jobs are to be graded by the job grading standards for [Trades Helper](#) and [Intermediate Jobs](#). Grade 10 in this standard is to be used as the "journey level" in applying the Intermediate Job Grading Table.

6641-8 ORDNANCE EQUIPMENT REPAIRER, GRADE 8 6641-8

General: The grade 8 ordnance equipment repairers perform standard repair, overhaul, and test of mechanical, electrical, pneumatic, and hydraulic components and assemblies which perform limited functions in such ordnance equipment and devices as target detecting, arming, control, steering, power, and propulsion units and associated handling, transporting, erecting and launching devices. At this level the repairers perform repair tasks on such items as pressure regulators and valves, electrical switches and harnesses, gears, shafts, linkages, and other devices which require few adjustments and contain little interaction between components which would complicate repair and test procedures. Work assignments at this level involve, for example, disassembling articles and locating worn, dirty, or improperly adjusted parts. The repairers perform visual examination of articles for the presence of foreign matter or obstructions, and proper wiring and connections. They repair or replace such components as bushings, seals, gaskets, pneumatic or hydraulic lines and fittings, and resistors, potentiometers, and electrical connectors in accordance with manufacturer catalogs and parts manuals.

Items serviced at this level are covered by specific maintenance and repair procedures and the grade 8 repairers apply a fundamental knowledge of operating principles when using blueprints, diagrams, trade tools, and test equipment. On routine assignments they select appropriate tools and equipment to perform repetitive tasks using predetermined methods and materials. The grade 8 repairers receive advice and technical assistance as needed from a higher graded repairer or supervisor during the assignments.

Skill and Knowledge: The grade 8 ordnance equipment repairers must have the skill to repair, rebuild, and maintain a variety of limited function mechanical, electrical, pneumatic and hydraulic components and assemblies. They must be able to disassemble items and perform visual examination to detect worn or damaged parts such as broken or discolored wires, worn gears, leaking seals or gaskets, and other deficiencies. They lubricate parts as required and remove dirt or other foreign matter with appropriate solvents. They perform minor repairs and adjustments, for example, polish and lap sealing surfaces and install surface seals as required. They adjust spring tension poppets and mechanical linkages and perform hand soldering of wire connections. The work at this level also requires the ability to use a variety of general purpose test equipment and the skill to perform resistance, continuity, and other functional tests of items to verify the adequacy of repairs in accordance with test procedures and instructions which explain the precise steps to be performed.

The grade 8 repairers must be skilled in the use of such measurement devices as calipers, micrometers, and feeler gauges and apply a knowledge of arithmetic to perform dimensional measurements and maintain precise tolerances. They must have a fundamental knowledge of electrical principles to test, repair, or replace such components as resistors, capacitors, potentiometers, switches, and motors while using wiring diagrams to locate defective parts. At this level the repairers must be able to use such test instruments as ohmmeters, voltmeters, and

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meggors to measure and adjust electrical quantities, and be familiar with the makeup and operation of such pneumatic and hydraulic devices as actuators, accumulators, valves, cylinders, and pumps to assure proper repair, assembly, and functional checkout of the items serviced in accordance with detailed instructions and procedures.

Responsibility: The grade 8 ordnance equipment repairers receive work assignments from a supervisor or higher graded repairer in the form of detailed written or oral instructions, which are usually supplemented by drawings, specifications, manuals, and diagrams. They work independently on routine assignments and the work consists of repetitive steps involved in the disassembly, repair, replacement, and test of parts and components. Judgments and decisions at this level are guided by clearly described procedures and instructions and the supervisor or higher graded repairer is usually available for any necessary assistance.

The grade 8 repairers are spot checked during the progress of the task or work order and completed work is checked for compliance with instructions and specifications. The work at this level may require coordination of repair efforts with Quality Control personnel and inspection of the items serviced to insure the quality of workmanship.

Physical Efforts: The ordnance equipment repairers are frequently required to stand, bend, stretch, and work in tiring and uncomfortable positions. Some work is occasionally performed in a sitting position while making repairs at a work bench or operating test stands and consoles. The work regularly requires lifting, pushing, pulling, and carrying various sizes and shapes of components and parts weighing up to 23 kilograms (50 pounds). They occasionally handle similar items weighing up to 45 kilograms (100 pounds).

Working Conditions: The work is normally performed inside shop areas, with occasional outside work in areas that are sometimes noisy and drafty; however, they are generally well heated and ventilated. There is frequent exposure to cuts, bruises, shocks, burns, and injury from possible ruptured lines or component failure during high pressure testing. Repairers occasionally must wear face masks and protective clothing when there is the possibility of exposure to toxic fuels and acids, and they are occasionally required to work in close proximity to explosive components and devices.

6641-10 ORDNANCE EQUIPMENT MECHANIC, GRADE 10 6641-10

General: As compared to the routine repair of limited function ordnance components and devices mentioned at the grade 8 level, the grade 10 mechanics service a variety of major items and assemblies of ordnance systems such as missiles, torpedoes, mines, depth charges, and associated testing and transporting, handling, erecting and launching devices. They troubleshoot, repair, overhaul, modify, rebuild, test, and install such items as gyroscopes, air supply systems, bearing assemblies, pumping units, turbine units, control sections and assemblies, servo mechanisms, and a variety of other electrical, mechanical, hydraulic, and pneumatic equipment and related devices.

At this level the mechanics perform more difficult work processes than those described at the grade 8 level. For example, they determine the nature and extent of required repairs and isolate equipment malfunctions by making preliminary functional tests with a variety of standard and special purpose test equipment, holding fixtures, and precision measurement devices. They disassemble weapons into major sections such as arming, steering, power, sustainer, motor, and igniter assemblies. Some special devices and electronic packages are removed and routed to other repair facilities when appropriate. In addition to replacing defective components the grade 10 mechanics perform repairs which are often complicated by critical tolerances and surfaces which require skilled workmanship in the machine and hand finishing and assembly of replacement parts. At this level the mechanics use a variety of hand and powered tools and precision measurement equipment to identify specific tolerances and reference points, and maintain dimensional accuracy. The work also requires the application of equipment modifications in accordance with detailed instructions. The grade 10 mechanics assemble repaired items and equipment and set up test configurations in accordance with appropriate specifications and instructions. They perform functional, operational, acceptance tests; evaluate performance characteristics; and compare test results with established parameters to determine the structural and functional integrity of repaired and rebuilt equipment. At this level the mechanics use a variety of reference materials and apply a broad knowledge of operating principles while working with blueprints, diagrams, trade tools, and test equipment. They work with a variety of equipment specifications, test procedures, and other technical directives and within the framework of acceptable trade practices. As compared to the closely supervised work described at the grade 8 level, the grade 10 mechanics work under general supervision and maybe required to remove, repair, and check out equipment aboard aircraft, ships, or at other user locations.

Skill and Knowledge: As compared to the limited repair and maintenance skills described at the grade 8 level, the grade 10 mechanics must be skilled in a variety of troubleshooting, defect isolation, and repair processes related to more complex ordnance equipment and multi-component devices which are usually composed of a number of interrelated electrical, mechanical, pneumatic and hydraulic assemblies and components. This involves complete or partial disassembly of equipment and making repairs which are often complicated by critical

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tolerances and dimensions which require the mechanics to rework or hand finish replacement parts. As compared to the clearly defined work processes and techniques mentioned at the grade 8 level, the grade 10 mechanics must apply sound judgment in the selection of repair techniques and achieving specified accuracies and tolerances. They must be skilled in the use of all precision measurement instruments common to the trade such as height gages, micrometers, dial indicators, optical comparators, and surface gages to assure dimensional accuracy of such critical parts as gears, shafts, bearing spacers, hydraulic valve sleeves and pistons, and a variety of mating and directional control surfaces. In addition, the mechanics at this level must be able to measure and evaluate such characteristics as concentricity, eccentricity, angularity, and surface finishes. The grade 10 mechanics must have the ability to independently interpret and apply the requirements contained in blueprints, wiring diagrams, equipment specifications, and other technical documents in order to plan, lay out, and effect disassembly, modification, repair, and test of ordnance equipment. This involves for example, the ability to identify critical surfaces and dimensions, trace faulty wiring or components, and perform standardized operational tests to insure the functional and mechanical integrity of such items as transfer valves, relief valves, flow regulators and limiters, arming valves, hydraulic release devices, firing mechanisms and depth setting devices. In addition to performing dimensional measurements as described at the grade 8 level, the grade 10 mechanics use more complicated shop mathematics and handbook formulas to provide for critical dimensions and calculate angles, fits, clearances, flatness, parallelism, and squareness. They perform more intricate hand work than described at the grade 8 level such as filing, scraping, and grinding to provide surface finishes and assemble equipment. The work at this level requires good dexterity and coordination between hands and eyes and the mechanics must be skilled in the use and operation of such shop machinery as bench lathes, drill presses, grinding, gear, and other machine tools to rework or finish replacement parts.

As compared to the limited variety of general purpose test equipment described at the grade 8 level, the grade 10 mechanics must be skilled in the use of more complex test consoles. For example, the mechanics utilize special test stands composed of such processing and indicating devices as manometers, air and hydraulic pressure gauges, frequency meters, flow meters, and multichannel recorders to measure and adjust such elements as pressure, flow, leakage, pneumatic impedance, and control or response rates. They also use a variety of pneumatic and hydraulic power units and such electrical equipment as phase-angle meters and oscilloscopes to measure and adjust such quantities as input-output voltage and pressure, continuity, dielectric strength, electrical and mechanical nulls and linearity, and other parameters of interest. The work at this level also requires the ability to analyze recorded data by mathematical computation or with rulers, overlays, or graphs.

The grade 10 mechanics apply a working knowledge of the makeup, operation, and installation of ordnance systems and equipment usually containing a number of interrelated devices such as target detecting, arming, steering, power, and propulsion assemblies. The work requires the

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ability to make all adjustments to operating tolerances and connect and align the surfaces, assemblies, and parts with one another. The mechanics must be skilled in the application of more complicated structural and operational test techniques than described at the grade 8 level, and must be familiar with such factors as the sequence and impact of malfunctions on related components and assemblies and the electrical, mechanical, pneumatic, and hydraulic operating relationships of the equipment serviced.

Responsibility: The grade 10 ordnance equipment mechanics receive work assignments from the immediate supervisor in the form of oral or written instructions for which drawings, specifications, or technical manuals are usually provided or available. As compared to the predetermined methods and procedures used at the grade 8 level, the grade 10 mechanics make more independent judgments regarding the sequence of repair operations, selection of appropriate technical references, and determining the most suitable tools, equipment, and materials required to complete the assigned tasks. They plan and carry out work assignments in accordance with established specifications and procedures and complete tasks using a variety of standard processes and techniques.

The grade 10 mechanics must evaluate malfunctions, isolate defects, and perform repairs in equipment which is complicated by more numerous components and related working parts than the limited function devices mentioned at the grade 8 level. They are responsible for assuring that workmanship meets the acceptable quality levels established for the items and equipment serviced, and in-process work may be subject to spot check by Quality Control personnel. The grade 10 mechanics are responsible for the safe operation of tools and equipment used and may be required to provide technical assistance to lower graded repairers or perform repairs at remote user locations.

Completed work may be subject to spot check by the supervisor to insure that overall work conforms with specification requirements and accepted trade practices. The supervisor is usually available for consultation on unique problems relating to design variations, configuration changes, and deviation from standard work practices to obtain dimensional accuracy, system performance, or equipment reliability.

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

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