



United States
Office of Personnel Management

FWS Job Grading Standard for Aircraft Electrician

2892

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**Workforce Compensation & Performance Service
Classification Programs Division
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WORK COVERED

This standard is used to grade nonsupervisory work involved in installing, troubleshooting, adjusting, testing, modifying, calibrating, and repairing aircraft electrical systems and equipment on board conventional and non-conventional aircraft such as electrical power control and distribution systems, lighting systems, refueling and fuel quantity indicating systems, electrical warning, controlling, and actuating circuits, and tying-in power and control circuits for functional systems, such as hydraulics, armament, radar, engines, and fire suppression. The work is characterized by the need to understand the functional characteristics and relationships of various electrical systems and equipment on aircraft.

WORK NOT COVERED

This standard does not cover work that primarily involves:

- Setup and operation of wire coding machines for the purposes of stamping identification code numbers on electrical wires and wire sleeves. (See [Job Grading Standard for Electrical Equipment Repairer, 2854.](#))
- Manufacture, repair, and modification of aircraft electrical cables and wiring harnesses as well as testing the completed product. (See [Job Grading Standard for Electrical Equipment Repairer, 2854.](#))
- Troubleshooting, testing, repairing, and overhauling of aircraft electrical equipment and components which have been removed from aircraft such as generators, AC and DC motors, transformers, power amplifiers, voltage regulating equipment, and switching and supervisory control panels. (See [Job Grading Standard for Electrical Equipment Repairer, 2854.](#))
- Troubleshooting, overhauling, modifying, repairing, testing, and maintaining aircraft electronic equipment. (See [Job Grading Standard for Electronics Mechanic, 2604.](#))
- Troubleshooting, repairing, overhauling, modifying, and testing aircraft electrical instruments. (See [Job Grading Standard for Instrument Mechanic, 3359.](#))
- Troubleshooting, repairing, overhauling, and modifying aircraft ordnance systems, equipment, and components such as ejection and bomb racks. (See [Job Grading Standard for Aircraft Ordnance Systems Mechanics, 6652.](#))
- Disassembling, repairing, reassembling, and charging batteries used in aircraft and other types of equipment. (See [Battery Repairing Series, 3725.](#))

TITLES

Jobs covered by this standard at the grade 10 level and above are to be titled *Aircraft Electrician*. Jobs covered by this standard below the grade 10 level (other than Helper and Intermediate Jobs) are to be titled *Aircraft Electrical Worker*.

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 Trade 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 Office of Personnel Management [Job Grading Standard for Intermediate Jobs](#). Grade 10 in this standard is to be used as the "full performance" level or grade in applying the Intermediate Job Grading Table.

NOTES TO USES

Ongoing technological advancements in the field of electronics have had and will continue to have an impact upon electrical systems, components, and equipment commonly found in military and nonmilitary aircraft. As a consequence, work within this occupation, in certain work situations, may require knowledge of electronic principles ranging from a practical understanding to a working knowledge. However, in determining appropriate grade levels for work within this occupation it is essential to note that the knowledge of electronics required of aircraft electrical workers and aircraft electricians is significantly less than that required of electronics workers and mechanics at comparable grade levels.

When evaluating complexity of work performed, classifiers and other users of this standard must avoid the improper approach of determining grade levels solely by comparison of the complexity or criticality of aircraft electrical systems and their electric and electronic components to complexity of equipment referenced in other job grading standards (e. g., [2604, Electronics Mechanic](#)). Grade levels can only be determined through an accurate evaluation of actual work performed and the corresponding skills and knowledges necessary to accomplish the required work.

For a detailed explanation regarding the impact of technological development in electronics and a discussion of computer controlled automatic test equipment (ATE) refer to the [Introduction to Electronic Equipment Installation and Maintenance Family, 2600](#).

2892-8 AIRCRAFT ELECTRICAL WORKER, GRADE 8 2892-8

General: Grade 8 aircraft electrical workers perform work involved in routine disassembly, repair, modification, assembly, testing, installation, and maintenance of electrical systems, equipment, and accessories such as flight control, fire detection, instrumentation, power control, fuel quantity, and utilities used in fixed or rotary wing aircraft. They correct minor discrepancies by removal, repair, or replacement of defective or deleted circuits, wires, connectors, control units, plugs, switches, circuit breakers, diodes, resistors, capacitors, relays and other parts of aircraft electrical systems. They perform limited functional checks on existing and newly installed aircraft electrical systems, equipment, wiring, and cables to check continuity, resistance, amperage, and insulation breakdown with meters, bridges, meggers, and specialized test sets. They assist in the setup and independently operate "bench-type" limited function circuit analyzing equipment to test electrical circuitry in items of limited complexity, such as control sticks or instrument panels. They may perform operational checks on components of limited complexity such as heating elements and electric rudder control switches. They assist higher graded workers in troubleshooting and performing operational checks on systems and equipment of moderate and higher levels of complexity.

In some work situations, grade 8 aircraft electrical workers assist higher graded workers in the setup and operation of computerized multiple circuit analyzing equipment to run test programs on interconnecting wiring and cabling of systems such as radar, flight control, navigational computers and related equipment specific electrical systems to determine if installation or repair was correctly made.

Skill and Knowledge: Grade 8 aircraft electrical workers require a working knowledge of electrical theory, principles, and circuitry and a general understanding of basic principles underlying electronics to perform work involved in the routine and repetitive repair, disassembly, modification, assembly, testing, installation, and maintenance of aircraft electrical systems, equipment, and accessories.

They must have knowledge of AC and DC power supplies and a basic understanding of aircraft electrical systems and their interrelationships. They require a working knowledge of various types and sizes of wires, cables, and connectors and their application in numerous aircraft electrical systems.

Workers at this level follow established work methods and procedures found in technical orders, manufacturers specifications, and engineering directives. They are able to read and interpret blueprints, wiring diagrams, and schematics. They are skilled in removing deleted and defective circuits and parts, installing new or replacement electrical components, instruments, accessories, and equipment in the electrical control, power, indicating, warning, actuating, lighting, utility, and related systems. They are skilled in repairing cable assemblies and connectors, and soldering and terminating wires. They are knowledgeable of procedures necessary to route, clamp, wrap, and the electrical, instrument, and electronic wiring. They

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exercise skill in removing and replacing electrical components following technical orders, manufacturers specifications, and standard trade methods. Grade 8 workers apply limited troubleshooting skills in analyzing basic malfunctions in wiring and associated components. They examine portions of aircraft electrical systems to visually check, test, and evaluate the condition of components, equipment, and circuits and to correct faulty or defective connections such as opens, shorts, and grounds, and to replace broken, discolored, or frayed wiring. They are skilled in performing operational checks on components of limited complexity such as heating elements, electric rudder control switches, and other components of similar complexity. They correct minor discrepancies by testing, adjusting, or replacing relays, fuel quantity amplifiers, solenoids, pressure switches, generators, control switches, circuit breakers, lights, transformer-rectifier units, inverters, instruments, servo units, and other components of similar complexity in aircraft electrical systems. They perform functional checks of electrical components installed or repaired to insure proper operation. Workers at this level are skilled in the operation of common electrical test devices such as multimeters, bridges, voltmeters, ammeters, wattmeters, meggers, and specially devised test sets to perform basic checks for continuity, resistance, voltage, opens, shorts, insulation breakdown, grounds, or malfunctioning switches and relays. They are skilled in the use of hand tools such as hand and automatic wire strippers, soldering equipment, wire cutters, heat guns, electric and pneumatic power tools, and other specialized tools of the trade.

Responsibility: Grade 8 aircraft electrical workers receive work assignments from a supervisor or a higher graded worker in the form of oral and/or written instructions. Work assignments are typically supplemented with wiring diagrams, blueprints, technical manuals, engineering instructions, and schematics concerning electrical wiring, systems, and components to be installed, modified, tested, and/or removed. On routine work assignments grade 8 aircraft electrical workers independently select tools and test equipment, plan work sequence, and decide which methods and techniques to follow in completing work assignments. Decisions and judgments are clearly controlled by established operating procedures and detailed instructions. Routine work assignments are typically carried out with little or no review in progress. On new or unusual work assignments at this level workers receive detailed written and oral instructions from the supervisor or a higher graded employee. All work is subject to review and evaluation by a higher graded worker, supervisor, or a quality control inspector during and upon completion of work assignments for conformance to standards and specifications.

Physical Effort: Grade 8 aircraft electrical workers frequently climb up and down ladders, check stands, work platforms, scaffolding, and aircraft structures while making repairs or installations. The work requires long periods of standing and considerable kneeling, bending, stooping, and stretching. The work frequently requires individuals to make repairs or installations in hard-to-reach places requiring awkward and strained positions. In addition,

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the work requires lifting and carrying aircraft electrical items weighing up to 9 kilograms (20 pounds) unassisted and occasionally up to 23 kilograms (50 pounds) with assistance of lifting devices or other workers.

Working Conditions: Grade 8 aircraft electrical workers work in hangars and on flight lines. Workers are subject to drafts, noise, and varying temperatures in hangars and weather, temperature, and noise extremes on flight lines. Workers are exposed to dust, dirt, grease, oil, fumes, solvents and other aircraft fluids while working on aircraft in various stages of repair or modification. Workers at this level are exposed to the possibility of abrasions, cuts, burns, electrical shock, skin and eye irritation, and falls from elevated work areas e.g., check stands and aircraft structures. In addition, some workers on flight lines are exposed to potential injury from turning rotors or jet blast during engine run ups.

2892-10**AIRCRAFT ELECTRICIAN, GRADE 10****2892-10**

General: In comparison with grade 8 workers who correct minor electrical discrepancies, accomplish other tasks of limited complexity, and are involved in routine disassembly, repair, modification, and maintenance, grade 10 aircraft electricians troubleshoot, modify, repair, and perform final functional and operational tests of complex electrical systems, components, and accessories, with intricate wiring systems under actual or ground power such as automatic flight control, armament, landing gear, antiskid, ignition, stall warning, power distribution, engine drive alternator and fuel indicating systems. They test, troubleshoot, correct and maintain electrical power control systems which include the tie-in of power and control circuits with other functional systems. They replace defective control units, relays, boards, servo units, indicating instruments, or other components of electrical systems. They remove, or relocate electrical and electronic components and wiring to facilitate the installation of new or nonconventional electric and electronic equipment and insure its proper operation. They install nonconventional electrical power and related equipment by routing and connecting wiring to new or existing electrical or electronic systems, components, or equipment. They align, adjust, and perform final calibrations on electrical systems, parallel generator units, and set voltages in AC inverts, DC regulators and generators. They manufacture a variety of aircraft specific or specialized "breakout boxes" and panels to facilitate testing of electrical systems. They occasionally assist engineering personnel in modifying existing systems or in developing repair procedures (i.e., prototyping) for new systems. Aircraft electricians at this level use standard hand tools and electrical test units, e. g., meters, bridges, meggers, harness testers, locally manufactured "breakout boxes", signal generators, oscilloscopes, timing devices, calibrators, multiple function analyzers, and computerized multiple circuit analyzing equipment.

Grade 10 aircraft electricians set up and operate computerized circuit analyzing equipment to run established and new diagnostic programs in various test modes to test aircraft electrical circuitry and interconnecting cabling of the entire aircraft or individual systems such as radar, navigational computers, and radio flight control. In some work situations, they update or assist in the development of diagnostic programs and program information necessary for computerized analysis of aircraft wiring and cable systems.

Skill and Knowledge: Grade 10 aircraft electricians apply a comprehensive knowledge of electrical theory, principles, and circuitry; a thorough knowledge of aircraft electrical systems and their interrelationships; and a working knowledge of electronic principles (e.g., knowledge of construction practices of electronic equipment in order to recognize types and sizes of resistors, capacitors, wiring, and transistors; knowledge to follow signal paths through printed circuit and wired circuitry, recognizing actual circuit configurations which are shown in schematics and diagrams; and knowledge of the electromagnetic basis of alternating current and inductive and capacitive reactance, series and parallel tuned circuits, impedance matching, and operation of transistors) in order to troubleshoot, modify, repair, overhaul, and maintain complex electrical systems onboard aircraft such as antiskid,

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automatic flight control, and fuel indicating systems. They also apply a thorough knowledge of the interface of electrical systems with hydraulic, electronic armament, instrument, and mechanical systems and assemblies. They apply a comprehensive knowledge of testing and troubleshooting techniques and procedures utilizing a variety of test devices (e. g., meters, "breakout boxes," signal generators, oscilloscopes, phase indicators, and capacitance testers) to analyze, correct, and maintain essentially all electrical systems on fixed and rotary wing aircraft.

Aircraft electricians at this level are skilled in testing, troubleshooting, analyzing, modifying, and repairing complex electrical systems and components. They are skilled in tracing hard to locate and intermittent electrical defects and problems using a variety of meters and test devices. They analyze fault indications obtained during testing and determine the type and location of malfunction and perform necessary repairs. They apply skill in repairing or replacing electrical equipment and components throughout the aircraft. They are skilled in installing, relocating, and repositioning conventional electrical and electronic components and wiring to facilitate installation of nonconventional equipment. They have the ability to lay-out connecting circuits and make connections in order to prevent equipment or circuit overload or malfunction by considering such factors as fuse and circuit breaker capacity, wire size and length, voltage drop, type of current, phasing and sequencing power tie-ins, and method of shielding. They are skilled in assembly of a variety of locally developed test devices (e.g., "breakout boxes and panels") utilizing switches, diodes, resistors, relays, terminal boards, wiring harnesses, and other similar components. They are skilled in calibrating and adjusting components such as amplifiers, proximity boxes, generators, and voltage regulators. Grade 10 aircraft electricians apply skill in performing initial and final functional and operational checks on the entire aircraft electrical system. They are skilled in installing, calibrating, and operational testing of fuel indicating, antiskid, autopilot, compass, and similar systems. They research aircraft modification history, technical orders, engineering change proposals, and manuals concerning wire codes, wiring configuration, and testing procedures. Aircraft electricians at this level must be able to assist engineering personnel in developing modifications and changes on electrical, electronic, instrument, and other integrated electrical systems.

Grade 10 aircraft electricians are skilled in setup and operation of computerized multiple circuit analyzing equipment in manual, semiautomatic, or automatic mode to run existing and new (i.e., not fully "debugged") diagnostic programs to test and analyze aircraft electrical circuitry and interconnecting cabling of systems such as navigational computers, radar, and related equipment and to repair discrepancies. Electricians at this level must be able to work with or assist programming personnel in developing, debugging, or modifying diagnostic programs by recommending changes where necessary and identifying apparent contradictions between technical guides and test programs.

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Responsibility: Grade 10 aircraft electricians receive work assignments from the supervisor in the form of written or oral instructions which are usually accompanied by appropriate blueprints, schematics, technical data, and engineering instructions. Blueprints, schematics, or technical data may be incomplete or absent on occasional assignments. As compared to the predetermined methods and procedures at the grade 8 level for routine work assignments, grade 10 aircraft electricians make more independent decisions and judgments regarding troubleshooting techniques, modification, and repair procedures. They plan the sequence in which the work will be accomplished, select tools, and carry out all work assignments in accordance with technical and engineering specifications, and complete assignments using a variety of electrical processes and techniques. They determine the extent and nature of repairs necessary to correct electrical faults in the aircraft electrical system. Work at this level typically includes primary responsibility for checking out the complete aircraft wiring system and connections, and insuring that all settings, calibrations, functional and operational checks are within specifications and conform to specific ranges and characteristics.

The supervisor or a higher graded worker is usually available to provide technical assistance on unusual or difficult problems relating to deviations from standard work practices. Completed work may be subject to spot checks by the supervisor and quality control personnel to insure that work has been accomplished in accordance with accepted trade practices and is in compliance with specifications and procedures.

Grade 10 Aircraft electricians may be required to "sign off" or "self certify" that they have completed their work assignments properly and in accordance with specific engineering or technical specifications. They also are responsible for providing technical assistance to lower graded workers.

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

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