

# Job Grading Standard for Telecommunications Mechanic, 2502

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## WORK COVERED

This standard is for grading nonsupervisory jobs involved in installing, modifying, troubleshooting, repairing, and maintaining voice and nonvoice communication systems including central office, private branch automatic exchanges (PBAXs), local area network systems, telephone sets, wire carrier equipment, communication cable, alarm systems, intercom and public address systems, and teletype equipment. The work requires knowledge of telephone and data circuitry equipment and installation procedures; knowledge of basic electrical and electronic principles as they pertain to voice and nonvoice transmissions; the ability to understand and follow such technical guidance as circuit descriptions, schematics, and layout sheets; and the ability to locate and repair trouble within the telecommunications system.

This standard cancels and supersedes the Job Grading Standard for Telephone Mechanic, 2502, issued in May 1973.

## WORK NOT COVERED

This standard does not cover work that primarily involves:

- Work involved in repairing, troubleshooting, calibrating, and testing electronic digital computers and peripheral equipment. ([See Electronic Digital Computer Mechanic Series, 2608.](#))
- Work involved in installing, repairing, and troubleshooting communications or other equipment requiring an in depth knowledge of electronics principles. (See [Job/fedclass/Fws2604.pdf Grading Standard for Electronics Mechanic Series, 2604.](#))
- Work pertaining to the planning, development, acquisition, and utilization of telecommunications systems, facilities, services, and procedures. (See [Position Classification Standard for Telecommunications Series, GS-0391.](#))
- Work pertaining to the design, development, evaluation, and testing of electronic systems and equipment. (See [Position Classification Standard for Electronics Technician Series, GS-0856.](#))

## TITLES

Jobs graded by this standard below grade 10 (other than helper and intermediate jobs) are titled *Telecommunications Worker*. Jobs graded by this standard at grade 10 and above are titled *Telecommunications Mechanic*.

## GRADE LEVELS

This standard does not describe all possible grades at which jobs might be classified. If jobs differ substantially from skill, knowledge, or other work requirements described in the standard, they may be graded either above or below the grade levels described based on 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 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's [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 USERS

Ongoing technological advancements in the field of electronics have had and will continue to have an impact upon electrical systems, components, and equipment found in telecommunications systems. 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 telecommunications workers and telecommunications mechanics is significantly less than that required of electronics workers and mechanics at comparable grade levels. For this reason, please disregard the discussion on Page 14 of the [INTRODUCTION TO ELECTRONIC EQUIPMENT INSTALLATION AND MAINTENANCE FAMILY, 2600](#), about work in digital switching centers requiring a depth of electronic knowledge which places the work in the 2600 family. (Note: The introduction to the 2600 family will be revised to delete the above reference.)

*Pay Categories:* In a least one instance there is a superficial similarity between work described in the [Telecommunications Series, GS-0391](#), and the Telecommunications Mechanic, 2502. However, the determination of proper pay category is based on the predominant knowledge and skill requirements, not on isolated instances of installation and modification work mentioned in one or two general schedule series. For example, installation and modification of telecommunication facilities is mentioned briefly in the Telecommunication standard, GS-0391. But installation and modification work in this series is an oversight function and is secondary to the major roles of designing, developing, planning, and acquiring telecommunications systems, facilities, and services. Also, while the telecommunications

mechanic must have a working knowledge of electronics principles and computer data bases, the paramount requirement is a comprehensive knowledge of voice and nonvoice transmission principles to install and repair communications systems.

## **TELECOMMUNICATIONS WORKER, GRADE 8**

*General:* Grade 8 telecommunications workers perform work involved in the routine installation, removal, maintenance, troubleshooting, and repair of voice and/or nonvoice communications systems. Working from job layouts, work sequences, and material requirements established by higher level workers, they install and terminate copper core and/or fiber optic house cables. They run cables, key cables, or house wire to all telephone sets, terminal connectors, lugs, pins, or screws, associated with key telephone equipment and/or terminating equipment for nonvoice circuits. They install and repair communication equipment such as call stackers, multiple-button sets, extension ringers, coaxial cables, various type connectors, and AB switches. They use standard handtools and a variety of test equipment such as voltmeters, ohmmeters, current flow and continuity testers, and handsets to locate and diagnose analog and digital telephone set failures. They inspect, repair, modify, and maintain a variety of telecommunication equipment such as single, dual-line, multiple-button electromechanical, and digital telephones. They assist higher grade workers in installing, removing, maintaining, troubleshooting, and repairing electronic and electromechanical telephone key systems/PBAXs; intercom and public address systems; alarm systems; and teletype equipment. They may operate a crew truck to and from work sites.

*Skill and Knowledge:* Grade 8 telecommunications workers require a practical knowledge of the characteristics, relationships, and measurement techniques of AC and DC current and a general understanding of basic electronic principles to perform work involved in the routine repair, disassembly, modification, assembly, testing, installation, and maintenance of telecommunications systems, equipment, and accessories. They know how to locate and diagnose the nature of trouble by tracing and measuring electrical current and digital signals through circuits for continuity and proper operation. They apply knowledge of wire color codes, layout sheets, wiring diagrams, and schematics to complete assignments.

Telecommunications workers at this level are skilled at inspecting and repairing electromechanical, solid state, and digital telephone equipment. They have skill in the use of common electrical test devices such as ohmmeters, voltmeters, current flow and continuity testers, and handsets to perform basic checks for continuity, resistance, voltage, opens, shorts, insulation breakdowns, and grounds. They have skill in the use of handtools such as electrical and manual hand drills, screwdrivers, long-nosed pliers, hammers, diagonal cutters, and other specialized tools of the trade.

*Responsibility:* Grade 8 telecommunications workers receive work assignments from their supervisor or higher grade worker. Work assignments are typically supplemented with wiring diagrams, layout sheets, and schematics concerning systems, equipment, and cable to be installed, modified, tested, and/or removed. On routine assignments, grade 8 telecommunications workers independently select tools and test equipment. They plan the 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. They receive detailed instructions from their supervisor on new or unusual work assignments. All work is subject to review in progress and upon completion for efficiency in operation of the system or equipment repaired and/or installed.

*Physical Effort:* The work requires frequent bending, pulling cables, working in awkward positions, walking and standing for long periods of time, and climbing ladders. In addition, the work requires lifting and carrying 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:* Work is performed inside and outside in all types of weather. Inside work areas can range from well lighted, heated, and climatically controlled to poorly illuminated work areas such as attics, crawl spaces, and basements. Workers are exposed to dust, dirt, and falls from ladders while installing cable. Workers are exposed to bruises and minor cuts from handling cable and equipment and from using handtools.

## **TELECOMMUNICATIONS MECHANIC, GRADE 10**

*General:* Grade 10 telecommunications mechanics install, remove, maintain, modify, troubleshoot, and repair voice and/or nonvoice communications systems including intercom and public address systems; alarm systems; teletype equipment; and electronic and electro-mechanical telephone key systems/PBAXs; terminal and communications equipment, including modems, multiplexers, fiber-optic end equipment, T1-carriers, and line drivers. In comparison to grade 8 workers who have job requirements established by higher level workers, grade 10 telecommunication mechanics independently survey the installation area to determine work methods, tools, and materials required to accomplish the project. They independently review work orders and layout sheets to select equipment and circuits required. They install and terminate copper core and/or fiber optic house cables. They run cables, key cables, or house wire to all telephone sets, terminal connectors, lugs, pins, or screws, associated with key telephone equipment and/or terminating equipment for nonvoice circuits. They install equipment such as backboards, relay racks, central processor unit, trunk cards, line cards, and station cards to provide the desired number of lines and stations. They program electronic key systems/PBAXs with desired features to meet customer requirements. They conduct operational tests of completed installations of all stations. They demonstrate and explain features and proper operation of telephone instruments to subscribers. Telecommunications mechanics at this level use standard handtools and a variety of test equipment. They may operate a crew truck to and from work sites.

*Skill and Knowledge:* Grade 10 telecommunications mechanics apply a working knowledge of the characteristics and principles of AC and DC current and electronics to troubleshoot and repair electronic and electromechanical key and PBAX systems and telephones, data circuitry components, and other related equipment and systems. They apply a thorough knowledge of copper core and fiber optic transmission principles. They apply a thorough knowledge of

different electronic and solid state voice and data systems including their capabilities, functions of their major circuits, and the associated cables and wiring used to interconnect the systems. They apply knowledge of office automation software by using prepared data bases to program desired telephone features into electronic key and PBAX systems.

Telecommunications mechanics at this level are skilled in installing, removing, maintaining, troubleshooting, and repairing intercom and public address systems; teletype equipment; and electronic and electromechanical telephone key systems, PBAXs, telephones, interface/ancillary equipment such as modems, line drivers, patch panels, station carrier units, line couplers for speed dialers, voice recorders, telefax machines, and local wire and cable in support of voice and nonvoice networks for computers, data, and alarm circuits. They have skill in the use test equipment such as: voltmeters, ohmmeters, current flow and continuity testers, handsets, breakout boxes, decibel (DB) meters, and optical time domain reflectometers. They have skill in the use of computer diagnostic equipment to analyze and restore faulty voice and nonvoice circuits.

*Responsibility:* Grade 10 telecommunications mechanics receive work assignments from the supervisor or leader in the form of work orders or on a project basis. They independently determine the work sequences, tools, and materials required. They follow or refer to layout sheets, building plans, floor plans, circuit schematics and descriptions, and manufacturers technical guidance. They are also responsible for providing technical assistance to lower grade workers.

Completed work may be subject to spot checks by the supervisor, but is usually checked by the efficiency in operation of the system repaired and/or installed. The supervisor provides technical advice or assistance on unusual or very difficult problems.

*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](#).

## TELECOMMUNICATIONS MECHANIC, GRADE 11

*General:* In comparison to grade mechanics who install, troubleshoot, program, maintain, and repair voice and nonvoice communications systems outside the central switching office, Grade 11 telecommunications mechanics install, test, troubleshoot, program, maintain, and repair digital switching equipment, attendant consoles, power and ringing relay racks, miscellaneous telephone, radio, fire alarms, intrusion alarms, and computer data circuits and related apparatus required in the central switching office. They analyze system failures and other unusual system occurrences to isolate the source of the problem and determine whether the failure is caused by software, hardware, or other factors. They perform scheduled preventive maintenance on the switching system components, subcomponents, peripheral, and other associated equipment. They make cable and pair assignments, and make proper cross connections on the main distribution frame using electric soldering irons and wire wrap guns. They maintain emergency

power equipment such as rectifiers, battery banks, inverters, and grounding systems. In some installations, they maintain manual and/or computerized central office records, including detail records, traffic analysis records, cable records, line records, subscriber service records and spare parts inventories. Telecommunications mechanics at this level operate computerized diagnostic and analytical test equipment to set up, install, operate, and maintain digital voice and nonvoice circuitry.

*Skill and Knowledge:* Grade 11 telecommunications mechanics apply a comprehensive knowledge of telecommunications principles such as switching, traffic, signaling, outside plant and networking and a knowledge of the operational, capabilities, and limitations of electronic telecommunications equipment and systems to diagnose problems and determine corrective action. They have a working knowledge of digital switch subsystems such as the computer processor unit (CPU), disk drives, time-division-multiplex (TDM) switching matrices, trunk and line circuit packs for analog and digital ports, signaling converters, digital announcers, and long distance recorders. They apply a working knowledge of the central office's automated tables/files to retrieve maintenance information, directory assignments, call routes, trunk assignments, equipment features, and equipment interface conditions. They have a working knowledge of transmission media subsystems such as T1-carrier cable terminals and repeaters, pulse-code-modulation (PCM) channel banks, optic fiber transceivers, multiplexers and cables, and subscriber line carrier systems. They have a working knowledge of terminal equipment including digital telephones, synchronous and asynchronous data modules, modems, protocol converters, and interface equipment to data networks.

Telecommunications mechanics at this level have skill in using test equipment such as: oscilloscopes, digital multimeters, signal generators, digital transmission test sets, computerized analog measuring systems, PCM span and repeater test sets, cable fault locators, optical time domain reflectometers, and optical power meters to perform test procedures from manufacturers' technical manuals on lines, incoming trunks, outgoing trunks, central controller, central message center, input/output devices, networks, peripheral modules, link junctures, attendant consoles, channel bank equipment, and T-1 span repeater units. They are skilled in loading, programming, manipulating, and retrieving data from dual-processor controlled voice and nonvoice switching systems. They have skill in using automated central office test equipment and computerized test systems for fault isolation, system diagnostics, and trend analysis on traffic studies, circuits, and networks. They are skilled at using central office manual and automated record systems to record traffic load and telephone number assignments.

*Responsibility:* Grade 11 telecommunications mechanics receive assignments from the supervisor in the form of work orders. They also receive assignments through user complaint calls. They independently identify and initiate additional work to overcome problems observed during operation of the inside equipment. They plan and accomplish work using experience and judgment to interpret technical manuals, schematics, wiring diagrams, and flow charts. They are also responsible for providing technical assistance to lower grade workers. Completed work is reviewed for overall system operation efficiency, and spot checked for customer satisfaction and general review of resolved problems. The supervisor is available to provide technical assistance on unusual or very difficult problems.

*Physical Effort:* The work requires frequent standing, walking, bending, and climbing ladders. In addition, the work requires lifting and carrying equipment 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:* Work is performed indoors in well lighted and climatically controlled areas. Mechanics are subject to falls from ladders, minor cuts, and bruises. They are subject to electrical shock from electrical or radio frequency energy and to burns from hot components, or laser light emissions.