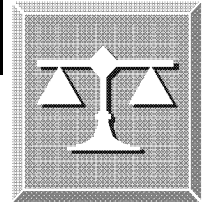


TS-31 June 1974

**Federal Wage System
Job Grading Standards**



WCPS-2 August 2002

**FEDERAL WAGE SYSTEM
JOB GRADING
STANDARD
FOR
MEDICAL EQUIPMENT
REPAIRING,
4805**



**Workforce Compensation
and Performance Service**



MEDICAL EQUIPMENT REPAIRING, 4805

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WORK COVERED

This standard is used to grade nonsupervisory work involved in the installation, maintenance, overhaul, repair, and testing of various medical and dental equipment used in patient diagnosis and treatment and in research laboratories. This work requires a knowledge and application of mechanical, electrical, and electronic principles and circuitry, the ability to determine malfunctions, and the skill to repair and maintain a variety of medical, laboratory, and dental equipment.

WORK NOT COVERED

This standard does not cover work that involves:

- Installation, maintenance, and repair of electrical wiring systems and fixtures and electrical controls or equipment other than medical or dental equipment. (See [Job Grading Standard for Electrician, 2805](#).)
- Overhaul, installation, maintenance, and repair of various 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](#).)
- Operation and monitoring of medical machines, devices, equipment or instruments in a hospital, clinic, or other medical facility as part of the diagnostic examination or treatment plan for patients. (See [Position Classification Standard for Medical Instrument Technician Series, GS-0649](#).)
- Installation and maintenance of medical electronic equipment **when a knowledge of medical procedures and electronic or engineering theory is the paramount requirement**. This kind of work is usually performed in support of professional General Schedule positions. Such positions typically involve engineering functions such as medical equipment development and evaluation; or work which requires application of a knowledge of physiology, anatomy, the principles and techniques of operation of medical equipment, and research or clinical procedures and requirements, and the ability to deal effectively with patients and members of the medical team. (See [Positions-Classifications Standard for Engineering Technician Series, GS-0802](#), and [Electronics Technician Series, GS-0856](#).)

TITLES

Jobs covered by this standard at grade 10 and above are to be titled *Medical Equipment Repairer*

Jobs covered by this standard below grade 10 are to be titled *Medical Equipment Worker*.

GRADE LEVELS

This standard defines only one grade level. If work differs substantially from the level of skill, knowledge, and other work requirements described in this standard, it may warrant grading above or below this grade level. The grade level described includes consideration of hazards, physical hardships, and working conditions that are a regular and recurring part of the medical equipment repairer occupation. This standard does not provide additional grade credit for exposure to hazards, physical hardships, and working conditions that may be of an "unusual nature" as defined in Appendix J of the Operating Manual for the Federal Wage System.

HELPER AND INTERMEDIATE JOBS

Helper and Intermediate Medical Equipment Repairer jobs are covered by the [Job Grading Standard for Trades Helper Jobs](#) and [Intermediate Jobs](#). (The grade level defined in this standard is to be used as the "journey level" in applying the Intermediate Job Grading Table.)

4805-11**Medical Equipment Repairer, Grade 11****4805-11**

General: Grade 11 medical equipment repairers install, modify, troubleshoot, maintain, test, calibrate, adjust, overhaul, and repair a wide variety of medical, laboratory, and dental equipment (electronic, electrical, and mechanical). Typical examples of equipment serviced include radiographic diagnostic and treatment units, cardiac defibrillators, hemodialysis units, ultracentrifuges, spectrophotometers, ultrasonic therapy equipment, electrophoresis apparatus, gas chromatographs, electron microscopes, X-ray units, electrocardiograph machines, cardiac monitors, electrosurgical units, electroencephalographs and radiography high speed film processors. They maintain and repair chemical, mechanical, hydraulic, pneumatic, vacuum, suction and pressure systems which may include water, steam, air, gas under pressure, and piped oxygen lines associated with equipment serviced.

Medical equipment repairers determine nature and extent of repairs required by checking equipment for malfunctions, requiring the tracing of wiring, broken or worn parts, leaks, feedback, and interference. They check voltage tolerances, amperage, power supplies, wave shape, frequency resonance, deflection time, decay curve, gain, balance, and signal sensitivity against prescribed tolerances and specifications. The repairers plan and carry out work assignments using blueprints, schematic drawings, technical manuals, wiring diagrams, liquid and air flow sheets, and other specifications.

They test equipment after repair and also new equipment to assure proper functioning; conduct preventive maintenance inspection of equipment; perform periodic checks to insure that using personnel are following proper preventive maintenance procedures; and may conduct on-the-job training for lower graded employees in the maintenance of medical, laboratory, and dental equipment.

Medical equipment repairers make standard computations using algebraic expressions and shop formulas relating to load requirements of wiring and equipment.

Skill and Knowledge: Grade 11 medical equipment repairers apply practical knowledge of the principles of electronic circuits, functions of electronic tubes and transistors, including X-ray tubes, in order to diagnose malfunctions, repair and test such electronic equipment as electrocardiographs, defibrillators, heart oscilloscopes, electron microscope, electroencephalographs, and spectrophotometers. Repairers at this grade level also have a knowledge of the relationships between electrical and electronic circuitry as well as the interrelationship of chemical, radiation, hydraulic, pneumatic, vacuum, or gas components of a piece of equipment or a system.

Medical equipment repairers are knowledgeable of the principles and theories governing the maintenance and repair of electrical equipment in order to diagnose malfunctions, and repair and test such electrical equipment as sterilizers, film driers, suction apparatus, and dental units. They apply a knowledge of hydraulic systems including their grips, locks, stop and release mechanisms, and have the ability to determine when properly adjusted with no leaks.

4805-11**4805-11**

Repairers have the ability to repair mechanical equipment such as sterilizers, X-ray tables, operating tables, pressure breathing therapy units, respirators, and other mechanical assemblies using gears, shafts, and pulleys. They also select proper replacement parts, modification kits, and identify materials, mechanisms, and components from a knowledge of electrical or electronic symbols, color codes, descriptions, and manufacturer's numbers. Medical equipment repairers use skill in working with small components, requiring good hand and eye coordination.

The grade 11 repairers use skill in the use of electronic test equipment such as vacuum tube voltmeters, multimeters, oscilloscopes, signal generators, tube checkers; ability to use electrical test equipment such as meggers, ohmmeters, test meters; skill in the use of such equipment as micrometers and calipers to detect wear and misalignment of gears, cams, valves, and other mechanical parts; and ability to use seat wrenches, and pressure gauges when working on hydraulic systems.

Workers at this level have the ability to interpret and apply blue prints, schematic drawings, wiring diagrams, liquid and air flow sheets, technical manuals, and other specifications. They also have the ability to make mathematical computations, using algebraic expressions and shop formulas relating to load requirements of wiring and equipment.

Responsibility: Grade 11 medical equipment repairers are assigned work orally or through work orders. They independently determine the nature of trouble and extent of repairs required and complete repairs following established trade practices and procedures, using technical manuals, blueprints, sketches, wiring diagrams, liquid and air flow sheets, and other specifications. The repairers at this level perform operational tests after repairs have been completed or when new equipment is received to assure that equipment is operating within prescribed limits so that lives are not endangered. The supervisor spot checks work for compliance with acceptable trade practices, directives, and operating specifications. The supervisor or higher level worker provides technical advice and assistance on unusual and more difficult problems.

Physical Effort: Work assignments involve standing, stooping, bending, and frequently working in cramped and awkward positions for prolonged periods. Medical equipment repairers continually lift from 5 to 18 kilograms (10 to 40 pounds) and, occasionally, objects weighing in excess of 18 kilograms (40 pounds).

Working Conditions: Repairers perform work inside, in well lighted, heated, and ventilated areas. They are exposed to the possibility of cuts, bruises, scrapes, broken bones, and serious burns caused by electrical shock. Repairers work in contaminated and contagious disease areas, and with radiation and contaminated equipment.