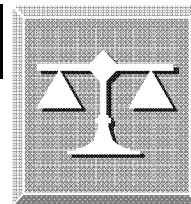


**TS-34 September 1974**

**Federal Wage System  
Job Grading Standards**



WCPS-2 August 2002

**FEDERAL WAGE SYSTEM  
JOB GRADING  
STANDARD  
FOR  
EXPLOSIVES OPERATING,  
6502**



**Workforce Compensation  
and Performance Service**



# EXPLOSIVES OPERATING, 6502

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## WORK COVERED

This standard covers nonsupervisory work involved in the manufacture of powder, propellant grains, solid or liquid explosives, and mixtures for flares or signals, and the manufacture, assembly, disassembly, renovation, modification, and deactivation of ammunition, explosives, or chemical or toxic filled munitions. Included are jobs which involve operation of equipment, jigs, or machines that were designed or modified to perform particular munitions operations.

This work requires a knowledge of explosives and explosives safety practices, the ability to operate equipment that is designed or modified for munitions operations, and the skill to safely perform operations with explosives.

## WORK NOT COVERED

This standard does not cover work involved in:

- Assembly, disassembly, processing, repairing, and testing of small arms, artillery, and other ordnance mechanical and electrical assemblies and equipment (see [Artillery Repairing Series, 6605](#); [Small Arms Repairing Series, 6610](#); [Ordnance Equipment Mechanic Series, 6641](#); or [Aircraft Ordnance Systems Mechanic Series, 6652](#));
- Operation of machine shop equipment such as turret lathes, precision grinders, drill presses, planers, hydraulic presses, etc. (see [Machining Series, 3414](#))
- Receipt, storage, issue, transfer, and check of ammunition, ammunition parts, powder, and explosives (see [Materials Handling Series, 6907](#));
- Destruction of all types of ammunition as well as toxic or explosive parts or materials (see [Munitions Destroying Series, 6505](#));
- Testing of explosives and ammunition to determine characteristics such as dispersion patterns, velocity and range (see [Explosives Test Operating Series, 6517](#)).

## TITLES

Jobs graded below grade-6 are to be titled *Explosives Worker*.

Jobs graded by this standard at grade-6 and above are to be titled *Explosives Operator*.

## GRADE LEVELS

This standard describes work at grade levels 4, 5, 6, 7, and 8. It does not describe all possible grade levels for this occupation. If jobs differ substantially from the level of skill, knowledge, and other work requirements described in the grade levels of the standard, they may be graded at levels other than those described, based on the application of sound job grading methods.

**6502-4****EXPLOSIVES WORKER, GRADE-4****6502-4**

*General:* Grade 4 explosives workers perform assignments consisting a few frequently repeated actions, working on a production line or assisting higher grade employees. This includes assignments such as checking munitions for obvious defects, replacing small explosive charges in bomblets or igniters, removing nose or base plugs with special spanners, or screening bulk explosives for metal or other contaminants. They receive detailed instructions, oral and written, outlining work to be done, materials and methods to be used, and safety procedures to be observed.

*Skill and Knowledge:* Grade 4 explosives workers perform hand operations such as safely handling small units of explosive charges and placing them in rocket casings; using go-no-go gauges to check dimensions of shells, rockets or explosive charges; hand unscrewing and disassembly or threading and assembly of standard components; using a limited variety of wrenches, spanners, pliers, and other common hand tools to tighten end plugs or do other simple assembly; and using spring or beam scales to weigh explosives or other materials to be mixed with the explosives. They understand the basic safety practices covering work with explosives such as placing condemned explosives in a water bath and limitations on amounts of explosives in the work area. They are able to recognize a variety of obvious unsafe conditions or defects such as rusted, dented, cracked, or leaking containers or the presence of objects or materials in the powder which might cause accidental explosion or burning.

*Responsibility:* A supervisor or other higher grade employee assigns and demonstrates work and is immediately available to provide assistance. Detailed oral instructions cover methods and procedures of each assignment such as work area, tools and equipment to use, and sequence of steps to be performed. In addition, standard operating procedures describe duties and safety instructions for each assignment. The work is frequently spot checked to assure quantity and quality of product and compliance with safety practices. The worker must exercise care in handling explosives to prevent waste due to spilling or accidentally mixing-in improper materials.

*Physical Effort:* Grade 4 explosives workers frequently lift bomb, shell, or rocket casings, powder charges, or other objects weighing 14 to 18 kilograms (30 to 40 pounds). Some assignments require lifts above 27 kilograms (60 pounds) at a production pace. They may pull or push hand trucks weighing several hundred pounds. The work requires sitting, walking, bending, reaching, crouching, and long periods of standing. Endurance and hand-eye coordination are required to work at a set pace and rhythm for long periods.

**6502-4****6502-4**

*Working Conditions:* Work is usually performed indoors, or outdoors in covered areas or passageways which provide some protection. Work areas are usually well lighted and ventilated. Some operations, however, such as melting powder or steaming out powder, cause uncomfortable steam or heat in the work area. Workers are required to stand on floors made of concrete, lead, or conductive composition. They wear protective clothing such as specially treated coveralls, respirators, and goggles on many assignments. They are frequently exposed to moisture and wet floors as a result of cleanup operations in powder working areas. They are exposed to fumes from acids and explosives. They are exposed to the possibility of explosion and flash fire. There is chance of injuries ranging from loss of life or limbs to burns, cuts, bruises, sprains, and nausea.

**6502-5****EXPLOSIVES WORKER, GRADE-5****6502-5**

*General:* In contrast to grade 6 explosives operators who operate a number of automatic machines and perform a number of hand assembly operations, grade 5 explosives workers perform only one such assignment, or a few related assignments, for example operating an automatic machine such as a vacuum machine to draw off powder charges or a pull-apart machine to break down fixed cartridge ammunition for reloading or demilitarization. They receive frequent spot checks on quantity and quality of work performed.

*Skill and Knowledge:* Grade 5 explosives workers know the cycle of operation of one or a few automatic machines and the sequence of hand operations associated with it. For example; they know and perform the procedures to load, operate, and unload a hydraulic defusing machine. They know how to handle the fused projectile safely and quickly and how to handle the fuse, how to load and operate the machine, how the machine should function, and what indications of malfunction to look for. Or, they may operate a vacuum unit to draw off powder from shell casings or other explosives containers, exercising knowledge of explosives practices to prevent or neutralize powder spills and knowledge of the type of munition to assure that all powder has been removed from cavities or crevices so that the item has been completely neutralized.

*Responsibility:* A supervisor assigns work through detailed oral and written instructions. On new assignments, the supervisor observes the work performed until satisfied that proper work methods and safety procedures are employed. Critical portions of the assignment may be demonstrated.

Grade 5 explosives workers are responsible for shutting off the machine in case of malfunction or error indications, and referring the problem to a supervisor or higher grade employee. In contrast to grade 6 explosives operators who regularly perform a number of different assignments, are responsible for determining and clearing minor stoppages, and receive occasional spot checks to assure quality of work, grade 5 workers perform only one or a few related assignments, refer operating problems to a supervisor or other higher graded employee and receive frequent spot checks of work to assure quantity and quality of product. Work is frequently checked for compliance with safety procedures.

*Physical Effort:* The physical effort at this level is similar to that described at the [grade 4 level](#).

*Working Conditions:* Working conditions at this level are similar to those described at the [grade 4 level](#).

**6502-6****EXPLOSIVES OPERATOR, GRADE-6****6502-6**

*General:* Grade 6 explosives operators regularly operate a number of automatic machines and equipment and perform a number of assembly operations. They operate machines such as crimping machines and hydraulic defusing machines to produce or modify munitions; at another type of activity they may work with explosives or propellants such as operating mechanical or hydraulic presses to manufacture black powder or tetryl pellets, to press out small explosives or propellant shapes, and to press explosives increments into shell casings. They perform a variety of assignments which involve a limited number of operations and require judgment and manual skill such as cutting excess material from propellant charges, assembling ammunition by inserting a variety of explosive and non-explosive parts in proper sequence, or weighing and blending explosives for boosters or explosive charges. They receive specific written instructions and their work is frequently spot checked.

*Skill and Knowledge:* Grade 6 explosives operators know the cycle of operation of a number of automatic single operation machines involving a sequence of hand and machine operations. For example, they know the number and weight of increments of high explosive to be pressed into a shell casing. They are able to weigh out the increments precisely. They know the pressure, dwell time, and amount of travel of the hydraulic ram in the press that is appropriate for each increment, and they are able to operate the press, assuring that all operating parameters are met. They are able to quickly recognize improper functioning to prevent damage to machine or product. In addition to visual indications and functioning, they know the normal sounds associated with the machine operation and are alert to detect any changes. They know the proper appearance of the item after the completed operation in order to check by visual inspection that the machine functioned properly. They look for such things as even crimping of casings and flush mounting of primers. They are able to assemble fuses or similar components using torque wrenches to achieve proper tightness; or scoop, weigh, or measure exact quantities of powders, using measuring scoops and laboratory type balance scales. The operators fully understand the hazards involved in handling and processing ammunition and explosives and apply all safety practices and procedures.

*Responsibility:* A supervisor assigns work and is usually available to provide assistance. Assignments consist of detailed written instructions for each job which cover the operations to be performed, methods to be used, and controlling specifications. Job assignments change frequently and the grade 6 operators are expected to know and apply these methods and specifications without extensive oral instructions. The machines operated are typically preset and adjusted.

Grade 6 operators are responsible for shutting off the machine in case of malfunctions. In case of minor stoppage, they may clear or restart the machines. On-the-job assistance is often available from higher grade employees. Employees at this level function with occasional spot checks to assure quality of output. However, work is often checked for strict compliance with safety procedures.



**6502-6**

**6502-6**

*Physical Effort:* The physical effort at this level is similar to that described at the [grade 4 level](#).

*Working Conditions:* Working conditions at this level are similar to those described at the [grade 4 level](#).

**6502-7****EXPLOSIVES OPERATOR, GRADE-7****6502-7**

*General:* In contrast to grade 8 explosives operators who regularly perform many of the more complex explosives operations, grade 7 explosives operators perform one or a few such production, rework, or maintenance operations, such as operating a semiautomatic machine, with several controls. Examples are production run fluoroscope machines or powder melting and blending kettles or hydraulic extrusion presses. Or, they may perform a manual task such as assembling a fuse, inserting booster charges and detonators, screwing or bolting down components to achieve mechanical strength and attaching and soldering the detonation circuit. Upon reassignment to new work areas or machines, grade 7 explosives operators receive detailed oral and written work assignments. In comparison with grade 6 explosives operators who work with a number of automatic machines characterized by performance of a single operation and few controls, grade 7 explosives operators work with a machine with several controls and performing several operations.

*Skill and Knowledge:* Explosives operators at the grade 7 level know the cycle of operations of one or a few work processes, machines, and equipment involved in powder working and ammunition production. They are able to change jigs or dies if required in the operating procedures and perform other related operations to safely produce a reliable product. They are familiar with the type of explosive or munitions to which they are assigned. When operating fluoroscope machines, for example, operators analyze the image on the screen to find internal defects such as missing seals and spacers or flaws in propellant or explosives as the munitions pass through the machine. They reject the defective items by operating a reject switch or lever. In hand measuring, mixing and blending of sensitive materials such as tetrazine, lead styphnate, or lead azide, they are able to recognize the proper feel of the mix so that they can tell when the product has proper moisture, texture and cleanliness. They are able to apply as directed the approved method of working the explosive such as temperature, moisture, and standard mixtures. They understand the standard operating and safety procedures for work with explosives.

*Responsibility:* A supervisor assigns work orally or in writing using sketches, blueprints, or specifications as necessary to illustrate new work assignments in detail. Machines are typically set up and preadjusted by others. After familiarization with the assignment, work output is not ordinarily reviewed except as part of the overall quality control procedure. Work in progress is observed frequently to assure compliance with safety practices. In contrast to the grade 6 level where the operators are responsible for assuring the proper operation of a number of automatic machines and performance is reviewed by frequent spot checks, the grade 7 operators perform assignments requiring exercise of judgment on how much to adjust controls or when to start another stage of the operation.

*Physical Effort:* The physical effort at this level is similar to that described at the [grade 4 level](#).

*Working Conditions:* The working conditions at this level are similar to those described at the [grade 4 level](#).

**6502-8****EXPLOSIVES OPERATOR, GRADE-8****6502-8**

*General:* In comparison to grade 7 explosives operators who exercise less skill and knowledge, performing only one or a few assignments, which are given in detail, grade 8 explosives operators regularly perform a wide variety of the more complex production, rework, or maintenance operations. They operate semi-automatic machines, with several controls, which often perform more than one operation. Examples are:

- Large propellant mixing machines,
- Production run fluoroscope machines,
- Powder melting and blending kettles,
- Preset shop type machines adapted to explosives work.
- In repetitive work, they receive brief assignments which cover changes to established procedures and they work independently.

*Skill and Knowledge:* Explosives operators at the grade 8 level apply a good working knowledge of most machines used in explosives operations and ability to make adjustments to machine controls to assure quality products. For example, operating powder kettles or propellant mixers, they correlate factors such as mixer current, elapsed mixing time, temperature of mix, and visual indications of powder texture to judge when the conditions specified in the standard operating procedures have been matched and then perform required adjustments such as adding solvent, changing mixing speed, or adjusting temperature. Operating lathes to deband projectiles, they place the shell in preset jigs, advance the tool carriage and take the cuts necessary to remove or modify the band. Operating washout units to remove explosives, they operate valves to regulate temperature and pressure of steam or hot water at the cleaning jets, and control flow of explosives through settling tanks.

Operating multistation cartridge loading machines they coordinate the work of lower grade employees at other stations, make minor adjustments to control the machine speed, the amount of powder inserted, the amount of crimping, etc. as indicated by visual checks and detector devices.

Explosives operators are familiar with many types of explosives or munitions; for example, they are able to recognize the proper feel of mixes such as styphnate, tetrazine, or lead azide to tell whether proper moisture, texture, and cleanliness is achieved and are able to identify various types of explosives in use and to understand and apply approved methods of working them, such as temperature, moisture, and standard mixes.

**6502-8****6502-8**

Explosives operators know and follow standard operating and safety procedures to carry out explosives operations without need for supervisory review of work product, other than spot-check for quality control requirements, and are able to apply oral instructions, sketches, specifications, and occasional blueprints to carry out new or changed assignments, using the supervisor's explanation in general terms of expected changes to established procedures.

*Responsibility:* A supervisor assigns work orally or in writing using sketches, blueprints, or specifications as necessary to illustrate new work assignments. In repetitive work, brief oral assignments emphasize the difference between this and assignments performed in the past. Job assignments change frequently and grade 8 operators are expected to know and apply a wide variety of procedures. It is the employees' responsibility to know and select approved basic techniques which will maintain close control of the operation. They make independent judgments as to when and how much to adjust the machine in process, i.e., when the conditions specified in the operating procedures have been achieved. Shop type machines are typically set up and pre-adjusted by others. However, employees at this grade are often called upon to set up and test operate the special purpose explosives processing machines when changing the setup of production lines to prepare for different types of work. This is done under the general direction of supervisors, machinists, or other higher grade employees. Individual work output is not ordinarily reviewed except as part of the overall quality control procedure. In contrast to the grade 7 level where the operators are responsible for only one or a few assignments such as described above and work is frequently reviewed to assure compliance with safety practices, the grade 8 operators, working within the framework of instructions and accepted work practices, are responsible for a wide variety of unrelated assignments requiring both hand and machine operations.

*Physical Effort:* The physical effort at this level is similar to that described at the [grade 4 level](#).

*Working Conditions:* The working conditions at this level are similar to those described at the [grade 4 level](#).