

Job Grading Standard for Sheet Metal Mechanic, 3806

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INTRODUCTION

This standard provides the job definition, titling instructions, and grading criteria for nonsupervisory jobs in the Sheet Metal Mechanic, 3806, for Federal Wage System (FWS) and other trades, craft, and labor pay plans.

This standard is divided into three parts. Part I contains occupational information applicable to Federal work covered by this standard without regard to pay plan or job grading system. Part II provides the grading criteria for jobs classified in accordance with FWS Key Ranking Jobs used to create the grade framework for FWS jobs. Part III will include explanatory material about the development of this standard and will be added after this draft is finalized.

The term “Federal Wage System” or “FWS” denotes the major job grading system and pay structure for trades, craft, and labor work in the Federal Government. Some agencies have replaced the FWS pay plan indicators with agency-unique pay plan indicators. References to Federal Wage System and Wage Grade (WG) have been omitted from much of this job grading standard.

Coverage

This job grading standard covers nonsupervisory jobs involved in the repair, fabrication, modification, and installation of sheet metal parts, items, and assemblies.

Cancellation of Existing Occupational Standard

Issuance of this job grading standard supersedes the current standard, as described in the following table:

Previous Standard	Action Taken
Sheet Metal Mechanic, 3806	Supersedes the standard for Sheet Metal Mechanic, 3806 , last revised September 1969.

PART I – OCCUPATIONAL INFORMATION

Part I is intended for use by all agencies in evaluating trades, craft, and labor work in the Sheet Metal Mechanic, 3806. It provides the job definition, titling instructions, and detailed information for this occupation.

General Job Determination Guidelines

For a variety of reasons, selection of the correct occupation for a job is essential to the human resources management process. For example, qualification requirements used in recruiting and organizational structure are often designed with consideration of the occupation.

Determining the correct occupation for a job is usually apparent by reviewing the assigned duties and responsibilities and then comparing them to the job definition and general occupational information provided by the standard. Generally, the job determination is based on the primary work of the job, the highest level of work performed, and the paramount skill and knowledge required to do the work. Normally, it is fairly easy to make this decision. However, in other instances, determining the correct occupation may not be as obvious.

When a job requires the performance of work in two or more occupations (mixed jobs), select the occupation most important for recruitment, selection, placement, promotion, or reduction in force purposes. This is typically the occupation having the highest skill and knowledge requirements.

Use the following guidelines to determine the appropriate occupation when the work matches more than one job. It is sometimes difficult to determine which particular occupation predominates. In such situations, apply the guidelines below in the order listed to determine the correct job.

- **Paramount skill and knowledge required.** Although there may be several different kinds of work in the job, most will have a paramount skill and knowledge requirement. The paramount skill and knowledge is the most important type of knowledge or experience required to do the work.
- **Reason for existence.** The primary purpose of the job or management's intent in its establishment is a positive indicator for determining the appropriate occupation.
- **Organizational mission and/or function.** Jobs generally align with the mission and function of the organization to which they are assigned.
- **Recruitment source.** Supervisors and managers can help by identifying the occupation that provides the best qualified applicants to do the work. This is closely related to the paramount skill and knowledge required.

Although the work of some jobs may require applying related skill and knowledge in repair, fabrication, modification, and installation of sheet metal parts, items, and assemblies, classification to the Sheet Metal Mechanic, 3806, may not be appropriate. The [Additional Occupational Considerations](#) section of this standard provides examples where the work may involve applying related skill and knowledge, but not to the extent it warrants classification to this occupation.

Additional information may be found in the Office of Personnel Management (OPM) publication [Introduction to the Federal Wage System Job Grading System](#).

Occupational Information

SHEET METAL MECHANIC, 3806		<u>Qualification Standard</u>
Job Definition	<p>This occupation covers nonsupervisory jobs involved in the repair, fabrication, modification, and installation of sheet metal parts, items, and assemblies. Sheet metal mechanic work requires knowledge of the physical properties and working characteristics of sheet metal, knowledge of tools and equipment required in the sheet metal trade and knowledge of shop mathematics and principles.</p> <p>Sheet metal work requires skill and knowledge in:</p> <ul style="list-style-type: none"> • using shop mathematics to determine curves, angles, and pitch; • planning and making pattern and template layouts; • using measuring instruments; • operating shop tools and equipment to construct manufactured items and systems with various seams; and • working with various kinds of metal, including magnesium, honeycomb material, galvanized and black iron, aluminum and aluminum alloys, stainless steel, copper and brass sheets, lead alloys, and bronze. 	
Titling	<p>Title 5, United States Code, requires OPM to establish authorized official job titles within occupations. These include a basic title (e.g., Sheet Metal Mechanic) and may be appended with one or more prefixes and/or suffixes. Agencies must use the official job titles for human resources management, budget, and fiscal purposes.</p> <p>The official titles for jobs in this occupation are:</p> <p>Journey and Intermediate Levels (Under the FWS, journey level jobs are at grade 10, and intermediate level jobs are at grade 8)</p> <p style="padding-left: 20px;"><i>Sheet Metal Mechanic</i> for jobs primarily involving sheet metal materials.</p> <p style="padding-left: 20px;"><i>Sheet Metal Mechanic (Aircraft)</i> for jobs primarily involving the manufacture and installation of aircraft sheet metal items.</p> <p>Worker Level (Under the FWS, jobs with this title are at grade 8)</p> <p style="padding-left: 20px;"><i>Sheet Metal Worker</i> for all jobs in this occupation at this level.</p> <p>Helper Level (Under the FWS, jobs with these titles are at grade 5)</p> <p style="padding-left: 20px;"><i>Sheet Metal Mechanic Helper</i> for jobs helping journey level sheet metal mechanics.</p> <p style="padding-left: 20px;"><i>Sheet Metal Mechanic (Aircraft) Helper</i> for jobs helping journey level sheet metal mechanics with aircraft sheet metal items.</p>	

(continued)

SHEET METAL MECHANIC, 3806 (continued)	
Titling (continued)	<p>Supervisors and Leaders</p> <ul style="list-style-type: none"> • Add the suffix “Supervisor” to the basic title when the agency classifies the job as supervisory. If the job is covered by the Federal Wage System refer to the Federal Wage System Job Grading Standard for Supervisors for additional titling and grading information. • Add the suffix “Leader” to the basic title when the agency classifies the job as leader. If the job is covered by the Federal Wage System refer to the Federal Wage System Job Grading Standard for Leader WL/NL for additional titling and grading information.
Occupational Information	<p>General Occupational Information</p> <p>Work with sheet metal materials requires skill and knowledge in repairing, fabricating, modifying, and installing sheet metal parts, items, and assemblies. The work also requires skill and knowledge in using tools and equipment required in the sheet metal trade and knowledge of shop mathematics and principles.</p> <p>Sheet metal includes, but is not restricted to, galvanized and black iron, aluminum and aluminum alloys, stainless steel, copper and brass sheets, lead alloys, and bronze. Sheet metal has no specific thickness. Although metals one-fourth inch thick or less are usually considered to be sheet metal, soft metals and alloys up to one-half inch may also be considered sheet metal.</p> <p>Sheet metal work involves planning, laying out, constructing, and installing articles such as deflectors, pans, straps, containers, wing patches and flaps, metal furniture, and other items with predominantly straight edges and regular curves. Sheet metal work also involves developing and laying out patterns, and cutting, forming, joining, assembling, and installing items and systems such as heating, air-conditioning, and ventilating pipes; conduits; drying ovens; bulkheads; airframes; spars; airscoops; control and flying surfaces; and other items and systems with combined straight and curved edges or irregular curves and planes. This work involves a variety of assembly joints, hems, and edges.</p> <p>Sheet metal mechanic work uses complex templates and patterns to shape, construct, and assemble objects with combined shapes such as rectangular, cylindrical, tapered, or truncated cones, combining the least number of seams and amount(s) of metal. This work requires the application of radial and parallel line development principles.</p> <p>A variety of tools including punches, drills, chisels, hammers, mallets, shears, rolls, brakes, and metal forming machines are used to cut, punch, drill, bend, and otherwise shape sheet metal parts. Other complex hand and power machines such as sliproll forming machines, box and pan brakes, rotary machines with extra forming rolls, crimpers, and beading machines are also used. Parts are typically joined by riveting, soldering, or spot welding.</p> <p>⇐BACK TO TABLE OF CONTENTS</p>

Impact of Technological Advancements

Technological advancements in the field of sheet metal materials and methods have an impact upon the work and have been taken into consideration in the development of this standard. New equipment such as abrasive waterjet or hydrojet cutting systems is usually controlled by computers so digital drawings can be used to generate cutting instructions. Waterjets cut by utilizing intense pressure of a narrow stream of water directed at the material to be cut. The narrow stream of water allows the waterjet to cut details impossible to achieve with other more conventional cutting tools. Other equipment may include plasma cutters used to cut steel and other electrically-conductive metals. These cutters use a high-voltage electrical arc and a compressed gas. An electrical arc generated by an internal electrode ionizes gas passing through a nozzle, creating a concentrated arc of plasma at the cutter's tip. The force of the plasma flow blows out the molten area of the metal.

Employees use computerized layout and laser-cutting machines to perform basic work processes. They routinely use personal computers or computer terminals to reference technical manuals, order supplies and tools, and track components in process. However, the knowledge of the properties and processes in performing the work remains the paramount subject matter knowledge required. Automation does not change the primary purpose of the work or the paramount skill required to do the work.

Additional Occupational Considerations

Some jobs may include work requiring skill and knowledge typically associated with the Sheet Metal Mechanic, 3806. In some cases, a closer look at the work may reveal classification to this job may not always be appropriate. The [General Job Determination Guidelines](#) section of this standard offers guidance on selecting the most appropriate job.

The following table provides examples of work similar to that performed by sheet metal mechanics, but not to the extent the paramount skill and knowledge required would warrant classification to Sheet Metal Mechanic, 3806.

If Work Involves...	See This Job Definition:
Using machine tools, such as lathes, milling machines, and machining centers to produce precision metal parts from raw stock metals, metal alloys, and other materials	3414, Machining
Fabricating, manufacturing, reconditioning, and repairing machine tools, jigs, and other equipment used in the manufacture, overhaul, and repair of equipment	3416, Toolmaking
Welding metals and alloys	3703, Welding
Repairing metal mobile equipment and components such as bodies, fenders, panels, and associated parts	3809, Mobile Equipment Metal Mechanic
Operating sheet metal forming machines	3869, Metal Forming Machine Operating
Fabricating and repairing metal tubes and pipefittings	3872, Metal Tube Making, Installing, and Repairing
Fabricating, repairing, modifying, removing, and installing composite and/or plastic items, parts, assemblies, and structures	4352, Composite/Plastic Fabricating
Planning, laying out, and constructing patterns and core boxes for foundry operations or the manufacture of wood or wood substitute form blocks	4616, Patternmaking 4654, Form Block Making
Planning and fabricating research and prototype models made from a variety of materials and processes for use in scientific, engineering, developmental, experimental, and test work	4714, Model Making
Repairing and modifying a variety of equipment and systems to achieve regulated climatic conditions	5306, Air Conditioning Equipment Mechanic
Installing, maintaining, repairing, and modifying equipment such as coal, gas, and oil-fired heaters and hot air furnaces, heating and power boilers, power generating equipment, and similar systems	5309, Heating and Boiler Plant Equipment Mechanic

Crosswalk to the Standard Occupational Classification

The Office of Management and Budget requires all Federal agencies use the Standard Occupational Classification (SOC) system for statistical data reporting purposes when collecting occupational data. The Bureau of Labor Statistics uses SOC codes for the National Compensation Survey and other statistical reporting. The Office of Personnel Management (OPM) and other Federal agencies maintain a “crosswalk” between OPM authorized occupational series and the SOC codes to serve this need. This requirement and these SOC codes have no effect on the administration of any Federal human resources management system. The information in this table is for information only and has no direct impact on classifying jobs covered by this job grading standard. The SOC codes shown here generally apply only to nonsupervisory jobs in these occupations. As changes occur to the SOC codes, OPM will update this table. More information about the SOC is available at <http://stats.bls.gov/soc>.

**Federal Occupational Series and Job Titles
and Their Related Standard Occupational Classification System Codes**

Federal Occupational Series	Standard Occupational Classification Code Based on Occupational Series		Job Title	Standard Occupational Classification Code Based on Job Title	
Sheet Metal Mechanic, 3806	47-2211	Sheet Metal Workers	Sheet Metal Mechanic	47-2211	Sheet Metal Workers
			Sheet Metal Mechanic (Aircraft)	47-2211	Sheet Metal Workers

PART II – GRADING INFORMATION

Part II provides grading information for use in determining the appropriate grade of nonsupervisory jobs in the Sheet Metal Mechanic, 3806. These grading criteria are applicable to Federal Wage System jobs. You will find more complete instructions for evaluating jobs in the following OPM publications: [Introduction to the Federal Wage System Job Grading System](#) and the [Operating Manual for the Federal Wage System](#).

General Job Grading Guidelines

Jobs are graded by use of a method involving consideration of the total job including:

- its purpose and relationship to other jobs;
- analysis of the work done and its requirements; and
- determination of the correct grade by comparison with the grade definitions in an appropriate job grading standard.

For trades, craft, and labor work, four factors are considered in grading jobs:

- **Skill and Knowledge** – Covers the nature and level of skill, knowledge, and mental application required in performing assigned work. Jobs vary in such ways as the kind, amount, and depth of skill and knowledge needed, as well as in the manner, frequency, and extent to which they are used.
- **Responsibility** – Covers the nature and degree of responsibility involved in performing work. Jobs vary in responsibility in such ways as the complexity and scope of work assigned, the difficulty and frequency of judgments and decisions made, the kind of supervisory controls, and the nature of work instructions and technical guides used.
- **Physical Effort** – Covers the physical effort exerted in performing assigned work. Jobs vary in such ways as the nature, degree, frequency, and duration of muscular effort or physical strain experienced in work performance.
- **Working Conditions** – Covers the hazards, physical hardships, and working conditions to which workers are exposed in performing assigned work.

Determining Grade Levels

This standard describes work at grades 8, 10, and 11. It does not describe all possible levels at which jobs might be established. You may grade jobs differing substantially from the level of skill, knowledge, and other work requirements described in this standard above or below these grade levels by applying sound job grading principles.

Helper and Intermediate Jobs

Use the Office of Personnel Management's [Federal Wage System Job Grading Standard for Trades Helper Jobs](#) and [Federal Wage System Job Grading Standard for Intermediate Jobs](#) to grade helper and intermediate jobs in Sheet Metal Mechanic, 3806.

Grade Level Descriptions

SHEET METAL WORKER, GRADE 8

General: Grade 8 sheet metal workers plan, lay out, construct, and install articles such as deflectors, pans, straps, containers, wing patches and flaps, metal furniture, and other items with predominately straight edges and regular curves. They assist higher-graded mechanics in the full range of layout and construction duties.

Workers at this level routinely use personal computers or computer terminals to reference technical manuals, order supplies and tools, and track components in process.

Skill and Knowledge: Grade 8 sheet metal workers apply knowledge of arithmetic to calculate and scribe patterns and apply shop principles of parallel or radial line development. These workers have skill in:

- planning, manufacturing, and installing cylindrical, square, or rectangular objects with easily constructed fastenings such as single- and double-hem edges and single, double, or grooved seams;
- using measuring instruments such as pocket rules, hook rules, flexible and semi-flexible rules, compasses, and other hand measuring plans and patterns;
- using basic hand and powered tools such as hammers, chisels, hand snips, band and circle saws, squaring shears, seamers, bar folders, brakes, and stakes to cut and form; and
- assembling parts by seaming, bolting, screwing, riveting, tacking, spot-welding, and soldering.

Responsibility: Grade 8 sheet metal workers receive detailed oral instructions and written work orders from the supervisor, lead sheet metal mechanic, or a higher-graded employee. The work consists of recurring steps involved in the disassembly or reassembly of parts, subassemblies, and larger components. Specifications are clearly described or patterns or templates are provided in the work orders and instructions. On routine assignments, they determine work methods and tools necessary to accomplish the assignment based on standard methods and procedures. Judgments and decisions at this level are guided by clearly described procedures and instructions. The work is spot-checked periodically by the supervisor or higher-graded mechanic who also provides guidance and assistance. Completed work is checked for compliance with instructions, specifications, and standardized shop practices and procedures. New assignments are performed under close review.

Physical Effort: Work assignments require moderate to strenuous effort. Workers must climb, bend, stoop, crawl, stand on concrete or metal surfaces, and work in confined spaces for prolonged periods. They frequently lift parts and equipment weighing up to 20 pounds (9 kilograms). Occasionally, they may lift and carry items weighing up to 50 pounds (23 kilograms) with the aid of mechanical lifting devices or assistance from other workers.

Working Conditions: Work is normally performed in clean, well-lighted, and well-ventilated areas. Some workers may be required to work outdoors, in parked aircraft, or in hazardous noise areas. Workers may be exposed to vibrations and extremes of heat, cold, and inclement weather. Dirt, dust, grease, and aircraft fluids are common in the work place. Workers are exposed to oil, fuels, hydraulic fluids, solvents, and other hazardous fluids and gases, such as hydrazine and Halon. Work involves the possibility of cuts, bruises, muscle strains, and injuries from falls from scaffolds, ladders, and aircraft surfaces. Some workers may be exposed to toxic fumes, high-pressure air and fluids, intake suction, rotating propellers, or extreme heat from engine exhaust.

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SHEET METAL MECHANIC, GRADE 10

General: Grade 10 sheet metal mechanics develop patterns and lay out, cut, form, join, assemble, and install items such as heating, air conditioning, and ventilating pipes; conduits; drying ovens; bulkheads; airframes; spars; air scoops; control and flying surfaces; metal furniture; and other items and systems with combined straight and curved edges or irregular curves and planes.

The items constructed are more difficult to plan and lay out than those at grade 8 because of the number of irregular angles, planes, and curves. The items are also more difficult to cut, bend, and form than those manufactured or installed by grade 8 workers whose work mainly involves standard curves and angles. Sheet metal mechanics at grade 10 use items that may be bent or formed to a variety of angles or curves with varying pitch or circumference. These items are also more difficult to construct, because the mechanic works with a variety of assembly joints, hems, and edges and operates more complex hand and power machines such as sliproll forming machines, box and pan brakes, rotary machines with extra forming rolls, crimpers, and beading machines. The grade 10 mechanic may also work on aircraft or aircraft parts or systems.

To devise patterns for these items, the grade 10 mechanic applies principles of radial line development combined with parallel line development. The grade 8 worker generally does not use both radial and parallel line development in the same item, because they work with less complex patterns usually developed by the use of one method.

Skill and Knowledge: Sheet metal mechanics at this level exercise skill in:

- planning, laying out, and constructing manufactured items and systems with dovetailed, set-in bottom, burred-bottom, wired, or lock seams;
- using complicated measuring instruments such as protractors; calipers; snap ring, height, depth, dial, and screw pitch gauges; and other hand measurement devices to measure plans and projects;
- operating complicated shop tools and equipment, for example, hand or powered crimping, burring, turning, and beading machines and soldering and welding equipment; and
- working with various metals, including stainless steel, copper sheet, magnesium, honeycomb material, and alloys.

These sheet metal mechanics use knowledge of:

- structural damage to sheet metal systems or items to plan and lay out repair and modification projects;
- complex shop mathematics to figure irregular curves, angles, and pitch; and
- pattern and template making to develop clear project instructions for lower-graded workers.

Responsibility: Mechanics at this level are provided written or oral instructions, blueprints, or sketches of the item or system to be manufactured or repaired. These mechanics make personal inspections of the work to be done, plan their own work, or devise a plan for others to follow. Mechanics at this level make templates when necessary and select, use, or prescribe methods, materials, and machines most appropriate for the assigned project. The supervisor spot-checks completed work for quality and accuracy and provides assistance on unusual problems when requested.

Physical Effort: Grade 10 mechanics use greater physical effort than grade 8 workers, because they engage in periods of continuous exertion while bending and shaping complex items and constructing larger, bulkier systems.

Working Conditions: Working conditions are similar to those described at [grade 8](#).

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SHEET METAL MECHANIC, GRADE 11

General: Sheet metal mechanics at this level plan, lay out, and develop templates to construct, assemble, and install irregular items and systems. The sheet metal items and systems used by sheet metal mechanics at this level have various combinations of features including: cornices, canopies, transition elbows, and oblique, truncated, or frustum cones. Objects and systems with these features are more difficult to make and join than those at grade 10, because they are usually unconventional, one-of-a-kind items, systems, or apparatuses used for a one-time project or in support of experimental or testing activities. In addition to the parallel line and radial line development typical at the grade 10 level, the grade 11 mechanic frequently uses triangulation principles.

The grade 11 level is also appropriate for sheet metal work on certain unconventional, first of their kind (i.e., prototypes), and destined for eventual manufacture as standard production items for aircraft, aircraft parts, or aircraft systems (e.g., a new wing configuration). The emphasis is on the uniqueness of the aircraft part or system and not on the uniqueness of the repair. Typically, the grade 11 work situation will be found in locations where experimental aircraft are designed and tested prior to fielding and when the production dies and detailed Technical Orders have not been developed.

Sheet metal mechanic work meeting or substantially exceeding the criteria described at this level should be evaluated at this grade.

Skill and Knowledge: Sheet metal mechanics at this level exercise skill to:

- plan, lay out, and develop complex templates and patterns to shape, construct, and assemble objects with combined shapes such as rectangular, cylindrical, tapered, or truncated cones, using the least number of seams and metal;
- adapt hand and power machines, shop practices, methods, and techniques to fit each new situation; and
- apply comprehensive knowledge of metals and their characteristics to meet the criteria of the project as outlined in the expected results.

Skill and knowledge is higher at this level than at the grade 10 level. The work involves a higher level of complexity to plan, lay out, form, assemble, construct, and install.

Responsibility: The grade 11 mechanic receives assignments with minimal accompanying information concerning the methods to be used. The mechanic independently plans, constructs, and installs or directs the installation of the objects or systems. Completed projects are accepted as prototypes, hardware for attachments to or in experimental devices, or for manufacture as standard items.

Responsibility at this level is greater than at the grade 10 level, because the items or systems are more difficult to plan, construct, and install. The mechanic is responsible for assignments from the initial planning stage to completion. Work is done from written or oral instructions, blueprints, sketches, or personal inspection of the item or system to be manufactured or repaired. These mechanics plan their own work or devise a plan for others to follow. They make templates when necessary and select, use, or prescribe methods, materials, and machines most appropriate for the assigned project. The supervisor spot-checks completed work for quality and accuracy and provides assistance on unusual problems when requested.

Physical Effort: Physical efforts are similar to those described at [grade 10](#).

Working Conditions: Working conditions are similar to those described at [grade 8](#).

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