



## Dictionary of Occupational Titles (DOT) Job Descriptions

[HOME](#) | [CONTACT US](#)

### 7 BENCHWORK OCCUPATIONS

713.684-022 to 726.685-054

This category includes occupations concerned with the use of body members, handtools, and bench machines to fit, grind, carve, mold, paint, sew, assemble, inspect, repair, and similarly work relatively small objects and materials, such as jewelry, phonographs, light bulbs, musical instruments, tires, footwear, pottery, and garments. The work is usually performed at a set position in a mill, plant, or shop, at a bench, worktable, or conveyor. At the more complex levels, workers frequently read blueprints, follow patterns, use a variety of handtools, and assume responsibility for meeting standards. Workers at the less complex levels are required to follow standardized procedures.

#### 713.684-022 EMBOSSESSER (optical goods)

Imprints identifying information on eyeglass frames according to prescription, using embossing press: Reads prescription to obtain information to be imprinted, such as owner's name, address, and telephone number. Sets type in type bar and slides bar into position in press. Turns knob to lock type bar in place. Positions eyeglass temple in spring clip below type bar. Places metallic foil over temple and pulls handle to lower electrically heated type bar and imprint information on temple. May mount trim on frame and be designated Trim Mounter (optical goods) I. Routes printed and trimmed eyeglasses to inspection section.

*GOE: 06.04.37 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### 713.684-026 EYEGLASS-FRAME TRUER (optical goods)

Bends and adjusts plastic or metal eyeglass frames according to prescription specifications, using jeweler's handtools, such as hammers, screwdrivers, and pliers. Measures frames to determine amount of adjustment required, using gauges and jigs.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### 713.684-030 FRAME CARVER, SPINDLE (optical goods)

Carves spectacle nose pieces of celluloid, plastics, and other material, using rotary spindle carving tool: Measures designated sample nose piece to determine dimensional specifications, using precision measuring instruments. Mounts specified cutting tool in machine chuck, using handtools. Starts machine and holds and turns nose piece blank against cutting tool to fabricate nose piece according to specifications.

*GOE: 06.04.24 STRENGTH: S GED: R2 M2 L2 SVP: 3 DLU: 77*

#### 713.684-034 MULTIFOCAL-LENS ASSEMBLER (optical goods) alternate titles: multifocal-button assembler

Fits and secures multifocal lens parts together preparatory to fusing, utilizing adhesive compound or asbestos tape: Dips multifocal button in cleaning solution and wipes dry. Brushes button and countersink blank to remove dust and lint. Positions button on polished surface of countersink blank. Performs test to detect presence of foreign matter between button and countersink blank, using instrument that indicates foreign matter when pressure is applied to outside edge of button. Recleans surfaces and performs test until instrument indicates lens parts are free of foreign matter. Places spring clamp on blank to hold button in position. Inserts metal peg between button and blank to allow air to escape during fusing, using tweezers. Applies cement to surface contact points around edge of button, using needle applicator, or wraps asbestos tape around button and countersink blank assembly to hold button in place. Removes

spring clip and metal peg after cement is set. Places assembled unit in tray for transfer to fusing room.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

### **713.684-038 POLISHER, EYEGLASS FRAMES (optical goods)**

Polishes plastic eyeglass frames and temple pieces to remove scratches and pit marks, using polishing wheel: Applies abrasive compound to wheel surface, using brush. Starts machine and holds and turns frame parts against wheel to polish parts and remove defects. Inspects and feels polished parts to verify removal of flaws. Presses sandpaper against polishing wheel to remove abrasive residue in preparation for next sequence.

*GOE: 06.04.24 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

### **713.684-042 WASHER (optical goods)**

Performs any combination of following duties to clean finished eyeglasses, dye plastic eyeglass lenses, and electroplate metal frames: Washes, rinses, dries, and buffs eyeglasses, using cleaning solution, cloth, and buffing wheel. Mixes trays of dye according to formula and places trays on heating plate to maintain specified temperature. Mounts plastic lenses in holder and immerses lenses in dye for specified period. Compares lens with sample to verify color and immerses lens in dye to correct color as necessary. Immerses metal frames in plating solution for specified period to electroplate frames.

*GOE: 06.04.39 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

### **713.687-010 CLIP COATER (optical goods) alternate titles: clip baker; dipper**

Coats tips of sunglass clips with protective plastic and cures coated clips in oven: Slides metal clips onto rack and immerses rack in molten plastic to coat tips of metal clips, or applies plastic to tips, using brush. Places racks of clips in oven for specified period to cure plastic. Removes racks, examines coating for proper baking, indicated by color of plastic, and places racks on table for further processing or in oven for further baking.

*GOE: 06.04.33 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **713.687-014 CONTACT-LENS-FLASHING PUNCHER (optical goods) alternate titles: puncher**

Punches flashing from molded plastic contact lenses, using handpress: Places compartmentalized box under openings in press-holding fixture to catch lens after punching. Positions lens in holding fixture and pulls lever to lower hollow punch which cuts flashing from lens. Repeats punching, allowing only lenses of same specifications to fall in same compartment. Labels and routes lenses in envelopes or boxes to stockroom or other work stations.

*GOE: 06.04.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **713.687-018 FINAL ASSEMBLER (optical goods)**

Attaches nose pads and temple pieces to optical frames, using handtools: Positions parts in fixture to align screw holes. Inserts and tightens screws, using screwdriver.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

### **713.687-022 INSPECTOR, EYEGLASS FRAMES (optical goods)**

Examines eyeglass frames and frame parts, such as temples, rims, nose pads, and bridge pieces, for defects and conformance to dimensional specifications. Feels and visually inspects frames to detect soldering irregularities, rough spots, and scratches. Verifies measurements of frame parts, using ruler and gauges.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

### **713.687-026 LENS INSERTER (optical goods) alternate titles: roll-over loader**

Fits lenses into plastic sunglass frames and places frames on conveyor belt that passes under heat lamps which soften frames preparatory to setting of lenses.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

### **713.687-030 LENS MATCHER (optical goods)**

Examines and matches colored goggle lenses to obtain pairs and places matched lenses of same shade in box. May inspect lenses for defects.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 77*

### **713.687-034 POLISHER, IMPLANT (optical goods)**

Polishes plastic implants used to fill eye socket of person with artificial eye, using polishing cloths and chamois: Cuts emery cloth and chamois cloth into strips, using scissors. Clamps plastic implant in vise, and pulls emery cloth strip back and forth through implant opening to remove rough edges and enlarge opening. Examines implant to verify smoothness and freedom from defects, using eye loupe.

*GOE: 06.04.24 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

### **713.687-038 SALVAGER (optical goods)**

Examines and dismantles sunglasses to salvage components, such as lenses, clips, and frames, using handtools: Examines sunglasses to determine salvageable components. Punches out rivets, using hammer and punch. Removes ornamental jewels, hinges, clips, and other parts and places parts in storage boxes. Cuts, unscrews, springs, or otherwise loosens frames to remove lenses. Stacks lenses by color, grind, shape, and shading. Sorts metal frames by style, and plastic frames by color for reprocessing.

*GOE: 06.04.34 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **713.687-042 SUNGLASS-CLIP ATTACHER (optical goods) alternate titles: heating-fixturer tender; melter**

Bonds metal spring clip to plastic clip-on sunglass frames, using electric heating equipment: Pulls lever or slides rod to clamp frames in heating fixture. Removes bonded frames and examines attachment and action of clip for freedom of movement.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

## **714 OCCUPATIONS IN FABRICATION AND REPAIR OF PHOTOGRAPHIC EQUIPMENT AND SUPPLIES**

This group includes occupations concerned with fabricating and repairing photographic apparatus, such as still and motion picture cameras and projectors, photocopy and microfilm equipment, blueprinting and diazo-type equipment, and other photographic equipment, parts, and attachments; sensitized film, plates, cloth, and papers; and prepared chemicals packaged for photographic use. Occupations concerned with electronic components are included in Group 726 and bulbs are included in Group 725.

### **714.131-010 SUPERVISOR, MOTION-PICTURE EQUIPMENT (motion picture; photo. appar.) alternate titles: cinetechnician supervisor**

Supervises and coordinates activities of workers engaged in assembling, repairing, remodeling, and maintaining photographing, projecting, sound, and related motion-picture equipment: Inspects malfunctioning equipment to determine extent of work to be performed and directs individuals or groups to make repairs or modifications. Trains new workers in equipment assembly and maintenance. May assign repair crews to motion picture production units. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 05.05.11 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

**714.281-010 AIRCRAFT-PHOTOGRAPHIC-EQUIPMENT MECHANIC (photo. appar.) alternate titles: research assembler; research mechanic**

Assembles, adjusts, tests, and modifies aircraft cameras according to engineering drawings and sketches, using handtools and bench machines: Reads and interprets engineering drawings and verbal instructions to determine fabrication methods and sequence of fabrication. Lays out reference points and dimensions on parts to be machined, using precision measuring instruments. Fabricates parts to specifications, using bench lathe, milling machine, shaper, and grinder. Measures parts to verify specified dimensions, using micrometer, dial gauges, and vernier caliper. Cuts, bends, drills, and fastens parts to assemble, repair, or modify camera, using handtools. Fabricates and installs electrical assemblies and wiring in camera housing, using handtools and soldering equipment. Tests camera units for operational efficiency, using calibrating instruments, multimeter, and stroboscope and adjusts mechanisms to correct inefficient operation. Installs film in camera and adjusts camera mechanisms to record sharpest image consistent with speed of aircraft, weather conditions, and object or terrain to be photographed. Records test data, prepares reports on fabricating techniques used, and recommends modifications to resolve problems.

*GOE: 05.05.09 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

**714.281-014 CAMERA REPAIRER (photo. appar.)**

Repairs and adjusts cameras, using specialized tools and test devices: Disassembles camera, using handtools. Tests and aligns diaphragm, lens mounts, and film transport to minimize optical distortion, using precision gauges. Adjusts range and view finders, using fixed focusing target. Calibrates operation of shutter, diaphragm, and lens carriers with dial settings, using electronic or stroboscopic timing instruments. Fabricates or modifies parts, using bench lathe, grinder, and drill press.

*GOE: 05.05.11 STRENGTH: S GED: R4 M4 L4 SVP: 8 DLU: 77*

**714.281-018 MACHINIST, MOTION-PICTURE EQUIPMENT (motion picture; photo. appar.) alternate titles: cinetechnician; motion-picture-camera repairer**

Assembles, repairs, remodels, and services photographing, projecting, editing, sound-recording, and power equipment used in motion picture production, using handtools and bench machines: Reads job order and blueprints to plan work procedures. Disassembles defective equipment, using handtools. Constructs replacement parts (except camera lenses and other optical parts) used to repair or remodel equipment, using machines, such as bench lathes, milling machines, gear cutters, grinders, and drill presses. Finishes, fits, and installs parts, using precision handtools and calibration devices. Measures installed parts for conformance to specifications, using micrometers and calipers. Operates repaired equipment to verify operational efficiency. Cleans and lubricates equipment.

*GOE: 05.05.09 STRENGTH: M GED: R4 M4 L4 SVP: 8 DLU: 77*

**714.281-022 PHOTOGRAPHIC EQUIPMENT TECHNICIAN (photo. appar.)**

Assembles, repairs, tests, and maintains still and motion picture cameras and photographic equipment according to customer, blueprint, or work order specifications, using handtools, bench machines, and test equipment: Reads diagrammatic and verbal specifications to determine repairs needed and sequence of operations. Inspects cameras and equipment to locate defects, using jewelers' loupe. Disassembles cameras to gain access to defects. Tests focus of lens system, using optical measuring equipment, and adjusts and repairs lens system to correct defective focusing, using handtools. Measures camera shutter speed, using electronic measuring instrument, and adjusts shutter mechanism to manufacturer's specifications, using handtools. Compares light meter readings with readings of light measuring instrument to verify accuracy of camera light meters. Adjusts light meters to correct defective readings, using handtools. Measures operating speed of movie cameras, using frequency counter and turns camera speed control, using screwdriver, to correct defective operation. Cleans and lubricates cameras and polishes camera lenses, using air gun, ultrasonic cleaning device, cloth, syringe, and tissue paper. May fabricate parts for cameras

and related equipment, using machines, such as bench lathe, milling machines, cutters, and grinders.

*GOE: 05.05.11 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

**714.281-026 PHOTOGRAPHIC-EQUIPMENT-MAINTENANCE TECHNICIAN (photo. appar.)**  
**alternate titles: technical-maintenance technician**

Fabricates, assembles, and repairs photographic equipment except cameras, using handtools and power tools: Examines equipment, such as photograph printers, print washers, driers and straighteners, and mounting presses. Replaces defective wood and metal parts and makes minor repairs, such as cleaning and tightening connections, soldering and welding broken metal parts, and bending and installing piping. Lays out framework dimensions on channel and angle stock, using tape measure, square, and scribe and cuts and grinds stock to dimensional specifications to fabricate equipment parts, using power saws, sanders, grinders, and files. Assembles frames and installs parts according to blueprint specifications, using handtools, such as drills, wrenches, reamers, and hole punches. Installs electrical wiring, following blueprints. Requisitions parts and materials.

*GOE: 05.05.09 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 77*

**714.281-030 SERVICE TECHNICIAN, COMPUTERIZED-PHOTOFINISHING EQUIPMENT (photofinishing)**

Analyzes malfunctions in computerized electromechanical photofinishing equipment and replaces or repairs defective components, utilizing knowledge of equipment operation and repair: Examines and tests equipment to determine nature and probable cause of malfunction, using work aids such as voltmeter, ohmmeter, schematic drawings, and equipment specifications. Removes and replaces defective electronic, electrical, mechanical, and plumbing components, such as pipes, valves, printed circuit boards, wiring, switches, thermostats, heaters, motors, pumps, gears, and drive chains, using handtools and following drawings and manufacturer's manuals. Tightens or solders loose connections and fittings, and performs related repairs. Adjusts equipment to manufacturer's specifications, using handtools and measuring instruments. Test operates equipment to ensure that defects have been corrected.

*GOE: 05.05.11 STRENGTH: M GED: R4 M3 L4 SVP: 6 DLU: 86*

**714.381-010 ASSEMBLER, PHOTOGRAPHIC EQUIPMENT (photo. appar.) alternate titles: assembler, precision-mechanical**

Assembles and adjusts photographic apparatus, such as motion picture cameras, projectors, film developing machines, and microfilm equipment, according to blueprint specifications, using handtools and portable power tools: Examines blueprints to determine specifications. Aligns, fits, and bolts components together to assemble mechanisms, subassemblies, and assemblies of photographic apparatus, using handtools, portable power tools, and drill press. Connects electrical wiring according to circuit diagram, using soldering iron. Tests function of assembled units, using precision mechanical, electrical, optical, and sound measuring instruments; and adjusts mechanisms to attain specified functional performance, using handtools. May repair defective products returned to production.

*GOE: 06.01.04 STRENGTH: L GED: R4 M3 L3 SVP: 6 DLU: 78*

**714.381-014 INSPECTOR, PHOTOGRAPHIC EQUIPMENT (photo. appar.) alternate titles: inspector, precision**

Inspects parts, subassemblies, and assembled photographic apparatus, such as still and motion picture cameras, magazines, enlargers, flash units, and film developing machines for conformance to verbal and diagrammatic specifications, using precision measuring and testing instruments: Examines blueprints, wiring diagrams, and other specifications to determine parts, dimensions, and tolerances required. Examines equipment for defects, such as missing parts, incorrect serial numbers, flaws in castings, and light leakage. Measures parts to ensure conformance to dimensional specifications, using micrometers, gauges, rules, and other precision measuring instruments. Tests functioning of electronic components, using test instruments, such as voltmeters, oscilloscopes, and signal generators. Trips camera shutters to

verify timing, using timing device. Measures focal distance of lenses, using depth micrometer or collimator. Traces electrical wiring and examines connections to detect assembly defects and tests electrical circuits for continuity, using wire diagrams and continuity meter. Examines test film to detect faulty operation of cameras, using projector, viewing screen, and hand lens. Records inspection data and marks or stamps inspection tag to indicate acceptance or rejection of equipment inspected.

*GOE: 06.01.05 STRENGTH: L GED: R4 M3 L3 SVP: 6 DLU: 77*

#### **714.381-018 PHOTOGRAPHIC-PLATE MAKER (electron. comp.) alternate titles: photographic-process attendant**

Prepares photographic plates used to print pattern of aperture masks on sensitized steel: Examines unexposed plate to detect foreign particles or emulsion flaws. Transfers image from master plate to unexposed plate by means of contact exposure and immerses plate in series of chemical and water baths to develop image on plate [DEVELOPER (photofinishing)]. Examines plate over light box in darkroom to detect flaws and verify conformity of pattern with master plate. Measures dot size and center distance, using calibrated microscope, and examines master and production plates for dot damage. Repairs defective plates by filling in missing dots, using photographic touch-up tool and ink. Installs and aligns plates in printing case for DISPLAY-SCREEN FABRICATOR (electron. comp.). Prepares developing solutions, following formula.

*GOE: 05.10.05 STRENGTH: L GED: R4 M3 L3 SVP: 6 DLU: 77*

#### **714.667-010 SENSITIZED-PAPER TESTER (photo. appar.)**

Tests tensile strength and light value of samples of photocopy, blueprint, and other sensitized paper to ensure conformance to specifications, using duplicating machines and testing devices: Inserts paper sample in duplicating machine and starts machine. Removes developed print and compares sample with printed standard to detect variations in color and clarity. Cuts paper sample into strips and clamps ends of strips in tensile strength measuring device. Turns handle of testing device until paper breaks. Records pounds of force required to break paper. Records test data in log.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **714.684-010 ASSEMBLER, PRODUCTION LINE (photo. appar.)**

Assembles components of cameras, camera magazines, camera shutters, movie projectors, and electronic photographic apparatus, such as exposure meters, using electric riveting press, punch press, soldering iron, and handtools: Screws, rivets, solders, and otherwise fastens and installs parts, following blueprints. Operates assemblies to test for specified functioning and adjusts mechanisms to attain specified functioning, using handtools, gauges, and meters. May be designated according to type of apparatus assembled as Camera Assembler (photo. appar.); Meter Assembler (photo. appar.); Projector Assembler (photo. appar.); or according to part assembled as Synchro Assembler (photo. appar.).

*GOE: 06.02.23 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 78*

#### **714.684-014 BELLOWS MAKER (photo. appar.) alternate titles: bellows assembler**

Builds or repairs camera bellows, using handtools, power tools, and gluing equipment: Selects cardboard cone bellow form according to size of bellows. Cuts paper pattern of cone. Cuts lining and cover materials for bellows, according to pattern, using scissors or electric knife. Stretches lining around cone and glues overlapping edges to cone. Cuts cardboard strips (ribs) and glues strips to lining. Glues cover over ribbed lining and attaches front and rear metal frames, using glue and clamps. Trims excess material from assembly, using scissors and removes dried glue, using solvent and cloth. Compresses assembly over special frame to pleat material and form completed bellows.

*GOE: 06.02.32 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

#### **714.687-010 CHECKER, FILM TESTS (photo. appar.)**

Identifies, wraps, and packages samples of sheet film for in-process testing according to specified procedures: Reads test requests for film in various stages of production and locates, removes, and batches sample sheets of specified film. Wraps, packages, and labels samples according to process stage and characteristics of film selected. Routes samples to testing department. Examines tested film, sorts rejected and approved sheets, and segregates rejected sheets with salvageable areas for cutting. Maintains records of film tested and test results.

*GOE: 06.03.02 STRENGTH: L GED: R3 M1 L2 SVP: 4 DLU: 77*

## **715 OCCUPATIONS IN FABRICATION AND REPAIR OF WATCHES, CLOCKS, AND PARTS**

This group includes occupations concerned with fabricating and repairing complete mechanical or electric watches and clocks, and mechanical movements used in clockwork-operated devices, such as timers, electric meters, and recorders.

### **715.131-010 SUPERVISOR (clock & watch)**

Supervises and coordinates activities of workers engaged in assembling watches, clocks, and related units, and testing assembled units: Inspects finished work at production stations to ensure conformance to specifications, using loupe and gauges. Trains workers in performance of tasks. Requisitions materials and supplies. Confers with other supervisory personnel to coordinate interdepartmental workflow. Sets up machines and equipment. Performs duties of workers supervised to expedite production. May supervise workers engaged in fabricating watch and clock parts. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **715.131-014 SUPERVISOR, DIALS (clock & watch)**

Supervises and coordinates activities of workers engaged in blanking, cleaning, brushing, soldering, polishing, plating, printing, and lacquering watch dials: Trains new workers in performance of tasks. Requisitions supplies and materials. Confers with other supervisory personnel to coordinate interdepartmental workflow. Confers with workers' representatives to resolve grievances. Sets up machines and equipment. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **715.131-018 SUPERVISOR, HAIRSPRING FABRICATION (clock & watch)**

Supervises and coordinates activities of workers engaged in fabricating watch hairsprings: Trains workers in performance of tasks. Requisitions supplies and materials. Confers with other supervisory personnel to coordinate interdepartmental workflow. Confers with workers' representatives to resolve grievances. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **715.131-022 SUPERVISOR, INSPECTION (clock & watch)**

Supervises and coordinates activities of workers engaged in inspecting and testing fabricated and assembled parts of watches, clocks, and related units for conformance to company standards: Demonstrates methods of work and use of equipment to train workers. Inspects randomly selected parts and units to ensure conformance to standards, using loupe, gauges, and comparator. Confers with other supervisory and quality control personnel to coordinate interdepartmental workflow and to determine corrective action required. May supervise workers engaged in inspecting and testing tools, dies, gauges, and other precision measuring instruments used in inspection. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

**715.131-026 SUPERVISOR, MAINSPRING FABRICATION (clock & watch)**

Supervises and coordinates activities of workers engaged in fabricating watch mainsprings. Performs duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

**715.131-030 SUPERVISOR, TUMBLING AND ROLLING (clock & watch)**

Supervises and coordinates activities of workers engaged in deburring, smoothing, and burnishing precision clock and watch parts: Trains workers in performance of tasks. Confers with other supervisory personnel to coordinate interdepartmental workflow. Confers with workers' representatives to resolve grievances. Requisitions supplies and equipment. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

**715.221-010 INSTRUCTOR, WATCH ASSEMBLY (clock & watch)**

Instructs workers in all operations concerned with assembly of watch movements: Conducts lectures on function of various parts and assemblies, and demonstrates assembly activities, such as \$T3overcoiling,\$T1 \$T3putting-in-beat,\$T1 \$T3truing II,\$T1 \$T3poising,\$T1 colleting, staking, and \$T3vibrating.\$T1 Instructs workers in handling of minute parts with loupe, microscope, and tweezers. May be designated according to assembly operation taught as Instructor, Hairspring (clock & watch).

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 77*

**715.261-010 MECHANICAL TECHNICIAN, LABORATORY (clock & watch)**

Performs variety of experiments on watch parts, lubricants, and abrasives used in manufacture of horological instruments to ascertain conformance to production standards: Heats or cools watch parts to specific temperatures in oven or refrigerator. Subjects heated or cooled watch parts to stress tests and records results. Tests lubricants and abrasives used in watch manufacture for conformance to established lubricity and abrasion levels. Analyzes test results to detect deficiencies in watch parts, lubricants or abrasives and suggests modifications in production methods to overcome deficiencies. Recommends new test procedures or testing devices as necessary. May assist in fabrication and installation of new testing devices. May repair ovens or refrigerators.

*GOE: 02.04.01 STRENGTH: L GED: R4 M4 L4 SVP: 7 DLU: 77*

**715.281-010 WATCH REPAIRER (clock & watch) alternate titles: clockmaker; watch adjuster; watchmaker**

Repairs, cleans, and adjusts watches, clocks, and related instruments, using watchmaker's tools, measuring instruments, bench machines, and cleaning equipment: Removes mechanism from case and examines mechanism for defective parts or accumulation of foreign matter, using loupe. Disassembles parts, such as hands, mainspring, \$T3escape wheels,\$T1 and balance wheel, using pliers, screwdriver, and tweezers. Places parts into watch-cleaning machine and starts machine that cleans, rinses, and dries parts. Tests \$T3truing II\$T1 of balance wheel assembly, using truing calipers and trues assembly, using tweezers. Repairs damaged or worn parts, using watchmaker's lathe and drill press. Replaces broken parts, such as mainsprings, hairspring, jewels, stems, escape wheel, and pinions, using handtools. Assembles mechanism and oils moving parts. Places mechanism in demagnetizing machine that automatically removes magnetic properties from mechanism. Replaces mechanism in case and tests assembled instrument for accuracy, using watch-rate recorder. Adjusts balance wheel speed regulator to synchronize reading of instrument with recorder. May repair jewelry [JEWELER (jewelry-silver.) 700.281-010]. May salvage and repair watchcases and be designated Repairer, Watchcases (clock & watch). May repair clocks used in electric power system timing equipment and be designated Time-Clock Repairer (clock & watch). May be designated according to type of instrument or instrument subassembly repaired as Demand



Equipment Repairer (utilities); Repairer, Hairspring (clock & watch).

*GOE: 05.05.11 STRENGTH: L GED: R4 M3 L3 SVP: 8 DLU: 90*

### **715.281-014 WATCH REPAIRER APPRENTICE (clock & watch) alternate titles: clockmaker apprentice; watchmaker apprentice**

Performs duties as described under APPRENTICE (any industry) Master Title.

*GOE: 05.05.11 STRENGTH: L GED: R4 M3 L3 SVP: 8 DLU: 77*

### **715.381-010 ASSEMBLER (clock & watch)**

Assembles and installs chime-controlling mechanisms in master clocks according to blueprints and sketches, using watchmaker's tools: Bolts mounting casting which houses clock and chimes mechanisms to inner rear panel of master clockcase. Installs toggle-switch and cut-off secondaries, for opening and closing chime-mechanism circuit, on panel, and makes wire connections. Disassembles, examines, repairs, or adjusts spring-wound clock, and reassembles clock [WATCH REPAIRER (clock & watch)] adding strike-control parts, such as hour-strike spring to hour mechanism, night-spot cutout to hour hand sleeve-wheel, and minute-mercury ring to minute mechanism. Bolts assembled clock mechanism in position on mounting casting. Assembles parts, such as dial, hour and minute hands, contact springs, motor drum and condenser, and makes wire connections to complete master clock mechanism. Installs completed assembly into master clockcase.

*GOE: 06.01.04 STRENGTH: L GED: R4 M2 L3 SVP: 7 DLU: 77*

### **715.381-014 ASSEMBLER, WATCH TRAIN (clock & watch)**

Assembles, inspects, and adjusts watch train (center, third, fourth, and escape wheels with pinions), using watchmaker's tools, loupe, and holding fixture: Examines parts to ensure freedom from defects, using loupe. Positions pillar plate in holding fixture and inserts pivots of wheel staffs into holes drilled in pillar plate jewels, using tweezers. Positions train bridge over wheels, aligns pivots with jewels in bridge, and screws bridge to pillar plate, using tweezers and screwdriver. Inspects assembled watch train for meshing of wheels and pinions and endshake (vertical play) of wheels, using tweezers and loupe [INSPECTOR, WATCH TRAIN (clock & watch)]. Moves jeweled bearings specified distance to correct deficient endshake, using micrometer and hand staking tool.

*GOE: 06.01.04 STRENGTH: S GED: R4 M2 L2 SVP: 6 DLU: 77*

### **715.381-018 BANKING PIN ADJUSTER (clock & watch) alternate titles: escapement matcher**

Inspects and adjusts position of watch banking pins to limit angle through which pallet swings to point where escape wheel clears pallet stones, using loupe and watchmaker's tools: Turns screw to move eccentrically placed banking pin until impulse face of escape wheel drops off pallet jewel. Moves pallet back and forth to test jewel pin shake (distance between pallet fork and jewel pin), to verify that shake is equal in both pallet positions, using tweezers. Bends pallet to equalize shake, using tweezers. Examines locking motion of escape wheel when guard pin is pressed against safety roller to verify guard pin shake (distance between guard pin and safety roller). Moves guard point out or files point to obtain correct length. Heats pallet to liquefy jewel adhesive, using hot plate, and moves jewels to correct slide, using tweezers. Examines pallet action to verify sufficient clearance between pallet and roller. Increases or decreases clearance between pallet and roller to correct deficiency, using tweezers.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 5 DLU: 77*

### **715.381-022 BARREL ASSEMBLER (clock & watch)**

Assembles, tests, and adjusts mainspring barrel assembly, using watchmaker's tools, handpress, and loupe: Attaches inner coil of mainspring to arbor of hand-operated mainspring winder, and winds spring within body of winder. Inserts wound spring into mainspring barrel, utilizing plunger inside winder. Presses barrel arbor into position and turns arbor until hook in arbor engages hole in center of coiled

spring, using tweezers. Places drop of oil on spring, using hypodermic syringe. Presses barrel cover into place, using handpress. Moves arbor up and down to test endshake (vertical clearance of arbor between cover and bottom of barrel), using tweezers and loupe. Corrects insufficient or excessive endshake [BARREL-ENDSHAKE ADJUSTER (clock & watch)]. May press rounded punch against barrel hub to correct side-shake (clearance between arbor and barrel hole).

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **715.381-026 BARREL-BRIDGE ASSEMBLER (clock & watch)**

Assembles barrel, setting lever, ratchet wheel, and barrel bridge to \$T3pillar plate\$T1 to form barrel-bridge assembly, using watchmaker's tools, loupe, and holding fixture: Positions pillar plate on holding fixture and places barrel in plate recess, using tweezers and loupe. Screws barrel bridge with assembled crown wheel and click (pawl) in position over barrel and screws setting lever and ratchet wheel in place, using screwdriver. Holds ratchet wheel in position and tightens ratchet screw, using screwdriver. Positions clutch wheel and winding pinion in place and inserts stem through hole in pillar plate to secure assembly, using tweezers and loupe.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **715.381-030 BARREL-ENDSHAKE ADJUSTER (clock & watch)**

Tests and adjusts barrel endshake (vertical clearance of arbor between cover and bottom of barrel), using holding fixture and jeweler's tools: Places barrel assembly in holding fixture and moves arbor up and down to test endshake, using tweezers. Estimates from experience whether shake is within acceptable limits (between 0.015 and 0.02 mm). Actuates arms of holding tool to bend barrel cover sufficiently to correct endshake error.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **715.381-034 BLOCKER AND POLISHER, GOLD WHEEL (clock & watch)**

Trues, blocks, and polishes gold watch wheels, using handpress, block adhesive, and polishing stones: Flattens (trues) wheel, using handpress. Blocks wheels in recess of disk-shaped block, using adhesive [BLOCKER (clock & watch)]. Rubs wheel on wet stone to rough polish wheel. Applies polishing compound to steel block and rubs wheel on block to polish wheel to required luster. Examines wheel to verify required luster and freedom from defects, using loupe.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **715.381-038 CHRONOMETER ASSEMBLER AND ADJUSTER (clock & watch)**

Assembles, tests, and adjusts marine chronometers, using watchmaker's tools and loupe: Assembles parts, such as plates, bridges, train wheels, mainspring, and fusee, in specified sequence, using tweezers and watchmaker's tools. Greases and assembles fusee and barrel assembly. Tests assembled parts, such as fusee and barrel and train wheels for specified endshake (vertical movement), using tweezers. Bends parts, such as bridges, to correct insufficient or excessive endshake. Oils and greases bushings and other surfaces requiring lubrication. Cleans parts, such as plates, mainspring barrel, and hands, using buff stick moistened with benzine. Tests operation and fit of parts and subassemblies during assembly and makes adjustments to eliminate any improper fit or malfunctioning. Changes timing weights on balance wheel to correct deficient timing and tightens or replaces loose jewels, using watchmaker's tools.

*GOE: 06.01.04 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

#### **715.381-042 CHRONOMETER-BALANCE-AND-HAIRSPRING ASSEMBLER (clock & watch)**

Assembles and trues balance and hairspring assemblies used in marine chronometers, using \$T3truing I\$T1 calipers and watchmaker's tools: Attaches hairspring to collet, using watchmaker's tools. Positions hairspring and collet assembly in truing calipers and bends hairspring to correct deficient truing, using tweezers. Attaches stud to hairspring and screws balance staff into balance wheel. Trues balance wheel,

using truing calipers. Fastens balance screws, weights, and timing screws in balance wheel, using screwdriver. Inserts impulse and unlocking rollers in assembly. Poises balance wheel, using truing calipers. Connects hairspring and collet to balance wheel assembly, using watchmaker's tools.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **715.381-046 DIAL MAKER (clock & watch) alternate titles: watch-dial maker**

Performs any combination of following tasks to fabricate clock and watch dials: Cuts out dial blanks, using handtools. Solders holding feet to dial, using soldering iron. Brushes, buffs, and polishes dial, using variety of abrasive wheels. Plates dials with silver, gold, nickel, or other metals [PLATER (electroplating)]. Stakes numerals and numeral indicators, such as diamonds, to dial [STAKER (clock & watch)]. Prints designs, numerals, and company's name on dials [TRANSFERRER (clock & watch)]. Inspects completed dials for dirt and scratches, completeness of printed designs, and adherence to dimension specifications.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **715.381-050 FINAL INSPECTOR (clock & watch) alternate titles: adjuster and inspector; finishing inspector; watch-assembly inspector; watch inspector, final movement**

Inspects and tests watch and clock subassemblies and completed watch movements for mechanical and visual defects and makes adjustments to correct defects, using watchmaker's tools and loupe: Inspects banking of pallet, lock, drop, and slide of escapement. Verifies that hairspring is level and centered [INSPECTOR, HAIRSPRING TRUING (clock & watch)], and inspects and adjusts \$T3beat\$T1 [PUT-IN-BEAT ADJUSTER (clock & watch)]. Tests endshake (vertical play of wheels), using tweezers, to verify that shake is within acceptable limits. Examines spring to verify centering between regulator pins and centers regulator lever. Examines movement for scratches, and blows out dust or dirt, using airhose. Activates watch and clock movements and compares time indicated with master clock to verify accuracy of movements. Listens to movements in operation to detect excessive noise. Turns time and alarm shafts and pulls alarm buttons to test alarm mechanisms for freedom of movement. Examines external surfaces for defects, such as cracked or scratched cases or crystals, loose or misaligned hands, and faulty printing on dials. Oils or inspects oiling of pallet stones and jeweled bearings. Disassembles movement to point of error and replaces defective parts, using watchmaker's tools. Observes minute parts with aid of loupe. May clean parts with soft leather and polish case with chamois.

*GOE: 06.01.05 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

#### **715.381-054 HAIRSPRING ASSEMBLER (clock & watch) alternate titles: watch-hairspring assembler**

Assembles, inspects, and adjusts watch hairspring and balance assemblies, using watchmaker's tools: Attaches hairspring to collet and stud [COLLETER (clock & watch) 715.684-066; STUDDER, HAIRSPRING (clock & watch) 715.684-186], and assembles parts of hairspring and balance, using punch, staking tool, tweezers, and other watchmaker's tools. Overcoils spring [OVERCOILER (clock & watch) 715.684-150], and trues spring [HAIRSPRING TRUER (clock & watch) 715.381-058]. Poises balance wheel. Locates vibrating point [HAIRSPRING VIBRATOR (clock & watch) 715.381-062]. Inspects and adjusts hairspring and balance assembly [INSPECTOR HAIRSPRING (clock & watch) I 715.381-066].

*GOE: 06.01.04 STRENGTH: L GED: R3 M1 L2 SVP: 5 DLU: 77*

#### **715.381-058 HAIRSPRING TRUER (clock & watch)**

Examines and adjusts hairspring assemblies to ensure horizontal and circular alignment of hairspring, using \$T3truing I\$T1 calipers, loupe, and watchmaker's tools: Mounts hairspring and balance wheel assembly between jaws of truing calipers. Turns wheel of caliper and examines spring to determine if center coils appear as perfect circles, using loupe. Bends inner coil of spring away from or toward collet to locate center of collet in center of spring and to correct errors resulting from faulty colleting of coil, using tweezers. Estimates space between collet and first inner coil to determine if space is within acceptable

limits, and bends coil to correct errors, using tweezers. Examines plane of hairspring to determine if coils are parallel to plane of collet and raises or lowers individual coils to correct discrepancies, using tweezers.  
*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

### **715.381-062 HAIRSPRING VIBRATOR (clock & watch)**

Locates \$T3vibrating\$T1 point (point at which length of spring is such as to cause attached balance wheel to oscillate at specified rate) on clock and watch hairsprings and cuts hairspring at specified point to synchronize oscillation of movements, utilizing one or both of following methods: (1) Fastens free end of spring of hairspring assembly in fixture of electronic vibrating device, and adjusts bed of device until it touches pivot of vertically oscillating balance wheel, as indicated on cathode-ray tube. Observes second cathode-ray tube to determine excess length of spring as vertical swings are translated into corresponding horizontal oscillations. Winds excess length of spring into holding fixture of device and readjusts bed until cathode-ray tube readings are within acceptable limits. Starts shears to cut excess spring at specified distance from vibrating point for attachment to stud. (2) Inserts end of spring into holding tweezers of master balance wheel assembly, and adjusts tweezers until pivots and arms of test and master balances are aligned. Releases lever that gives starting impulse to both balances simultaneously, and observes operation to determine if balances are synchronized. Resets holding point of vibrator tweezers and repeats operation until balances are synchronized. Cuts off spring at specified distance from vibrating point for attachment to stud, using cutting pliers.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

### **715.381-066 INSPECTOR, HAIRSPRING I (clock & watch)**

Inspects completed hairspring assemblies, using loupe and watchmaker's tools: Verifies that spring and balance wheel are true in flat and round [INSPECTOR, BALANCE TRUING (clock & watch)], and that mass of balance wheel is equally distributed around axis of rotation [INSPECTOR, POISING (clock & watch)]. Examines positioning of parts to determine that parts are in \$T3beat,\$T1 and that \$T3overcoil\$T1 is in specified relationship to spring, using loupe. Verifies that parts are securely staked, using tweezers. Separates unsatisfactory assemblies. Observes minute parts and functioning of parts with loupe. May test parts to determine if \$T3vibrating\$T1 point has been accurately located, using master balance [HAIRSPRING VIBRATOR (clock & watch)].

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

### **715.381-070 INSPECTOR, WATCH ASSEMBLY (clock & watch)**

Inspects watch subassemblies and incomplete watch movements for mechanical and visual defects, using watchmaker's tools and loupe: Inspects parts, such as bridges, jewels, and screws, for cracks, scratches, and other surface defects, using loupe. Turns wheels to detect amount of vertical play (endshake) and to ascertain if wheels have sufficient freedom, using tweezers and picks. Winds mainspring to determine wheel characteristics, such as flatness of path and freedom of movement. Examines wheels and pivots for bends and alignment, using loupe. Records defects found.

*GOE: 06.01.05 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

### **715.381-074 INSPECTOR, WATCH TRAIN (clock & watch)**

Inspects assembled watch train (center, third, fourth, and \$T3escape wheels\$T1 with pinions) for vertical play of wheels (endshake), meshing of gears, and cleanliness of movement, using watchmaker's tools and loupe: Moves wheels up and down to test endshake, using tweezers, and determining from experience whether shake is within acceptable limits. Turns center wheel to ascertain that gears mesh and that train turns easily. Examines assembly for cleanliness, oiling of cap jewels, and to determine that wheels are level and in parallel planes, using loupe. Rejects or accepts watch train assemblies and places defective assemblies in trays according to type of defect.

*GOE: 06.01.05 STRENGTH: S GED: R4 M2 L3 SVP: 7 DLU: 77*

**715.381-078 LOCATION-AND-MEASUREMENT TECHNICIAN (clock & watch)**

Inspects machined watch parts to ensure that hole locations, contour measurements, and shapes conform, within prescribed tolerances, to blueprint specifications, using coordinate measuring machine (precision optical device) and working to tolerances of up to 0.00001 inch: Places watch part on viewing table of projector, adjusts focus of projector, and installs glass chart on viewing screen preparatory to inspection. Aligns part with specified locations or measurement points on chart and examines projected enlargement to determine if hole locations, contour, and shape of part fall within tolerance lines etched on chart. Positions part on microscope table of coordinate measuring machine to reexamine part and to obtain precise coordinate measurements. Observes part through microscope and adjusts calibrated controls of measuring machine to center watch part and to determine vertical and horizontal measurements. Compares readings with chart and blueprint specifications and calculates differences between readings and specifications. Records inspection data and interprets findings to supervisory personnel. May operate coordinate measuring machine equipped with spotting and scribing device to locate, spot, and scribe tool, gauge, fixture, and die blanks and be designated Location-And-Measurement Technician, Tool Room (clock & watch).

*GOE: 06.01.04 STRENGTH: L GED: R4 M3 L3 SVP: 6 DLU: 77*

**715.381-082 PALLET-STONE INSERTER (clock & watch)**

Sets pallet stones in watch pallets, using tweezers and pallet-stone inserting fixture: Positions pallet over projecting pins in seat of fixture. Manipulates fixture attachments to squeeze sides of stone-holding recesses together to produce friction-tight holding recesses. Inserts stones in recesses, using tweezers.

*GOE: 06.02.32 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

**715.381-086 PALLET-STONE POSITIONER (clock & watch)**

Adjusts position of pallet stones to extend each stone specified amount from face of holding recess, using positioning fixture: Fits pallet in fixture beneath binocular microscope. Examines pallet stones through microscope and inserts needle between base of stones and holding recess to force stones upward from recess. Swings fork end of pallet against positioning pins of fixture to force stones specified distance into recess.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

**715.381-090 SCREWHEAD POLISHER (clock & watch)**

Polishes screwheads to produce watch screws of specified dimensions and finish, using blocking equipment and polishing wheels: Fits screws in block, using tweezers and suction device. Applies shellac over screws, heats block to melt shellac, and seats screws in block, using handpress. Grinds block screwheads to remove burrs, using grinding wheel. Polishes screwheads to specified dimensions and finish, using flat-lap polisher [FLAT POLISHER (clock & watch)], or manually oscillates screwheads on polishing stones, using overhead pole or hand stick to apply pressure. Examines and measures screws to verify required finish and dimensional specifications, using loupe and precision gauge. Washes and boils block to remove loose polish and to liquefy shellac. Taps block to remove screws. Rinses, dries, and places screws in beakers for inspection.

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L2 SVP: 5 DLU: 77*

**715.381-094 WATCH ASSEMBLER (clock & watch)**

Assembles, tests, and adjusts complete watch movements according to specifications, using watchmaker's tools and loupe: Attaches hairspring and balance assembly, train, escapement, winding and setting mechanism, mainspring, jeweled bearings, and bridges, using tweezers, hand staker (press), and other watchmaker's tools, and loupe. Inspects movement for accuracy, diagnoses cause of defects, and replaces defective parts. Adjusts subassemblies, such as \$T3truing IIS\$T1 balance and banking escapement.

*GOE: 06.01.04 STRENGTH: L GED: R4 M3 L3 SVP: 6 DLU: 77*

**715.384-010 BALANCE ASSEMBLER (clock & watch)**

Screws watch balance and balance bridge assembly to \$T3pillar plate.\$T1 Places pillar plate in holding fixture, and positions balance and bridge assembly on plate securing with screws. Tests balance for endshake (vertical play) by gently moving balance, using tweezers, and determining from experience if shake is within acceptable limits. Raises bridge slightly, using tweezers, or disassembles bridge and presses down on reverse side to correct shake. Touches oil-filled hypodermic needle to jewel to oil lower balance jewel prior to assembling. Observes minute parts with aid of loupe and handles parts with tweezers.

*GOE: 06.02.23 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

**715.384-014 INSPECTOR, MECHANISM (clock & watch)**

Inspects assembled watch winding and setting mechanisms for mechanical and surface defects, using tweezers and loupe: Moves stem in and out to verify clicking into winding and setting positions and turns stem in each position to test for ease of winding and setting. Moves barrel of mechanism to test for amount of vertical play (endshake), using tweezers, and determining from experience whether shake is within acceptable limits. Examines movement for scratches and presence of dirt, using loupe.

*GOE: 06.03.01 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

**715.384-018 INSPECTOR, POISING (clock & watch)**

Inspects \$T3poise\$T1 of watch balance wheels to determine if mass of wheel is equally distributed around balance wheel staff, using poising tools and loupe: Mounts wheel in poising tool that supports staff on knife edges as wheel is rotated in channel, using tweezers. Observes rotating wheel to verify evenness of turning, using loupe. Removes screw from uneven or heavy area of wheel and mills screw to decrease weight, using hand milling tool. Rejects and segregates units if balance wheels are out of poise or if general condition of unit does not meet specifications.

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

**715.384-022 INSPECTOR, WATCH PARTS (clock & watch)**

Examines and measures watch and clock components, such as pinions, wheels, gears, \$T3pillar plates,\$T1 shafts, pallets, wheel and pinion assemblies, and escapement assemblies to ensure conformance to tolerance specifications and quality standards, using loupe, precision measuring instruments, and electronic timing devices: Reads blueprints and inspection specifications for parts to be inspected to determine types and sequences of inspection and measuring instruments required. Examines components for surface defects, such as scratches, burrs, nicks, and blemishes, using loupe, optical comparator, microscope, and tweezers. Measures components to ensure adherence to dimensional specifications, using precision measuring instruments, such as gauges, calipers, dial indicators, comparascopes, and micrometers. Approves or rejects components according to inspection results and records reasons for rejection. Checks accuracy of measuring instruments, using calibrating equipment. May project watch parts on screen to inspect parts [COMPARATOR OPERATOR (any industry)]. May weigh fine parts, such as timing, balance, and gold screws to ensure conformance to weight specifications, using balances and scales. May test hardness of watch parts [HARDNESS INSPECTOR (heat treating)]. May be designated according to component inspected as Arbor Inspector (clock & watch); Balance-Staff Inspector (clock & watch); Barrel Inspector (clock & watch); Case Inspector (clock & watch); Hands Inspector (clock & watch); Mainspring-Strip Gauger (clock & watch). May be designated: Mainspring-Strip Inspector (clock & watch); Pinion Inspector (clock & watch); Plate Inspector (clock & watch); Screw Inspector (clock & watch).

*GOE: 06.01.04 STRENGTH: S GED: R3 M2 L3 SVP: 6 DLU: 77*

**715.584-010 DIAL REFINISHER (clock & watch)**

Refinishes watch dials, according to specifications: Removes original finish and dial markings, such as numerals and calibrations on faceplate, using chemical solution and buffing wheel or wire brush. Applies specified finish to dial, using plating solution. Embosses and retouches markings, using stamping equipment, paint, and brush. Sprays dial with lacquer to preserve finish. May attach numerals to faceplate with rivets. May apply radium to dial markings to form luminous dial.

*GOE: 06.04.33 STRENGTH: S GED: R2 M1 L2 SVP: 5 DLU: 77*

#### **715.584-014 REPAIRER, AUTO CLOCKS (clock & watch)**

Repairs surface defects in battery-operated clocks for motor vehicles, using handtools: Examines rejected clock for defects, such as scratched or broken lens, damaged backplate, and bent or missing hands. Removes and replaces defective parts, using handtools, such as punch, tweezers, staking tool, and screwdriver. Places repaired clock in tray for retiming. Records quantity and type of clocks repaired.

*GOE: 06.04.34 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.584-018 STONER, HAND (clock & watch)**

Stones (polishes) watch parts, such as winding wheels and clicks (pawls), to specified thickness, using blocking equipment and polishing stone: Adjusts stops on block corners to specified height indicated by gauge, using screwdriver. Brushes block surface with vaseline to hold wheels or clicks in place. Fits wheels or clicks over protruding pins of block, using tweezers. Places block, face down, on stone. Fits projecting pin of handle in block recess and rubs block against stone with circular motion until touch indicates parts are stoned to size. Verifies thickness of part, using loupe and indicator gauge.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.660-010 SET-UP WORKER (clock & watch)**

Sets up and adjusts staking machines used to assemble clock and watch parts according to blueprints and operation sheets: Confers with department supervisor and reviews operation sheets to determine parts or assemblies to be processed, assembly specifications, and instructions for machine setup. Bolts or screws specified dies into beds of machines according to blueprints, using handtools. Operates machines to press or rivet parts together to form sample assemblies. Examines and measures sample assemblies for adherence to surface and dimensional specifications, using gauges such as micrometers and calipers, and confers with quality control personnel to gain approval of sample for production. Demonstrates operation of machines to production workers and examines work to detect production defects. Oils and cleans machines, using oilcans and cloths.

*GOE: 06.01.02 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 77*

#### **715.681-010 TIMING ADJUSTER (clock & watch) alternate titles: poiser, balance**

Alters weight of watch balance wheels to correct timing of movement, using jeweler's tools and loupe: Receives movement from INSPECTOR, TIMING (clock & watch) with indication of rate of gain or loss in time. Replaces balance wheel screw with one of heavier weight or adds washer of specified weight when movement is fast, using screwdriver. Repeats operation on opposite side of balance wheel to maintain \$T3poise.\$T1 Replaces balance wheel or files angle of screw point to reduced weight, using hand file. Repeats operation on opposite side of wheel to maintain poise. Observes minute parts, using loupe.

*GOE: 06.02.24 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **715.682-010 BARREL FINISHER (clock & watch)**

Operates lathe to turn watch gear blanks (barrels) to size preparatory to milling. Positions barrels into chuck of lathe. Starts lathe and holds tool against material. Gauges finished barrels, using measuring device.

*GOE: 06.02.02 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

**715.682-014 COUNTERSINKER (clock & watch)**

Operates vertical- or horizontal-drill press to countersink drilled holes in watch parts: Places part in bed or chuck of press. Aligns countersinking bit and hole, using loupe, and advances bit manually to automatic stop device. Removes part from press and measures depth of countersink, using precision dial gauge. May countersink screw holes around periphery of balance wheels and be designated Countersinker, Balance Screw Hole (clock & watch).

*GOE: 06.02.02 STRENGTH: L GED: R2 M2 L1 SVP: 3 DLU: 77*

**715.682-018 POLISHER (clock & watch)**

Operates lathe and rag wheel polisher to smooth and polish edges of watch plates and bridges: Selects basswood \$T3lap IST1 of specified size to polish recessed or curved surfaces and mounts lap in lathe. Holds bar of abrasive against rotating surface to charge lap. Manipulates bridge or plate against lap to smooth corners and edges. Strings cut parts on wire and pushes parts against revolving edge of rag wheel to polish parts to specified finish. Washes polished parts in benzine to remove cutting and polishing compound. Holds and turns wooden lap against lathe to dress lap.

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

**715.682-022 TAPPER, BALANCE-WHEEL SCREW HOLE (clock & watch)**

Operates powered horizontal tapping machine to cut internal threads in screw holes around periphery of watch balance wheel: Places center hole of balance wheel over protruding pin of machine chuck. Turns wheel to align hole with tap and presses handle to start tap forward into hole. Verifies size of holes, using precision plug gauge. Replaces worn taps.

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

**715.682-026 TOOTH POLISHER (clock & watch)**

Operates bench-polishing machine to remove scratches and burrs and to impart polished finish to watch pinion teeth: Positions pinion in machine holder, using tweezers. Depresses pedal to engage lapping wheel and holds abrasive and polishing compound against rotating wheel to dress wheel. Presses machine lever to lower and hold lapping wheel against pinion to remove defects and polish pinion teeth. Releases pedal to stop machine after prescribed period and raises lever to gain access to polished pinion. Depresses pedal of hot air device to melt polishing compound adhered to pinion and to blow pinion into container. Mounts pinion in holding calipers and cleans pinion, using electric brush and cleaning compound. Examines and measures cleaned pinions to verify specified finish and dimensional specifications, using loupe and precision gauges.

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

**715.684-010 ADJUSTER, ALARM MECHANISM (clock & watch)**

Adjusts alarm mechanism and lubricates moving parts of electric alarm clock assemblies, using handtools: Clamps lead wires of clock motors to current outlet. Bends alarm striker, turns alarm indicators to specified setting, and pulls and turns set shafts to adjust and set alarm, using tweezers, pliers, and knife. Observes mechanism in operation to verify freedom of moving parts. Lubricates moving parts, using brush and lubricant. Places acceptable assemblies on conveyor for further processing and places defective assemblies in tray for repair. Tallies number of mechanisms adjusted, using counter, and records production.

*GOE: 06.04.34 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 77*

**715.684-014 ASSEMBLER, MOVEMENT (clock & watch)**

Assembles watch, clock, and appliance timer movements, using handtools and power tools: Positions front plate assembly in holding fixture. Positions setting and winding mechanisms on front plate and



positions escapement, pallet, and train pivot in pivot holes of front plate, using tweezers and loupe. Positions backplate over pillars and aligns pivots of parts with pivot holes in backplate. Fastens backplate to movement, using pneumatic screwdriver. Attaches alarm components to alarm clock movements, installs motors in electric clocks, and assembles motors and appliance timers, using handtools and pneumatic screwdriver. Records quantity of movements assembled.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.684-018 BALANCE TRUER (clock & watch)**

Tests and adjusts watch balance wheels to ensure that rim is concentric with staff axis: Mounts balance wheel and staff on test stand or between jaws of \$T3truing IIST1 calipers, using tweezers, and twirls wheel by hand. Determines that dial gauge readings are within acceptable limits as rim of revolving wheel brushes against gauge arm on test stand, or determines no clearance variation between rim of wheel and caliper index pointer placed above rim, using loupe. Bends rim to eliminate distortions, using tweezers or rim wrench.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

#### **715.684-022 BALANCE-BRIDGE ASSEMBLER (clock & watch)**

Attaches balance assembly to balance bridge: Positions regulator in nest of holding block and places balance bridge over regulator to fit balance bridge jewel into hole in regulator. Presses bridge into place, using tweezers. Positions balance wheel and hairspring assembly over bridge, and places hairspring stud into hole in bridge. Tightens screw to hold stud securely. Oils balance bridge jewel, using oil-filled hypodermic needle. Observes minute parts, using tweezers and loupe.

*GOE: 06.02.23 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **715.684-026 BENCH HAND (clock & watch)**

Positions screws in rims of balance wheels and secures screws in place, using screwdriver.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.684-030 BEVELER (clock & watch)**

Bevels watch hands to form rounded surface, using ram: Positions watch hand in nest on bed of die, using tweezers, and starts ram. Blows dirt from die after each operation, using compressed-air hose.

*GOE: 06.02.24 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.684-034 BLOCKER (clock & watch) alternate titles: blocker, polishing**

Positions flat pieces, such as clutch levers and escape wheels, on circular metal blocks or into recesses in blocks preparatory to grinding operation: Heats block and applies shellac. Places pieces over surface of block, using tweezers. Reheats block, places sheet of paper on top of block, fits press block directly over circular block, and applies pressure in screw press to position pieces firmly in shellac. Removes pieces from press, and inspects parts for proper position prior to grinding process. Blocks parts, such as wheels and screws, using suction device. Heats, shellacs, and presses loaded blocks to secure parts. May spread layer of vaseline over block to hold parts.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 4 DLU: 77*

#### **715.684-038 BURNISHER, BALANCE WHEEL ARM (clock & watch)**

Burnishes chamfer on watch balance wheel arm, using burnishing tool and loupe: Fits balance wheel in work plate of jig and tightens jig to hold wheel in place. Burnishes arm by hand to round and polish edges. Inspects finished wheel, using loupe.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.684-042 BURRER (clock & watch) alternate titles: burrer, hand; scraper burrer**

Removes burrs from rims, edges, and recesses of watch parts, such as pillar plates and barrel bridges, using burring tool. Inspects parts to ensure removal of burrs, using loupe.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.684-046 CANNON-PINION ADJUSTER (clock & watch)**

Attaches and adjusts cannon pinion to arbor of center wheel, using hand punch: Lubricates arbor, using oil-filled hypodermic needle. Positions cannon pinion over center wheel arbor and secures pinion onto arbor, using tweezers or hand punch. Pinches arbor with pliers at specified points to loosen or tighten pinion. Observes minute parts, using tweezers and loupe.

*GOE: 06.04.23 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

**715.684-050 CAP-JEWEL PLATE ASSEMBLER (clock & watch)**

Attaches cap jewel plate to train and balance bridges: Places bridge in holding fixture and positions cap jewel plate over bridge, aligning cap jewel with hole in bridge. Inserts minute screw into hole with tweezers and screws plate to bridge. Observes minute parts with loupe. May insert screw in hole of balance bridge to facilitate subsequent fastening of hairspring stud.

*GOE: 06.02.23 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

**715.684-054 CASER (clock & watch)**

Performs any combination of following duties to insert clock and watch assemblies in cases: Inserts and secures crown and stem into clock and watch movements, using loupe, tweezers, screwdriver, and other jeweler's tools. Cleans case, using air hose, and inserts movement into case. Presses revolving plastic cup against crown or rubs crown against plastic strip to wind movement. Sets watch to specified time prior to testing. Secures watertight cases, using pliers, or places assembly in device that tightens case automatically. May remove temporary crown and stem prior to assembly, using handtools. May measure stem, using gauge, and file stem to specified length. May screw crowns onto stems. May test waterproof watches in air pressure and water tanks.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

**715.684-058 CLOCK ASSEMBLER (clock & watch)**

Attaches power cords, cases, dials, and hands to electric clock movements to assemble electric clocks, using handtools: Inserts end of power cord through opening in clock case and splices wires from motor of clock movement to cord, using plastic connectors. Fastens case to clock movement, using pneumatic screwdriver. Positions dial over front plate of movement and attaches hour, minute, and second hands to cannon pinion, using wrench. Aligns clock hands and alarm indicator and pulls alarm button to test mechanism. Snaps plastic crystal into case, affixes label to back of case and places assembled clock on conveyor for further processing.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

**715.684-062 COLLET DRILLER (clock & watch)**

Tends drill press that drills holes in metal collars (collets) prior to assembly with watch escapement movement. Positions collets on bed of drill press, using tweezers. Lowers revolving drill to bore and countersink hole in collets.

*GOE: 06.02.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

**715.684-066 COLLETER (clock & watch)**

Attaches inner coil of watch hairspring to collet preparatory to assembly to balance wheel: Positions collet over arbor of colleting tool, using tweezers and forces collet into place, using hand punch. Places hairspring over arbor and inserts end of inner coil into hole in collet, using tweezers and loupe. Inserts tapered brass pin into hole in collet and pulls pin through hole to secure hairspring against wall of collet, using tweezers and pliers. Cuts protruding ends of pin with pliers. May examine plane of hairspring and collet to ensure conformance to specifications.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.684-070 CROWN ATTACHER (clock & watch)**

Attaches watch crowns to stem: Inserts stems into chuck of machine and places crown in holding tool. Presses holding tool against revolving stem that automatically screws on crown. May hold stem with pliers and screw crown onto stem by hand.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 77*

#### **715.684-074 CROWN-WHEEL ASSEMBLER (clock & watch)**

Attaches watch crown wheel and click (pawl on ratchet wheel) to barrel bridge, using tweezers and loupe: Places bridge in holding fixture. Positions and secures crown wheel center (washer) over post in bridge and crown wheel over washer, using screw, tweezers, and loupe. Positions and secures click in bridge. Inserts click spring into position. May lubricate friction points of assembly, using oil-filled hypodermic needle.

*GOE: 06.02.23 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **715.684-078 CRYSTAL CUTTER (clock & watch)**

Grinds improperly fitting watch crystals to specified size and to remove rough or chipped edges, using abrasive wheel. Brushes crystal with lacquer and dries crystal under heat lamp to protect surface of crystal. Examines and measures crystals to ensure conformance to specifications, using loupe, calipers, and micrometer.

*GOE: 06.04.30 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

#### **715.684-082 DIAL-SCREW ASSEMBLER (clock & watch)**

Attaches dial screws to pillar plates preparatory to securing dial to watch, using screwdriver, tweezers, and loupe: Aligns number of pillar plates in holding fixture. Inserts and fastens screws to plates.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 77*

#### **715.684-086 DIALER (clock & watch)**

Attaches clock or watch dials to movements: Places movement in holding fixture, and positions hour wheel and one or more dial washers over cannon pinion, using punch or hand staking tool. Positions dial over movement, and inserts dial feet into holes in pillar plate or rod. Inserts feeler gauge between dial and plate to facilitate specified fit, tightens screws to secure dial, and removes gauge. Observes minute parts, using loupe and handles parts with tweezers. May snap clock dials in place in faceplate grooves. May attach clock hands, using hand staking tool.

*GOE: 06.02.23 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **715.684-090 DISASSEMBLER (clock & watch)**

Disassembles defective auto clocks for salvage or reuse of parts, using watchmakers' tools: Turns screws and nuts and separates parts, such as case, lens, backplate, hands, and dial, using screwdrivers, pliers, and tweezers. Segregates parts in trays for reuse. Places scrap parts in tray for salvage. Removes date stamp markings from parts, using solvent and cloth. Places dented or bent cases and backplates on metal block and straightens or smooths defective part, using mallet. Records quantity and type of clocks

disassembled.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.684-094 FINAL INSPECTOR, MOVEMENT ASSEMBLY (clock & watch)**

Inspects completed watch and clock movements and motors for defects, such as surface blemishes, missing parts, and misalignment of parts, using loupe, watchmaker's tools, and gauges: Winds and activates movements to verify prescribed wheel motion. Examines movements and motors for defects, such as misalignment of parts, missing parts, cracked or broken parts, and deficient oil content on jewels. Replaces or tightens missing screws, using screwdriver; removes scratches on parts, using buffing stick; and oils jewels, using hypodermic syringe. May test performance of motors used in electric clocks and timers, using voltmeter and ammeter and be designated Motor Checker (clock & watch). May be designated according to type of movement inspected as Final Inspector, Balance Wheel (clock & watch).

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

### **715.684-098 FINER (clock & watch)**

Attaches balance wheel and hairspring assembly to watch or clock movement, using handtools: Positions balance wheel and hairspring assembly between balance stud and balance screw of watch or clock movement assembly, using tweezers. Tightens balance screw to secure balance wheel and hairspring assembly to movement, using wrench. Inserts end of hairspring through eye (slot) of regulator and into hole of hairspring stud, and inserts hairspring wedge into hole of hairspring stud to secure end of spring to stud, using tweezers. Engages \$T3impulse pin\$T1 to pallet to activate movement, using tweezers. Oils specified parts of watch or clock assembly, using oil-filled hypodermic needle.

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

### **715.684-102 HAIRSPRING ADJUSTER (clock & watch)**

Inspects and adjusts watch hairsprings after assembly to \$T3pillar plate\$T1 for conformance to mechanical specifications, using loupe, holding device, and tweezers: Mounts assembly in holding device. Examines outer coil to verify that coil is centered between regulator pins, and that positioning of \$T3overcoil\$T1 is within acceptable limits, using loupe. Pinches segment of coil to position and level coil, using tweezers. Spins balance wheel to verify that all coils of spring are within same plane and concentric with collet when oscillating. Adjusts coils to correct discrepancies, using tweezers.

*GOE: 06.01.04 STRENGTH: L GED: R3 M1 L2 SVP: 4 DLU: 77*

### **715.684-106 HAND FILER, BALANCE WHEEL (clock & watch)**

Removes excess metal from inside rim of balance wheel, using radius file: Positions wheel in slot of work jig filing plate. Files excess metal between arm and inside rim of wheel to obtain specified balance of wheel, using file and loupe. Inspects wheels to ensure conformance to specifications. Shapes files on emery wheel.

*GOE: 06.02.24 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.684-110 HANDS ASSEMBLER (clock & watch)**

Attaches hands to faces of clocks and watches: Places movement in holding fixture of hand staking tool. Positions hour hand on hour wheel and forces hand over arbor to secure friction tight fit, using staking punch. Positions minute hand over cannon pinion of minute wheel and secures fit, using staking punch. Aligns hour hand with specified hour marking, and minute hand with numeral twelve. Bends tips of hands with tweezers to conform to curvature of dial. Presses second hand over fourth wheel arbor and secures fit. Winds watch and observes movement of hands to determine specified clearance between hands, dial, and crystal. Observes and handles minute parts, using loupe and tweezers.

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

**715.684-114 INSPECTOR, BARREL ASSEMBLY (clock & watch)**

Inspects and adjusts mainspring barrel assembly, utilizing either of following methods: (1) Grasps barrel arbor with pliers and locks arbor by means of adjustable ring on plier arms. Holds barrel and turns arbor to wind mainspring. Allows pliers to hang freely to observe spinning motion as result of spring unwinding, indicating faulty assembly. Separates faulty assemblies and places rejected assemblies by type of reject in containers for repair. (2) Winds spring to determine if arbor hook is secured in hole of center coil, using hand winding device. Tests endshake (vertical play) of barrel, using tweezers. Separates faulty barrel assemblies.

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 6 DLU: 77*

**715.684-118 INSPECTOR, HAIRSPRING TRUING (clock & watch)**

Examines assembled watch hairsprings to determine if spring is in same plane and concentric with collet, and that space between collet and first inner spring is within acceptable limits, using loupe. Separates faulty assemblies for adjustment by HAIRSPRING TRUER (clock & watch).

*GOE: 06.03.02 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

**715.684-122 INSPECTOR, HAIRSPRING II (clock & watch)**

Examines unassembled hairsprings for flatness and concentricity, using tweezers and loupe: Stretches spring to ensure specified plane and spacing between coils, using tweezers. Examines spring to detect defects, such as blemishes and bent or short tongues, using loupe. Segregates standard and defective springs in boxes for salvage, storage, and shipping. Records inspection data for identification purposes.

*GOE: 06.01.05 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

**715.684-126 INSPECTOR, WHEEL AND PINION (clock & watch)**

Inspects and adjusts assembled watch wheels and pinions for surface and mechanical defects, using tweezers, gauges, and loupe: Examines wheels for levelness, using gauges, and adjusts wheels to correct discrepancies [STRAIGHTENER, HAND (any industry)]. Tests and adjusts endshake (vertical movement) of wheels, using loupe and tweezers. Mounts wheels in gauge and observes gauge readings to verify that wheels and pinions are concentric with staff. Places straightedge on flat surface of wheels and turns wheels, observing wheels to detect passage of light, to test wheels for flatness. Examines wheels to detect scratches and broken teeth, using loupe. Segregates faulty and acceptable assemblies.

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

**715.684-130 JEWEL INSERTER (clock & watch)**

Inserts jewels in jewel settings: Squirts oil over settings on sheet of paper. Moistens tip of wooden peg with oil, picks up individual jewel, and positions jewel in setting, using peg. Presses jewel into setting, using staking tool. Inspects specified number of completed settings to ensure proper seating of jewels, using loupe.

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

**715.684-134 JEWEL STAKER (clock & watch)**

Presses jewels to watch bridges and plates, using staking tool: Positions part in nest of tool, using tweezers and loupe. Presses identifying mark or part on bridge or plate, using hand-operated punch. May press jeweled or metal markers onto dial for use as numerals, using adhesive-tipped stick.

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

**715.684-138 LACQUERER (clock & watch)**

Covers watch dials with lacquer to protect dials preparatory to polishing or plating numerals, or preparatory to final assembling. Dries lacquer in heated cabinets.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.684-142 MECHANISM ASSEMBLER (clock & watch)**

Assembles parts of watch winding and setting mechanism to \$T3pillar plate:\$T1 Positions clutch lever, clutch-lever spring, setting wheel, and minute wheel on plate, using loupe and tweezers. Places yoke over parts, and secures yoke with screws. May oil clutch and winding pinion, using oil-filled hypodermic.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.684-146 OILER (clock & watch)**

Oils watch parts, such as jeweled bearings, on center, third, fourth, and escape wheels, using oil-filled hypodermic needle or automatic oil dispenser. Observes minute parts, using loupe to determine specified amount of oil applied. May oil industrial motor assemblies.

*GOE: 06.04.33 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.684-150 OVERCOILER (clock & watch)**

Raises and bends outer coil of watch hairsprings to ensure \$T3overcoiling:\$T1 Positions balance assembly in holding fixture, using tweezers. Threads stud end of spring through fixture and clamps end securely. Adjusts series of levers to raise outer coil specified distance above plane of spring and straighten raised portion parallel with plane of spring. Pinches and bends outer coil to obtain concentric position with inner coils and to ensure overcoiling, using loupe and tweezers.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.684-154 PALLET ASSEMBLER (clock & watch)**

Attaches pallet assembly to \$T3pillar plate:\$T1 Places pallet arbor into hole in jewel of pillar plate. Places pallet bridge over pallet, aligns hole in jewel with pallet staff, and secures bridge to form assembly, using tweezers, loupe, and screwdriver. Moves pallet up and down, using tweezers, to test and adjust endshake (vertical movement) and estimates movement within acceptable limits. May disassemble pallet and bridge and move pallet bridge jewel to adjust endshake, using hand-operated press.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.684-158 PALLET RECTIFIER (clock & watch)**

Adjusts passing hollow (crescent-shaped notch) and sizes jewel-hole slots of pallets, using holding fixture and burnishing wheel: Locates pallet over hole in fixture. Pushes pallet into stop against V-shaped lap to adjust passing hollow. Holds pallet against carbide burnisher to size jewel slots according to specified width and depth. Turns fixture during burnishing to round walls of jewel slot.

*GOE: 06.02.24 STRENGTH: S GED: R2 M2 L2 SVP: 4 DLU: 77*

#### **715.684-162 PEARLER (clock & watch)**

Cuts cone-shaped notch in face of watch dial for use as numerals: Positions dial on bed of press, aligns second and center holes with pins in press. Raises bed of press to bring dial in contact with diamond-cutting tool that automatically cuts cone-shaped notch.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.684-166 PIN INSERTER, REGULATOR (clock & watch)**

Secures regulator pin in regulator, using jeweler's tools. Positions regulator in holding fixture and places pin in hole of regulator, using tweezers and loupe. Taps pin with hammer and cuts off protruding excess of

pin, using pliers. Secures fit of pin, using staking tool.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

### **715.684-170 POLISHER, DIAL (clock & watch)**

Polishes watch dial blanks, using abrasive belt or wheel: Holds blanks against rotating belt or wheel to buff dials, using jeweler's rouge. May rub dial over hone to impart distinctive mat finish to dial and be designated Watch-Dial Stoner (clock & watch). May polish raised numerals on watch dials and be designated Polisher, Numeral (clock & watch).

*GOE: 06.02.24 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.684-174 PUT-IN-BEAT ADJUSTER (clock & watch)**

Aligns hairspring stud with center of roller and roller jewel with line of center on \$T3escape wheel\$T1 pallet to ensure \$T3in-beat\$T1 of watch movement: Positions balance wheel assembly in fixture of tool, using tweezers, and engages crescent of roller with lever to prevent balance wheel from turning. Engages slot in hairspring collet, using plunger, and turns collet and attached hairspring until stud on outer coil of hairspring is aligned with indicator on balance wheel. Observes minute parts, using loupe.

*GOE: 06.02.23 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

### **715.684-178 SET-STAFF FITTER (clock & watch)**

Installs wheel and sleeve assembly in clocks preparatory to inserting hour hand: Places wheel and sleeve assembly over center staff protruding through front frame and meshes assembly with dial wheel pinion. Places time and alarm train onto staff and inserts staff through hole in clock frame. Places clock frame in jig of press that secures assemblies by means of washer and collet.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

### **715.684-182 STAKER (clock & watch) alternate titles: staking-machine operator; staking-press operator**

Presses or rivets parts together for use in assembly of watches, clocks, timers, and industrial motors, using staking machine or hand staking tools: Positions parts in specific relationship to each other in recess of die (bed) or fits part in punch of machine, using tweezers and loupe. Activates machine to lower punch that presses or rivets parts together. Places assembled parts on conveyor, in tray, or on table for further processing. May be designated according to parts assembled as Balance-Staff Staker (clock & watch); Hairspring Staker (clock & watch); Pin Inserter (clock & watch); Pinion Staker (clock & watch); Roller Staker (clock & watch).

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

### **715.684-186 STUDDER, HAIRSPRING (clock & watch)**

Attaches stud to watch hairspring preparatory to assembly to balance bridge, using studding fixture, loupe, and watchmaker's tools: Positions stud in recess of studding fixture, using tweezers, and broaches hole in stud, using handtool. Inserts end of outer hairspring coil into hole, and forces tapered brass pin through hole to wedge spring in place, using loupe and watchmaker's tools. Cuts off protruding ends of pin, using pliers.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.684-190 TRANSFERRER (clock & watch) alternate titles: watch-dial printer**

Prints numerals, minute and second tracks, and company name onto timepiece dials, using printing equipment: Positions holding fixture and gelatinous head in printer. Places engraved metal plate in holding fixture and spreads ink over plate. Removes excess ink, using spatula. Lowers gelatinous head of transfer printer onto plate to transfer design from plate to head. Moves watch dial into position and lowers gelatinous head to print design on dial. Applies lacquer to specific parts of dial to protect them during

brushing operations.

*GOE: 06.01.04 STRENGTH: L GED: R3 M1 L1 SVP: 3 DLU: 77*

### **715.684-194 TRUER, PINION AND WHEEL (clock & watch)**

Inspects and adjusts electric-clock wheel parts to correct \$T3truing IIST1 of pinion and wheel assemblies, using comparator, loupe, and truing tools: Places part in rotating jig of comparator and projects part onto calibrated screen to determine degree of truing defect [COMPARATOR OPERATOR (any industry) 699.384-010] or examines part to determine defect, using loupe. Bends parts manually to correct truing defect or forces truing tool against rotating part to correct defect.

*GOE: 06.01.04 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.685-010 COLLET GLUER (clock & watch)**

Applies glue to hairspring and balance wheel assembly of auto clocks and tends oven that dries glue to secure parts together: Places hairspring and balance wheel assembly in slots of die, using tweezers. Applies glue to inner coil of hairspring to join hairspring to balance staff collet, using glue dispenser. Sets time and temperature controls on bench-mounted oven and places tray of dies containing balance and hairspring assemblies in oven. Pulls trays from oven subsequent to curing of glue and stacks trays on rack for cooling. Pulls hairspring and balance wheel assemblies from dies and places assemblies in tray for further processing.

*GOE: 06.04.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **715.685-014 CUTTER, V-GROOVE (clock & watch) alternate titles: groove turner**

Tends lathe that cuts decorative V-shaped circular groove in faces of heattreated watch wheels. Depresses pedal to open chuck, inserts wheel, and releases pedal to secure wheel in chuck. Brushes lubricant on cutter and turns wheel to advance cutter into rotating watch wheel to cut groove.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.685-018 DEBURRER, MACHINE (clock & watch)**

Tends bench lathe that removes burrs and polishes watch parts, such as pinions and wheels: Inserts part in chuck of lathe, using loupe and tweezers. Positions deburring tool on tool rest, starts lathe, and moves tool against part to smooth surface.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

### **715.685-022 DRILLER AND BROACHER (clock & watch)**

Tends vertical drill that bores and broaches pinholes in watch regulators: Positions regulator in drilling jig, using tweezers, and closes jig. Places jig on table beneath drill, aligns bushing guide holes of jig with drill, using loupe, and depresses drill to bore holes in regulator. Removes drilled regulator from jig, positions and aligns holes under tapered broach (boring tool), and pulls handle to automatic stop to shape and enlarge holes.

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

### **715.685-026 END POLISHER (clock & watch) alternate titles: pivot-end polisher**

Tends polishing machine that smooths and imparts specified finish to pivot (staff) ends of pinions and arbors: Pulls spindle handle to insert and position pinion in holder of workpiece. Depresses pedal to start felt-wheel lap rotating across pivot end to polish ends. Charges wheel with lime stick as needed. Inspects ends to detect defects, such as burrs and rough surfaces, using loupe. Performs minor adjustments to machine.

*GOE: 06.02.02 STRENGTH: L GED: R2 M2 L2 SVP: 4 DLU: 77*



**715.685-030 GRINDER II (clock & watch)**

Tends jigging machines that grind pivots of watch parts to specified lengths: Pulls spindle handle to open spindle, inserts pinion with tweezers, and releases handle to force pinion into place in chuck. Depresses pedal to start rotating grinding wheel across end of pivot to grind pivot to specified size. Measures pinions to ensure specified lengths, using loupe and precision upright gauge.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.685-034 INSPECTOR, TIMING (clock & watch) alternate titles: reliability inspector; timer; timing-machine operator**

Tends electric timer that verifies timing \$T3beat\$T1 of clock, watch, and timer movements and adjusts movements to correct timing defects, using watchmaker's tools and loupe: Sets up timing device for specified type movement. Positions movement in holding fixture and connects movement to timing device. Activates timing device that automatically compares timing beat of test movement with standard and records discrepancies on tape. Adjusts movements to attain accurate beat or routes movement to TIMING ADJUSTER (clock & watch) 715.681-010. Records timing beat defects. Places acceptable movements in tray for assembly.

*GOE: 06.01.05 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

**715.685-038 MAINSPRING WINDER AND OILER (clock & watch) alternate titles: mainspring-winding-machine operator**

Tends semiautomatic mainspring-winding machine that winds mainspring into shell (barrel) and lubricates bearing surfaces: Opens chuck, inserts arbor, and fits spring assembly over arbor. Depresses pedal that allows winding and oiling mechanism to wind spring around arbor, and oil spring. Places barrel over spring by hand and removes assembly from chuck. May wind mainspring, using hand-operated spring-winding tool. May reverse mainspring to coil spring in direction used in watch and be designated Mainspring-Reverse Winder (clock & watch).

*GOE: 06.04.02 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

**715.685-042 PINION POLISHER (clock & watch)**

Tends lathe that polishes leaves, pivots, or staffs of clock pinions: Clamps part in chuck of lathe. Starts lathe and swings tool rest into position. Forces slip of bell metal against rotating part to smooth surface. Repeats process, polishing part with slip of oilstone and buffing part with rouge to produce smooth, even surface. Examines part for surface defects, using loupe and tweezers. May be designated according to part polished as Pivot Polisher (clock & watch).

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.685-046 POLISHER, BALANCE SCREWHEAD (clock & watch) alternate titles: screwhead polisher**

Tends semiautomatic turning lathe that bevels and polishes balance wheel screwheads: Places screw, using tweezers, into threaded chuck and depresses pedal to turn screw firmly into chuck. Turns, bevels, and polishes screwhead by manually feeding diamond tool against rotating head until automatic stop is reached. Depresses pedal to reverse direction of rotating chuck and to remove finished screw. Observes parts, using loupe and tweezers.

*GOE: 06.04.02 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.685-050 PRESS OPERATOR, PIERCE AND SHAVE (clock & watch)**

Tends automatic press that pierces holes and shaves corners and holes of watch parts: Cleans work plate of press, using airhose. Positions part in recessed nest or over protruding pins of work plate. Presses button to activate press that automatically pierces and shaves part. Removes finished part from press and

measures dimensions of hole, using plug gauge.

*GOE: 06.04.02 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.685-054 PROFILER, HAND (clock & watch)**

Tends profiling machine that cuts grooves and recesses in watch parts: Clamps part in chuck. Moves forward and lateral guide handles simultaneously to press model against guide point as cutting progresses. Measures profiled dimensions, using precision indicator gauge and loupe.

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

#### **715.685-058 SOLDERER (clock & watch)**

Tends machine that solders holding feet (used to secure dial to watch movement) to back of watch dials: Places dial on asbestos holding fixture. Positions soldering rings over specified points on dial and positions dial foot in each ring, using tweezers. Lowers weights onto holding feet to secure feet in fixture. Starts machine that automatically moves lighted gas torch into position to solder feet to blank.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.685-062 TAPPER II (clock & watch)**

Tends tapping machine that cuts internal threads in watch-setting levers: Places levers in holding fixture of machine and aligns hole in lever under tap. Starts machine that lowers tap into holes to cut threads. Verifies size of hole, using plug and thread gauges. Removes burrs from tapped hole, using powered burr cutter.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.685-066 TORQUE TESTER (clock & watch) alternate titles: mainspring-torque tester**

Tends torque-testing machine that measures strength of watch mainsprings: Positions barrel in testing holder. Moves controls and reads scale indicating strength of coiled spring. Segregates assemblies into trays according to strength measurements.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.685-070 TUBING-MACHINE TENDER (clock & watch)**

Tends bench-mounted punch press that forms pivot holes in watch hour-hand tubes. Positions hand in nest on bed of press, using tweezers. Activates press that automatically forms hole in hour hand for insertion of pivot.

*GOE: 06.04.24 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **715.686-010 DESTATICIZER FEEDER (clock & watch)**

Feeds auto clock lenses into machine that coats lenses with anti-electrostatic solution: Wipes dust from lenses, using cloth, and examines lenses for imperfections. Discards defective lenses. Presses lenses in clamps of circular conveyor that carries lenses through spray booth for application of solution that dissipates electrostatic charges and prevents further accumulation of charges on lenses. Presses buttons to start and stop conveyor and to activate sprayer. Removes lenses from clamps subsequent to spraying and places lenses in box.

*GOE: 06.04.21 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.686-014 MACHINE FEEDER (clock & watch)**

Feeds jeweled settings, right-side-up, into hoppers of automatic machines in clock and watch manufacturing plant, using tweezers.

*GOE: 06.04.09 STRENGTH: L GED: R1 M1 L1 SVP: 1 DLU: 77*

**715.687-010 BAND ATTACHER (clock & watch)**

Attaches wrist bands to watches, using handtools: Removes holding pins from case, using handtool, and inserts pins into holes in band. Reattaches pins in case to secure band. Threads band through hole in women's watchcases, and crimps metal cord ring around band to secure band.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

**715.687-014 BARREL-CAP SETTER (clock & watch)**

Attaches cap (cover) to mainspring barrel assembly, using handtools: Places barrel assemblies in nests of special holder. Positions caps on assemblies, using tweezers, and presses caps firmly in place, using cap press (handtool). Oils assembly, using fountain oiler or oil-filled hypodermic syringe.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

**715.687-018 CRYSTAL ATTACHER (clock & watch)**

Inserts watch crystals into bezels (grooved holding rings) by hand.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

**715.687-022 DIAL BRUSHER (clock & watch) alternate titles: scratch brusher**

Cleans and polishes timepiece dials or dial blanks, using power brushing wheel or handbrush: Applies abrasive powder to dials. Holds dials against rotating brush or manipulates brush over dials to clean and polish dials. Examines surface of dials subsequent to cleaning and polishing to verify specified cleanliness and finish, using loupe. Rinses dials in water or alcohol and dries dials in heated centrifuge.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

**715.687-026 DIPPER, CLOCK AND WATCH HANDS (clock & watch)**

Dips watch and clock hands, mounted on board, into lacquer to cover perforations in hands preparatory to painting with radioactive paint. Skims off film of thickened lacquer from surface of tank before repeating process, using spatula.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

**715.687-030 FOOT STRAIGHTENER (clock & watch)**

Straightens timepiece dial holding feet, using holding device and gauge: Positions dial in holding device, aligning feet with holes in fixture of device. Closes collet of device that squeezes and straightens feet. Places dial in gauge that duplicates watch movement to determine that feet are straight and properly positioned and that center and second holes are correctly placed.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

**715.687-034 GAUGER (clock & watch)**

Measures height of pinions on wheel to ensure conformance to specifications, using gauge: Adjusts pointer of dial gauge to zero mark according to standard pinion on gauge block. Places test wheel and pinion in nest of gauge block, using tweezers, and reads gauge to determine height of pinion. Separates pinions according to grade.

*GOE: 06.01.05 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

**715.687-038 HAIRSPRING CUTTER I (clock & watch)**

Cuts off end of inner coil of watch hairspring to provide sufficient clearance for spring to slip over collet, using tweezers, hand clippers, and loupe. Places spring over gauge to determine if fit is correct.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

**715.687-042 HAIRSPRING CUTTER II (clock & watch)**

Cuts individual hairspring wires to specified length, using hand-operated cutting device: Pulls wire from spool and positions and clamps wire end in cutting stop. Pulls wire taut and cuts wire to specified length, using pivoted cutting blade.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 77*

**715.687-046 HAMMER ADJUSTER (clock & watch)**

Shapes hammers used to strike bells in alarm clocks, using holding fixture: Fits ends of hammers into holding fixture. Bends arms to required shape by hand.

*GOE: 06.02.24 STRENGTH: L GED: R1 M1 L1 SVP: 1 DLU: 77*

**715.687-050 INSPECTOR, BALANCE TRUING (clock & watch)**

Inspects watch balance wheels to verify that rim lies in single plane and that plane is perpendicular to staff axis, using ST3truing II\$T1 caliper, tweezers, and loupe. Mounts balance wheel and staff between jaws of truing calipers, using tweezers, and adjusts index pointer above end of balance arm. Turns and examines wheel to verify that space between index and both arms is identical, using loupe. Adjusts index pointer over rim of wheel and verifies that width of light slit between rim and index does not vary as wheel is rotated. Rejects wheels that are not true.

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

**715.687-054 INSPECTOR, BALANCE WHEEL MOTION (clock & watch)**

Examines motion of watch balance wheel to verify that wheel swings around an arc of at least 180 degrees, using holding fixture and loupe: Winds and positions watch in holding fixture. Examines swing of wheel utilizing balance arm as point of reference, to verify that swing is at least 180 degrees of arc, using loupe. Disassembles faulty balance wheel movements for repair.

*GOE: 06.03.02 STRENGTH: S GED: R2 M2 L2 SVP: 3 DLU: 77*

**715.687-058 INSPECTOR, BALANCE-BRIDGE (clock & watch)**

Examines assembled watch balance bridges to detect scratches and damaged screws and cap jewels, using loupe and tweezers. Centers regulator, using tweezers, and verifies that jewel is properly oiled, using loupe. Segregates faulty balance bridges.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

**715.687-062 INSPECTOR, CASING (clock & watch)**

Inspects assembled watches, clocks, and appliance timers for conformance to company standards: Scans assemblies to detect defects, such as surface blemishes, broken or scratched crystals, faulty plating, tightness of case, and presence of foreign matter. Turns crown and set buttons on assemblies to determine ease of setting and winding. Compares accuracy of watches and clocks with master clock to determine conformance to specified tolerances. Marks type of defects found on assemblies, using pencil or crayon, and places defective assemblies in containers for repair.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

**715.687-066 INSPECTOR, DIALS (clock & watch) alternate titles: hands-and-dial inspector**

Examines clock and watch dials for surface and mechanical defects, using loupe, gauges, and pick: Examines dials for surface defects, such as scratches, finger marks, double lines in printing of numerals, and defective lacquer coating, using loupe. Turns movement, dial side down, to determine if watch hands slip. Inspects hands to determine if they are aligned with numerals, are specified distances apart, and that they do not touch dial or crystal, using gauges. Moves second hand to ascertain if hand slips on arbor,

using pick. Inspects dials for centering of center and second holes, using gauges. May bake dials in oven for specified time to harden lacquer coating.

*GOE: 06.03.02 STRENGTH: S GED: R3 M2 L3 SVP: 4 DLU: 77*

#### **715.687-070 INSPECTOR, SOLDERING (clock & watch)**

Inspects soldered dial feet to verify that solder has melted evenly and that feet are held securely. Tests positioning of feet, using go-not-go gauge. May mix flux for use in soldering dial feet.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.687-074 INSPECTOR, TIMERS (clock & watch)**

Examines appliance timers for surface defects and sets timers preparatory to testing: Examines timers for defects, such as scratched dials, dents, and broken or missing parts. Places defective timers in carton for repair. Plugs test light into timer and turns dial of timer to specified setting. Places timer on vertical rack for testing and connects timer cord to electrical outlet. Flips switch of timer to verify that test light burns and that timer functions.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **715.687-078 MAINSPRING FORMER, ARBOR END (clock & watch)**

Forms arbor end and arbor spiral on watch mainsprings so arbor end will fit snugly around arbor hole, using hand forming tool. Mounts mainspring and arbor blanks in forming tool, using tweezers, and moves levers to form specified end and spiral.

*GOE: 06.02.24 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 77*

#### **715.687-082 MAINSPRING FORMER, BRACE END (clock & watch)**

Bends brace end of watch mainspring to match inside of mainspring barrel, using hand bending tool. Places brace end against pin in center of tool, using tweezers. Turns clamp to secure brace end in tool and manipulates tool handle to bend brace end to specified shape.

*GOE: 06.02.24 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.687-086 MASKER (clock & watch)**

Brushes lacquer in second track recess of timepiece dial to prevent removal of finish during polishing and brushes lacquer over trylons (numerical markings) of dial to prevent trylons from being plated during dial-plating operation.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-090 MOTOR POLARIZER (clock & watch)**

Polarizes motors used in timers and clocks, using electromagnet: Oils rotor pinion of motor, using oil-soaked cloth. Inserts motor between poles of electromagnet and activates electromagnet to polarize motor. Places polarized motor on conveyor for further processing. Tallies each polarized motor, using counting device, and records daily production.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-094 MOUNTER, CLOCK AND WATCH HANDS (clock & watch)**

Mounts clock and watch hands on board preparatory to dipping in lacquer: Presses eyelet end of hand onto adhesive material on board with pointed end extending specified distance over edge of board, using tweezers. Examines mounted hands to ensure that all hands on board are aligned and parallel.

*GOE: 06.04.23 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-098 PAINTER, CLOCK AND WATCH HANDS (clock & watch)**

Brushes short narrow stripes of radioactive paint on watch and clock hands so that hands will be visible in dark, using artist's brush.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-102 PARTS REMOVER (clock & watch)**

Removes watch parts from metal polishing blocks, utilizing one of following methods: (1) Heats block on hot plate to melt shellac, and pushes parts off block, using spatula, or holds block upside down and blows parts off block, using compressed air hose. (2) Heats and places block upside down on bed of handpress. Lowers ram to force parts out. (3) Places blocks in caustic solution to dissolve shellac and loosen parts.

*GOE: 06.04.34 STRENGTH: L GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-106 RACKER (clock & watch)**

Places electric clocks or electric motors used in clocks and timers on rack and connects lead wires to current outlets preparatory to testing. Records quantity racked, identification number, rack number, and date.

*GOE: 06.04.34 STRENGTH: L GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-110 REAMER, CENTER HOLE (clock & watch)**

Reams center holes of balance wheels subsequent to recessing operation to clean holes, using hand reamer and loupe.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.687-114 ROTOR ASSEMBLER (clock & watch)**

Assembles rotors used in electric timer motors, using glue dispenser and die: Places rotor disk in die attached to conveyor. Positions rotor shaft, with hub attached, through hole of rotor disk. Presses tip of pencil-shaped glue dispenser against hub of rotor shaft and rotor disk to join parts. Places plastic pinion in die, lifts glued assembly from die, and presses rotor shaft through hole in pinion to complete rotor assembly. Places completed assemblies in tray for further processing.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 77*

#### **715.687-118 SET-KEY DRIVER (clock & watch)**

Attaches time and alarm setting keys to assembled alarm clock movement, using press: Places keys into holding fixture of press and positions clock movement over keys so that ends of staff protrude through keyholes. Starts press that forces staffs into keys.

*GOE: 06.04.23 STRENGTH: L GED: R1 M1 L1 SVP: 2 DLU: 77*

#### **715.687-122 SPRING LAYER (clock & watch)**

Straightens, shapes, and forms clock springs, using holding fixture and pliers. Winds coiled spring around peg or pin of fixture and bends and shapes spring to specifications, using needle-nosed pliers.

*GOE: 06.02.24 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **715.687-126 WASHER (clock & watch)**

Immerses watch parts in series of cleaning and rinsing solutions to wash parts: Empties parts onto wire screen subsequent to washing and rinsing, and adds sawdust. Shakes screen causing sawdust to absorb moisture from parts and to drop parts through screen. Separates parts according to size, or places parts in box, for transfer to next operation. May dry parts, using electric lamp, centrifugal drier, or tumbling barrel. May weigh parts on balance scale. May mix cleaning solutions. May dip polishing blocks in caustic and soap solutions to remove shellac or vaseline and be designated Block Cleaner (clock & watch). May clean

mainspring barrel assemblies, using buff stick dipped in naphtha and be designated Mainspring-Barrel-Assembly Cleaner (clock & watch).

*GOE: 06.04.39 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **715.687-130 WINDER (clock & watch)**

Winds assembled watch movements and adjusts watch hands to indicate correct time preparatory to testing: Turns crown of movement against soft plastic sheet or holds crown against revolving plastic cup to wind movement or winds movement by hand. Rewinds movement after specified period and segregates movements that have gained or lost time in excess of specified amount.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

## **716 OCCUPATIONS IN FABRICATION AND REPAIR OF ENGINEERING AND SCIENTIFIC INSTRUMENTS AND EQUIPMENT, N.E.C.**

This group includes occupations concerned with grinding, polishing, and coating optical lenses, reflectors, filters, and prisms and ophthalmic eyeglass, sunglass, and contact lenses.

### **716.130-010 SUPERVISOR (optical goods)**

Supervises and coordinates activities of workers engaged in fabricating and inspecting eyeglass, contact, and precision optical lenses: Inspects lenses for defects and adherence to specifications, using devices such as polariscope, magnifying glass, protractor, and power determining instrument. Trains workers in operation of lens processing machinery, theory of optics, and lens handling. Keeps records and prepares reports on machine maintenance, lens breakage and spoilage, inventory and requisition of supplies, and personnel production and assignments. Sets up, adjusts, and repairs lens generators, polishers, edgers, and hardeners, using handtools. Performs other duties as described under SUPERVISOR (any industry) Master Title. May be designated according to type of lens manufactured as Supervisor, Contact Lens (optical goods); Supervisor, Multifocal Lens (optical goods); Supervisor, Precision Optical Elements (optical goods); Supervisor, Sunglasses (optical goods); or according to department as Supervisor, Fusing Room (optical goods); Supervisor, Grinding And Polishing (optical goods). May be designated: Molding-Room Supervisor (optical goods); Supervisor, Inspecting (optical goods); Supervisor, Lens Generating (optical goods).

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 86*

### **716.280-010 OPTICIAN APPRENTICE (optical goods; retail trade) alternate titles: ophthalmic-technician apprentice; optical-mechanic apprentice**

Performs duties as described under APPRENTICE (any industry) Master Title.

*GOE: 05.05.11 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

### **716.280-014 OPTICIAN (optical goods; retail trade) alternate titles: optical mechanic**

Sets up and operates machines to grind eyeglass lenses to prescription specifications and assembles lenses in frames: Reads lens and frame specifications from prescription. Selects lens blanks from stock. Sets up and operates machines, such as generator, polisher, edger, and hardener, to fabricate lenses to specifications. Mounts lenses in metal, plastic, or rimless frames. Inspects mounted lenses for conformance to specifications [INSPECTOR, EYEGLASS (optical goods)]. Examines broken lenses to identify original lens prescription, using power determining and optical centering instruments.

*GOE: 05.05.11 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

### **716.280-018 OPTICIAN (optical goods) alternate titles: flat optical element maker; optical model maker and tester; precision lens technician**

Sets up and operates machine tools to fabricate optical elements and systems, applying knowledge of layout and machining techniques and procedures, shop mathematics, and properties of optical and abrasive materials: Studies work order, blueprints, and sketches to formulate machining plans and sequences. Measures and marks dimensions and reference points to lay out stock for machining. Selects premixed compounds or mixes grinding, polishing, and holding compounds according to formula. Mounts workpiece on holding fixture, using adhesive, friction, or vacuum. Mounts and secures workpiece and tooling in machines. Operates machines, such as saws, lathes, grinders, milling machines, generators, polishers, and edgers to fabricate optics, fixtures, tools, and mountings of specified sizes and shapes. Grinds and polishes optics, using handtools, as required. Measures and tests optics, using precision measuring and testing instruments. May develop specifications and drawings from verbal description. May perform experimental work and research to develop new production methods and procedures applying shop mathematics and knowledge of production techniques. May train and direct other workers.  
*GOE: 05.05.11 STRENGTH: L GED: R4 M4 L4 SVP: 8 DLU: 77*

### **716.360-010 SIZER, MACHINE (optical goods)**

Sets up machines to grind and polish edges or surfaces of lens blanks: Selects specified grinding and polishing tools and secures tools to machine spindles, using handtools. Turns adjustment screws to set radius of grinding and polishing arm stroke according to size of lens holding block. Sets time cycle which automatically stops machines on completion of grinding and polishing process. Tilts and secures generator machine head at required angle with workpiece according to specified curve and thickness of lens. Installs and adjusts lens holders and diamond wheel on edging machines according to diameter of lens. May dress grinding wheel.

*GOE: 06.01.02 STRENGTH: L GED: R3 M3 L3 SVP: 7 DLU: 77*

### **716.381-010 INSPECTOR, PRECISION (optical goods) alternate titles: inspector, optical elements; lens inspector**

Inspects precision optical and ophthalmic lenses at various stages of production to ensure specified standards have been met, using precision measuring instruments: Reads prescription and work order to ascertain lens specifications. Examines lenses for defects, such as pits, scratches, unpolished areas, bubbles, and chips, using magnifying glass and polarized light. Verifies lens dimensions, such as thickness, size, curve, and position of bifocal element, using mechanical and fixed measuring instruments, such as calibrated microscope, micrometer, and test glass. Compares lens to sample to verify specified color. Mounts lenses on optical centering and power determining instrument, adjusts dials to focus and center test pattern, and compares power, centering, and axis readings with prescription to ensure specified standards have been met. Measures properties, such as coating thickness, angles, curves, and focal length of lens, using electronic, optical, and electromechanical measuring instruments, such as spectrometer, collimator, goniometer, and facimeters. Marks and routes defective lenses for rework or salvage. May clean optics to facilitate inspection. May be designated according to stage in production as Final Inspector (optical goods); In-Process Inspector (optical goods); or according to type lens inspected as Camera-Lens Inspector (optical goods); Contact-Lens Inspector (optical goods); Instrument-Lens Inspector (optical goods); Ophthalmic-Lens Inspector (optical goods); Prism Inspector (optical goods); Reticle Inspector (optical goods).

*GOE: 06.01.05 STRENGTH: S GED: R4 M3 L4 SVP: 7 DLU: 78*

### **716.381-014 LAY-OUT TECHNICIAN (optical goods)**

Locates and marks centers, axes, and terminal points on ophthalmic lens blanks, draws reference lines, and writes specifications to guide workers who surface or finish lenses: Reads work order to ascertain lens specifications. Examines lens blank to ensure freedom from defects and to verify color and size specifications. Positions lens blank to be surfaced on protractor and marks center, direction of cylinder axis, and position of reading lens segment. Mounts lens blank to be finished in optical centering and power determining instrument and adjusts dials to align and focus target. Compares dial readings with work order to ensure lens blank has been surfaced to meet power and axis specifications. Rejects defective



lenses. Depresses marking device on instrument to mark optical center and horizontal axis of lens blank. Writes specifications on lens blank to guide lens fabricating workers. May be designated according to department worked in as Bench-Lay-Out Technician (optical goods); Surface-Lay-Out Technician (optical goods).

*GOE: 06.01.04 STRENGTH: S GED: R3 M3 L3 SVP: 6 DLU: 77*

#### **716.382-010 LATHE OPERATOR, CONTACT LENS (optical goods) alternate titles: contact-lens cutter**

Operates jeweler's lathe to cut inside or outside curvature in contact lens blanks: Reads prescription to determine lens thickness and dioptric power and converts specified dioptric power to radius dimensions, using conversion table. Inserts plastic blank in holding chuck of lathe. Adjusts cutting tool mechanism for specified radius of inside or outside curvature and depth of cut. Starts lathe and turns crank to advance cutting tool. Observes gauge and readjusts lathe to prevent excessive cutting. Pulls control arm to move cutting tool across face of lens. Removes lens from chuck and examines lens for smoothness of cut. Measures lens to verify compliance with specifications, using thickness gauge and calipers. Tapes finished lens to work order and places lens in routing box.

*GOE: 06.02.08 STRENGTH: L GED: R3 M3 L3 SVP: 5 DLU: 77*

#### **716.382-014 OPTICAL-ELEMENT COATER (optical goods)**

Controls vacuum coating equipment to coat optical elements with chemical or metal film to alter reflective properties of elements: Reads work order to ascertain thickness of optical element and type coating material specified. Installs heating filament in coating machine according to type coating applied, using screwdriver. Fills crucible with coating material and positions crucible under heating filament. Secures optical element in jig and centers jig in vacuum chamber of machine to ensure uniform coating of optical surface. Places dome-shaped lid (vacuum bell) over jig or lowers lid equipped with window depending upon machine used. Starts machine that creates vacuum and releases chemicals or metal to form coating on optical element by process of sublimation or atomization. Observes changing colors of element through vacuum bell or through window in lid to determine when element is coated to specifications, or reads exposure meter to determine coating thickness. Applies and removes strip of cellophane to test adherence of coating to optical element. May immerse elements in chemical solution to clean elements. May operate ultrasonic vibrator to clean element. May inspect optical elements prior to coating to detect defects, such as blemishes, abrasions, and rough edges, using microscope. May cement optical elements together to form multiple laminated elements [CEMENTER (optical goods)]. May spray emulsion on lens preparatory to coating.

*GOE: 06.02.21 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **716.382-018 PRECISION-LENS GRINDER (optical goods) alternate titles: lens grinder; optical technician**

Sets up and operates grinding and polishing machines to make lenses, optical flats, and other precision optical elements for optical instruments and ophthalmic goods, such as telescopes, aerial cameras, military optical systems, and eyeglasses: Operates machine to rough-grind blanks of optical glass to approximate size and shape or manually positions and turns blanks against grinding wheel or ST3lap IST1. Blocks optical element in plaster or other compound. Mounts blocked element in machine and operates machine to oscillate and rotate element against abrasive to fine-grind element to final size and shape. Periodically stops machine to inspect and measure elements for accuracy and degree of completion. Polishes surfaces, using lens-polishing machine [PRECISION-LENS POLISHER (optical goods) 716.682-018]. May cement lens elements together to obtain corrected lens assemblies. May mount optical elements in holders or adapters for use in instruments. May be designated according to type of lens ground as Eyeglass-Lens Grinder (optical goods); Instrument-Lens Grinder (optical goods); Multifocal-Button Grinder (optical goods).

*GOE: 06.02.08 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 86*

**716.382-022 PRECISION-LENS-GRINDER APPRENTICE (optical goods) alternate titles: instrument-lens-grinder apprentice; lens-grinder apprentice**

Performs duties as described under APPRENTICE (any industry) Master Title.  
*GOE: 06.02.08 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 77*

**716.462-010 PRECISION-LENS CENTERER AND EDGER (optical goods)**

Operates grinder to edge and bevel precision ophthalmic optical lenses: Reads work order or blueprint to determine edge specifications. Selects lens holding tool of specified size and mounts tool in truing machine. Starts machine and turns handwheel to move cutting tool into lens holding tool to true holding tool. Applies heated pitch or other adhesive to lens holding tool and affixes lens on tool. Passes beam of light through lens and repositions lens on holding tool until beam remains stationary to center lens on tool or centers lens, using collimator. Secures holding tool and lens assembly in fixture of edge grinder. Adjusts grinder for variables, such as speed, rate of feed, and depth and angle of cut. Starts machine and turns handwheel to bring grinding wheel in contact with lens. Observes machine operation; stops machine to measure lens edge, using precision measuring instruments, such as micrometers and calipers; and adjusts machine to grind and bevel edge to specifications. May hold lens against grinding wheel to bevel edges to specified angle. May set up machines for other workers and train workers to operate machines.

*GOE: 06.02.08 STRENGTH: L GED: R3 M3 L2 SVP: 6 DLU: 77*

**716.681-010 BLOCKER AND CUTTER, CONTACT LENS (optical goods)**

Blocks contact lens blanks and cuts lenses to specified diameter, using jeweler's lathe and handtools: Immerses \$T3laps \$T1 in molten wax and embeds lens in wax or presses two-faced adhesive tape into depression of lap, using rounded tool, and affixes lens to tape. Trims excess tape, using knife. Positions lens and lap assembly in blocking device. Presses plunger to center and fasten lens to blocking device. Mounts blocked lens in chuck of jeweler's lathe. Turns crank and observes gauge to set cutting tool for specified diameter. Starts lathe and turns handle to feed cutting tool into lens. Removes cut lens from lathe and smooths burrs, using emery cloth. Places laps in container of solvent to remove tape or wax residue before reuse.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 77*

**716.681-014 GLASS CUTTER, HAND (optical goods)**

Lays out and cuts optical glass to specified dimensions and weight for molding into lens blanks, using templates, balance scale, and glass cutting tool: Examines optical glass stock or molded blanks for defects, such as bubbles, cracks, and scratches, and rejects defective stock. Weighs glass stock to facilitate cutting to specified weight, using balance scale. Traces outline according to dimension specifications, using template. Cuts glass according to pattern, using glass cutter. Grinds rough edges from blank, using rotating grindstone.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

**716.681-018 LENS POLISHER, HAND (optical goods)**

Hand polishes optical elements, such as lenses, prisms, and optical flats, to finish element or remove defects, using jeweler's rouge, polishing cloth or device, precision measuring instruments, and jeweler's lathe: Examines surface of element to detect defects, such as stains and scratches, and measures element to determine amount of finish required, using precision measuring instruments. Rubs rouge onto chamois, using jeweler's rouge stick, or onto polishing device mounted on workbench, using sponge. Rubs chamois over surface of element or oscillates element against polishing device to remove defects from element. Mounts element on spindle of jeweler's lathe, starts lathe, and holds rouge-coated chamois against element to finish element. Verifies dimensions of finished element, using precision measuring instruments, and examines elements to ensure all defects have been corrected, using magnifying glass. Cleans finished

elements, using lens cleaning solution, cloth, and paper.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

### **716.681-022 OPTICAL-GLASS ETCHER (optical goods) alternate titles: glass etcher**

Etches numerals and graduation lines on prisms and other optical glass surfaces for use in optical instruments, using pantograph engraver: Mounts glass specimens in holder. Dips glass elements in molten wax to obtain uniform protective coating. Positions tracing stylus of pantograph on template and guides stylus around template. Inscribes pattern of lines and numerals on elements in wax coating with needle which is affixed to pantograph arm. Exposes glass to hydrofluoric acid fumes to etch pattern. Cleans glass with water and solvents. Fills etched characters with opaque paste to improve readability. Inspects etched work for uniformity, using calibrated microscope.

*GOE: 06.02.30 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 77*

### **716.682-010 EYEGLASS-LENS CUTTER (optical goods) alternate titles: lens cutter**

Sets up and operates bench-mounted cutting machine to cut eyeglass lenses to specified size and shape: Selects metal pattern according to prescription specifications and mounts pattern in spring clamp of cutting machine. Sets control dial for specified lens diameter plus allowance for edge grinding. Aligns center and axis marks on lens with markings on pad of cutting machine and lowers cushioned pressure arm of machine which holds lens in position. Lowers cutting arm over lens and turns crank which rotates lens under cutting wheel to determine if machine settings are correct. Presses cutting arm down to hold cutting wheel against lens and turns crank to cut lens. Removes lens from machine and chips excess material from lens edges, using chipping pliers. Routes cut lenses to edging department.

*GOE: 06.02.08 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

### **716.682-014 PRECISION-LENS GENERATOR (optical goods)**

Sets up and operates lens generating machine to grind ophthalmic and optical element blanks, such as lenses, prisms, and optical flats, to specified curvature and thickness: Reads work orders, sketch, or blueprint to ascertain grinding specifications. Selects specified size holding tool or fabricates tool to fit optic blank. Presses blank into holding tool and mounts tool in generator. Selects specified diamond grinding wheel and secures wheel on generator spindle. Adjusts generator controls to regulate rotation speed of tool and blank, rate of feed, angle of arc, and depth of cut. Positions coolant nozzle over blank and starts generator to grind blank to specified curvature and thickness. Observes generator operation. Stops generator after specified time lapse and measures optic blank to verify curvature and thickness, using precision measuring instruments, such as dial gauge, spherometer, and micrometer. May utilize pitch or vacuum holding device to secure blank on holding tool. May move generator controls manually to grind blank. May operate surface grinder or milling machine to generate optical surfaces. May be designated according to type lens ground as Cataract-Lens Generator (optical goods); Eyeglass-Lens Generator (optical goods); Instrument-Lens Generator (optical goods); Multifocal-Button Generator (optical goods). May operate lens generator to remove scratches and true surface of lens and be designated Truer (optical goods).

*GOE: 06.02.08 STRENGTH: L GED: R3 M3 L3 SVP: 6 DLU: 77*

### **716.682-018 PRECISION-LENS POLISHER (optical goods)**

Operates polishing machines to polish ophthalmic lenses or optical elements, such as lenses, prisms, and flats for use as contact or eyeglass lenses or in precision optical instruments: Mounts optical element on holding tool, using tape or cement. Selects  $\$T3$ lap I, $\$T1$  according to size of optical element and applies pitch or other adhesive to polishing face of lap. Presses optical element into adhesive to form polishing surface. Mounts holding tool on polishing machine spindle and positions lap and element assembly over tool. Applies abrasive, or positions abrasive flow nozzle over element, and starts machine that polishes element. Observes polishing operation and periodically stops machine to rinse element with water and to test element for conformance to specifications, using test lens, monochromatic light,

microscope, and power determining and optical centering instruments. May guide polishing lap manually over element. May mix adhesive according to formula. May be designated according to type of lens polished as Contact-Lens Polisher (optical goods).

*GOE: 06.02.08 STRENGTH: L GED: R3 M2 L2 SVP: 7 DLU: 78*

#### **716.684-010 BLOCKER, HAND (optical goods)**

Affixes precision optical or ophthalmic lens blanks in metal blocks used to hold blanks during grinding and polishing operations: Selects blocks according to size of lens blank and heats blocks or lenses over gas burner to prepare for adherence of pitch or wax. Pours molten pitch into block, using ladle, or melts wax over holding surface of block, using torch. Presses and centers lens blank into wax or pitch. Pushes lens to test for adherence to block and positions blocked lens under fan for cooling. May smooth and remove sharp edges from lens, using grinding wheel. May test centering of lens in block, using lapping machine.

*GOE: 06.02.30 STRENGTH: L GED: R3 M1 L1 SVP: 3 DLU: 77*

#### **716.685-010 BLOCKING-MACHINE TENDER (optical goods)**

Tends blocking machine that seals optical or ophthalmic lens blanks in metal blocks preparatory to grinding and polishing of lenses: Applies lacquer to lens blank, using spray gun or brush. Mounts lens and block in blocking machine, aligns marks on lens blank and block, and clamps lens and block in place. Pulls lever to admit molten pitch or metal alloy and water through holes in block and starts machine that bonds lens blank to block. Pours molten pitch or loads solid metal into machine to replenish supply. May tend machine that casts metal block and bonds lens to block in one operation.

*GOE: 06.04.08 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **716.685-014 DRILLER (optical goods)**

Tends bench-mounted, single-spindle drill press that bores holes in optical lenses for attachment of ear and nosepieces: Holds lens against base of drill bit and puts drop of cutting oil over spot to be bored. Starts drill and regulates lever to lower and hold drill bit against lens. Wipes lens with soft cloth to remove cutting oil and glass grindings.

*GOE: 06.04.08 STRENGTH: S GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **716.685-018 GRINDER, HAND (optical goods) alternate titles: backside grinder**

Tends machine that grinds approximate curves on lens blanks preparatory to fine grinding: Selects lens blanks as specified on production order. Places lens blank in holder and positions holder and lens assembly on diamond lap of grinding machine. Lowers spindle of weighted arm onto lens holder to hold lens on lap. Starts machine and moves control arm back and forth to grind lens blanks to specified curvature or holds lens blank against grinding wheel to grind blank. Removes blank from holder and washes blank in water to remove grinding abrasive. Measures blanks to verify specified curvature, using lens gauge.

*GOE: 06.04.08 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **716.685-022 LENS-FABRICATING-MACHINE TENDER (optical goods)**

Tends one or more bench machines that generate, grind, edge, or polish ophthalmic lenses and precision optical elements: Mounts blocked element in machine holding device. Verifies machine settings or adjusts machines for variables, such as speed, machining time, and flow rate of abrasive or coolant. Starts machine that automatically generates, grinds, polishes, or edges optical element. Removes element after specified machining time, rinses element in water, and measures to verify specified dimensions of element, using micrometer, caliper, dial gauge, and shadowgraph. May deblock and clean element in degreasing tank. May be designated according to fabricating process or type lens fabricated as Contact-Lens-Curve Grinder (optical goods); Contact-Lens-Edge Buffer (optical goods); Fusion-Juncture Grinder (optical goods); Lens-Edge Grinder, Machine (optical goods); Lens-Generating-Machine Tender (optical

goods); Multifocal-Button Countersink Grinder (optical goods).  
*GOE: 06.04.08 STRENGTH: L GED: R2 M2 L2 SVP: 4 DLU: 77*

#### **716.687-010 DEBLOCKER (optical goods) alternate titles: cleaner**

Performs one or more of following duties to deblock and clean precision ophthalmic or optical elements, such as lenses, flats, prisms: Chills blocked element to crystallize pitch or other block adhesive and strikes block with mallet to separate element from block, or heats block to soften adhesive and removes element with fingers. Places lenses and elements in basket and immerses basket in degreasing tank or automatic cleaning machine. Places elements in tray of solvent. Cleans finished surfaces of element with pad and brush and rubs unfinished surfaces on board dusted with abrasive to remove foreign substances. Inspects lens to ensure cleanliness and freedom from defects. Sprays or brushes protective coating on element, allows coating to dry, and places in element tray or wraps in tissue. Replenishes solvents in trays and tanks. Drains molten metal block adhesive from machine or tank for reuse. May clean pitch from surface of block, using hammer, knife, and wire wheel.

*GOE: 06.04.39 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

#### **716.687-014 GLASS CHECKER (optical goods)**

Tests glass stock for color density to determine acceptability of stock for colored lenses, using light transmitting equipment. Inserts colored glass stock in transmission equipment that passes light through stock and registers color density. Reads machine dial and rejects or accepts glass stock according to chart listing density specifications.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **716.687-018 INSPECTOR, MULTIFOCAL LENS (optical goods)**

Inspects multifocal lenses or lens parts, at various stages of processing, for defects caused by flaws in glass or improper assembly: Examines lenses or lens parts, such as polished multifocal buttons, polished lens blanks, and fused multifocal buttons, for defects, such as scratches or chips on surface or presence of dust or water stains along fused juncture. Measures dimensions of lenses or parts, using lens gauge or millimeter ruler. Places lenses or lens parts in trays for transfer to other departments. Keeps production record. May chill mounted lenses in freezer to contract mounting pitch for ease of lens removal. May remove lenses or lens parts from block by tapping block with hammer. May be designated according to lens or lens part inspected as Fusing-Line Inspector (optical goods); Multifocal-Button Inspector (optical goods); Topside Inspector (optical goods).

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **716.687-022 LENS EXAMINER (optical goods) alternate titles: inspector-in-process; lens assorter; lens inspector**

Performs one or more of following tasks to inspect glass and plastic lens blanks for defects: Removes paint and wax from blank with solvent and razor blade. Rinses blank in water. Examines surface and edges to detect defects, such as pits, scratches, and chips. Inspects blanks with polariscope to detect annealing defects, such as bubbles, striae, fire cracks, or seal checks. Marks defective blanks for rework or salvage, using crayon or pencil. Sorts blanks by grade and type of defect. Weighs lens blanks and records weight for determining shipping costs. May pack blanks in cartons for shipping. May gauge blanks [LENS-BLANK GAUGER (optical goods)]. May assemble nonprecision optical element into mechanical housing.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 4 DLU: 77*

#### **716.687-026 LENS-BLANK GAUGER (optical goods) alternate titles: clocker; lens assorter; neutralizer; sizer**

Measures lens blanks for conformance to specified dimensions, using fixed curvature and thickness gauges, dial indicator, rule, or eye wire. Matches lens blanks with standard lenses to verify focal strength of blanks. Sorts blanks according to size, shape, or focal strength.

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **716.687-030 LENS-BLOCK GAUGER (optical goods)**

Examines blocked lens to determine whether lens blanks are positioned evenly on block, using template. Positions template over blocked lens blank, holds assembly against light, and examines assembly to detect presence of light between blank and template indicating uneven positioning of lens blank on block.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 77*

#### **716.687-034 WET INSPECTOR, OPTICAL GLASS (optical goods) alternate titles: optical-glass inspector**

Inspects optical glass immersed in chemical bath, to detect striae (internal stresses): Selects premixed chemical solution or mixes liquid chemicals in tank according to refraction index and grade of glass. Immerses glass in bath and focuses Burton lamp, collimating light, or striae scope on glass to detect internal stresses (striae). Marks defective areas with pencil. Writes inspection results and maintains permanent records for each melt. Sorts and grades glass according to type of defect noted. May operate transmission machine [GLASS CHECKER (optical goods)] to examine glass for strain. May saw glass stock [GLASS CUTTER (any industry)].

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

#### **719 OCCUPATIONS IN FABRICATION AND REPAIR OF SCIENTIFIC AND MEDICAL APPARATUS, PHOTOGRAPHIC AND OPTICAL GOODS, HOROLOGICAL, AND RELATED PRODUCTS, N.E.C.**

This group includes occupations, not elsewhere classified, concerned with assembling, fabricating, and repairing scientific and medical apparatus, photographic and optical goods, watches and clocks and related products.

#### **719.261-014 RADIOLOGICAL-EQUIPMENT SPECIALIST (inst. & app.) alternate titles: radiologic electronic specialist**

Tests, repairs, calibrates, and assists in installation of radiological and related equipment used in medical diagnosis or therapy, applying technical knowledge of electronic, radiological, and mechanical systems, and user knowledge of computers, and using manuals, test equipment, measuring instruments, handtools, and power tools: Confers with supervisor, manufacturers' representatives, equipment operators, and other workers to discuss and establish work priorities, resolve equipment related problems, and plan installation, preventive maintenance, and repair procedures. Inspects and tests malfunctioning equipment to determine cause of malfunction, following learned procedures and repair manual instructions, using specialized test and analysis instruments and manufacturers' specifications. Disassembles malfunctioning equipment and removes, replaces, or repairs defective components, and readjusts components to manufacturers' specifications, using handtools, power tools, and measuring instruments. Removes old equipment, prepares space for installation of new equipment, and oversees installation of new equipment by manufacturer. Tests and calibrates equipment at regular or required intervals, using test and measuring instruments and handtools to maintain manufacturers' operational specifications. Selects, devises, designs, and installs mechanical or structural hardware, using tools and utilizing knowledge of mechanics and structures to resolve special equipment operation problems. Maintains records of maintenance and repair work and approved updates of equipment as required by manufacturer. Demonstrates operational procedures for equipment to users. May fabricate hardware, using machine and power tools, handtools, and related equipment. May work for manufacturer and specialize in particular line of equipment.

*GOE: 05.05.11 STRENGTH: M GED: R5 M5 L5 SVP: 7 DLU: 89*

**719.381-014 HEARING-AID REPAIRER (inst. & app.)**

Tests and repairs hearing aids, using oscilloscope, electrical test meters, and handtools, following schematic diagram: Tests circuits for shorts, open wires, or defective parts, using electrical test meters. Solders loose connections and replaces defective parts, such as resistors, condensers, batteries, and transistors. Repairs or replaces transformer, microphone, and volume control, using handtools. Cleans and lubricates mechanical parts with solvent and oil.

*GOE: 05.10.03 STRENGTH: S GED: R4 M3 L4 SVP: 6 DLU: 78*

**719.381-018 BLOCK MAKER (protective dev.)**

Molds lead blocks to be used as shields in radiation therapy treatments: Lays out x-ray film taken of patient in treatment position and tapes film over grid on lighted table. Sets distances on mold cutting machine, duplicating distances from which x ray was taken. Calculates required thickness of block, based upon equipment to be used in treatment and applying knowledge of geometry. Aligns template and styrofoam piece in blocking tray over x-ray film. Guides hand held stylus along lines drawn on x-ray film or print showing area to be treated, simultaneously cutting styrofoam piece with hot wire to form styrofoam mold used in making block. Sets mold in vise and tightens metal clamps to hold mold securely in position. Pours heated lead alloy into mold to form block. Mounts cooled block on lucite board, using screws. Installs finished block in tray of machine and views superimposed outline of block on x-ray film to verify accuracy of block and adherence to standards. Records patient information on finished block. May transport patients to and from treatment area.

*GOE: 05.12.13 STRENGTH: M GED: R3 M3 L3 SVP: 3 DLU: 90*

**72 OCCUPATIONS IN ASSEMBLY AND REPAIR OF ELECTRICAL EQUIPMENT**

This division includes occupations concerned with assembling, fabricating, or repairing equipment, components, and parts for equipment to transmit, control, or convert electrical power; signaling and detection equipment; and home radios, television sets, and phonographs.

**720 OCCUPATIONS IN ASSEMBLY AND REPAIR OF RADIO AND TELEVISION RECEIVING SETS AND PHONOGRAPHS**

This group includes occupations concerned with assembling and repairing radio and television receivers, recorders, phonographs, and related items. Occupations concerned with sound recording and transcription are included in Group 194.

**720.281-010 RADIO REPAIRER (any industry) alternate titles: trouble shooter, radio**

Repairs radio receivers, phonographs, recorders, and other electronic-audio equipment, using circuit diagrams and test meters: Tests wiring, tubes, resistors, and other parts, using electronic test equipment, such as voltmeters and oscilloscopes, to locate defects. Replaces defective parts, using handtools, and solders loose connections with soldering iron. May compute charges for labor and materials. May install radios in automobiles [AUTOMOBILE-ACCESSORIES INSTALLER (automotive ser.)]. May be designated according to type of radio repaired as Automobile Radio Repairer (any industry); Radio Repairer, Domestic (any industry).

*GOE: 05.10.03 STRENGTH: L GED: R4 M2 L2 SVP: 6 DLU: 77*

**720.281-014 TAPE-RECORDER REPAIRER (any industry)**

Tests, repairs, and adjusts tape-recording machines, following schematic diagrams and manufacturer's specifications, using handtools and electronic testing instruments: Disassembles machine and replaces worn parts, such as sprocket wheels, drive belts, electrical switches, and guide rollers, using handtools. Records voice and listens to playbacks to detect distortion in sound. Tests circuits, using instruments, such as voltmeters, oscilloscopes, audiogenerators, and distortion meters. Replaces defective resistors,

condensers, and tubes. Solders loose connections. Tests operation of repaired recorder.

*GOE: 05.10.03 STRENGTH: M GED: R4 M3 L2 SVP: 7 DLU: 77*

## **720.281-018 TELEVISION-AND-RADIO REPAIRER (any industry) alternate titles: television repairer**

Repairs and adjusts radios and television receivers, using handtools and electronic testing instruments: Tunes receiver on all channels and observes audio and video characteristics to locate source of trouble. Adjusts controls to obtain desired density, linearity, focus, and size of picture. Examines chassis for defects. Tests voltages and resistances of circuits to isolate defect, following schematic diagram and using voltmeter, oscilloscope, signal generator, and other electronic testing instruments. Tests and changes tubes. Solders loose connections and repairs or replaces defective parts, using handtools and soldering iron. Repairs radios and other audio equipment [RADIO REPAIRER (any industry)]. May install television sets [TELEVISION INSTALLER (any industry)].

*GOE: 05.10.03 STRENGTH: M GED: R4 M3 L2 SVP: 7 DLU: 77*

## **720.684-010 ASSEMBLY ADJUSTER (comm. equip.) alternate titles: record-changer adjuster**

Tests and adjusts assembled phonograph turntable and record-changer unit for specified operation: Adjusts speed of turntable to specified number of revolutions per minute, using screwdriver and stroboscope. Listens for and eliminates noise in bearing. Removes humming noise from coil. Adjusts pickup arm, record magazine, elevator shafts and pads, and transfer lever to positions for accurate automatic record transfer.

*GOE: 06.04.34 STRENGTH: L GED: R2 M2 L1 SVP: 3 DLU: 77*

## **720.684-014 PHONOGRAPH-CARTRIDGE ASSEMBLER (comm. equip.) alternate titles: cartridge assembler**

Assembles parts into components and components into complete phonograph cartridge assemblies: Positions, fits, and fastens together variety of small parts to make contact block assembly, using tweezers, toothpick, cement stick, and screwdriver. Welds ground piece to contact block, using spot welder. Solders fine wires from coils to contact block, seam in copper shield, and ground piece to shield, using pencil soldering iron. Plugs completed contact block assembly into ohmmeter to test for continuity. Assembles parts of magnet holder and stylus arm, using handpunch, tweezers, cement stick, holding fixture and loupe. Bakes subassembly in small oven to join parts and fix stylus angle. Fits subassemblies into potting assembly, verifies stylus alignment, and screws them together, using screwdriver.

*GOE: 06.04.23 STRENGTH: S GED: R2 M2 L2 SVP: 5 DLU: 77*

## **720.687-010 RECORD-CHANGER ASSEMBLER (comm. equip.)**

Performs one or more repetitive operations to assemble record changers, such as positioning plates in jig, screwing and bolting parts together, soldering pickup and motor leads, and inserting springs and other small parts, using screwdrivers, wrenches, and soldering iron.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

## **720.687-014 RECORD-CHANGER TESTER (comm. equip.)**

Tests automatic record changers for accuracy of record transfer and pickup movement by placing several records on changer and observing performance. Segregates for adjustment record changers not meeting performance standards.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

## **721 OCCUPATIONS IN ASSEMBLY AND REPAIR OF MOTORS, GENERATORS, AND RELATED PRODUCTS**



This group includes occupations concerned with assembling and repairing electric motors, power generators, motor-generator sets, railway motors and control equipment; and motors, generators, and control equipment for gasoline-electric and oil-electric buses and trucks. Occupations concerned with winding and assembling coils, magnets, armatures, and related components are included in Group 724.

### **721.131-010 ELECTRIC MOTOR REPAIRING SUPERVISOR (any industry)**

Supervises and coordinates activities of ELECTRIC-MOTOR ANALYST (any industry) and ELECTRIC-MOTOR REPAIRER (any industry) engaged in repairing electric motors, generators, switches, starting devices, and other electrical equipment. Estimates cost of repairs. Performs duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 05.05.10 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **721.131-014 SUPERVISOR, INSPECTION AND TESTING (elec. equip.)**

Supervises and coordinates activities of workers engaged in inspecting and testing parts and subassemblies of electric motors and generators, such as armatures, stators, and field assemblies for conformance to specifications: Assigns workers to inspect parts for defects, such as improperly connected, broken, or cracked leads, surface defects on commutators, and for dimensional specifications of parts and subassemblies. Designates type of test, method and procedure, and equipment to be used in testing parts and subassemblies. Analyzes test data to diagnose cause of malfunctions and schedules repair of products not meeting specifications. Trains workers in use of testing equipment. Performs other duties as described under SUPERVISOR (any industry) Master Title. May be designated according to operation coordinated as Supervisor, Coil And Armature Inspection (elec. equip.); Supervisor, Electric Motor Testing (elec. equip.).

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **721.261-010 ELECTRIC-MOTOR ANALYST (any industry)**

Determines causes of failures in electric motors, following drawings and specifications and using handtools and electrical test meters: Dismantles motor, using handtools. Examines bearings, brackets, and other parts for wear and damage. Tests armature and stator for shorted, grounded, or broken wires, using electrical test meters. Lists causes of motor failures and repairs required and reports adjustment and repair requirements to repairer. May repair mechanical parts and reassemble motor, using handtools and power tools. May rebuild motor.

*GOE: 05.07.02 STRENGTH: L GED: R4 M3 L2 SVP: 7 DLU: 77*

### **721.261-014 FINAL TESTER (elec. equip.)**

Conducts final test on electrical equipment, such as generators, motors, motor generator sets, switchgear, and control apparatus to determine conformity to specifications, using electrical testing equipment, measuring instruments, and mechanics' and electricians' handtools: Sets up test circuit by connecting unit to power supply, resistors, transformers, meters, and test panels in prescribed sequence. Operates and tests unit under specified conditions by moving levers, handwheels, knobs, and pushbuttons to apply prescribed voltages and current. Observes instruments, such as meters, tachometer, vibrometer, oscilloscope, thermometer, and potentiometer, and makes calculations, using slide rule, to determine resistance, starting torque heat, load, saturation, and other electrical characteristics. Observes and measures mechanical performance, such as ventilation, bearing noise, \$T3airgap,\$T1 and end play, using micrometers, verniers, torsion meters, and other measuring and testing devices. Adjusts controls, such as resistors, relays, and circuit breakers to correct malfunctions. Records findings in test log and forwards findings to engineering department for analysis. May conduct dynamometer test on large motors and generators. May diagnose mechanical or electrical difficulties and suggest changes in design and operating function to engineering department. May mount units to test base.

*GOE: 06.01.05 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

**721.281-010 AUTOMOTIVE-GENERATOR-AND-STARTER REPAIRER (automotive ser.)**

Tests, repairs, and rebuilds automotive generators and starters: Tests generator unit to ascertain amperage and voltage output, using voltmeter and ammeter. Disassembles unit and cleans brushes, bearings, shafts, and armatures in solvent and examines parts for wear or defects. Refaces commutator using lathe. Tests starter spring tension, using testing device. Replaces or repairs defective parts, and reinstalls generator in vehicle. Adjusts fan belt tension and voltage output. May charge or replace battery. May be designated according to part repaired as Automotive-Generator Repairer (automotive ser.); Automotive-Starter Repairer (automotive ser.).

*GOE: 05.05.05 STRENGTH: M GED: R4 M3 L2 SVP: 6 DLU: 77*

**721.281-014 ELECTRIC-MOTOR ASSEMBLER AND TESTER (any industry) alternate titles: motor assembler**

Assembles and adjusts repaired electric motors to meet specified ratings, using handtools and electrical meters: Cleans motor parts with gasoline. Repairs or replaces damaged parts and assembles motor, using handtools. Measures velocity, horsepower, and current consumption of motor, using electrical meters and mechanical testing devices. Adjusts motor to ratings specified on motor nameplate. May ream and fit motor bearings and grind, turn, and polish parts, using machine tools, such as grinder and lathe.

*GOE: 06.02.23 STRENGTH: L GED: R4 M3 L2 SVP: 7 DLU: 77*

**721.281-018 ELECTRIC-MOTOR REPAIRER (any industry)**

Repairs electric motors, generators, and equipment, such as starting devices and switches, following schematic drawings, and using handtools, coil-winding machines, power tools, and test equipment: Disassembles and removes armature, stator, or rotor from housing. Examines coil connections for broken or defective wiring. Tests coils, armatures, stator, rotor, and field coils for continuity, shorts, and grounds and insulation resistance, using test lamp, ammeter, and ohmmeter. Cuts out or removes defective coils and removes insulation from core slots. Cuts and forms insulation and inserts insulation into armature, rotor, or stator slots. Rewinds coils on core while in slots manually or makes replacement coils, using coil-winding machine. Installs and aligns prewound coils in slots, using hammer, drift, or mallet. Replaces defective coil leads and solders connections of coils in specified sequence. Examines bearings, shafts, and other moving parts for excessive wear or defects. Refaces commutators and machines parts to specified tolerances, using machine tools. Assembles and tests motor for specified performance. May be designated according to size of motor repaired as Fractional-Horsepower Motor Repairer (any industry); equipment repaired as Dynamotor Repairer (any industry); or part repaired as Armature Straightener (elec. equip.); Coil-Connector Repairer (elec. equip.); Commutator Repairer (any industry); Field-Coil Repairer (elec. equip.); Stator Repairer (any industry).

*GOE: 05.05.10 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

**721.281-022 MAGNETO REPAIRER (any industry)**

Tests and repairs magnetos used in gasoline and diesel engines, using meters, gauges, and handtools: Connects magneto to motor and electrical test panel and starts motor to determine source of malfunction. Disassembles magneto and inspects coils, condenser, and armature for shorts. Repairs or replaces worn or defective parts, using handtools. Verifies polarity of armature. Cleans parts with alcohol or solvent and reassembles unit. Adjusts breaker points, using feeler gauge. Installs magneto in engine.

*GOE: 05.05.05 STRENGTH: L GED: R4 M2 L2 SVP: 6 DLU: 77*

**721.281-026 PROPULSION-MOTOR-AND-GENERATOR REPAIRER (automotive ser.)**

Reconditions defective motors and generators of electric buses: Lifts propulsion motors or generators onto worktable, using chain hoist. Disassembles defective units, using handtools. Inspects parts to determine required repairs. Repairs or replaces worn and defective parts, such as carbon brushes, cables,

and connecting wires. Reassembles motors and generators. Tests circuitry, using testing lamp.

*GOE: 05.05.10 STRENGTH: M GED: R4 M3 L2 SVP: 7 DLU: 77*

### **721.281-030 TESTER, MOTORS AND CONTROLS (elec. equip.)**

Tests endurance and performance of electric motors and electrical-control components, such as motor reversers, cam and unit switches, shunt contactors, and magnet valve adapters under simulated operating conditions, in laboratory or production areas, following specified procedures, using testing equipment: Positions motors or parts, such as switches, contacts, and magnetic cores on test rack, and connects leads to power source and test panels. Pulls switch to start equipment and regulates controls for prescribed timing, speeds, and voltages. Turns off lamps and moves rheostat controls of generators to adjust load resistance. Observes and adjusts measuring instruments, such as ammeters and voltmeters, in prescribed sequence, to measure electrical characteristics, such as blow-out, drop-out, pick-up, resistance, electrical stress, and iron content of cores. Examines parts for mechanical defects or failures. Records test data. May replace worn brushes on power supply generator. May be known according to item tested as Transformer Tester (elec. equip.).

*GOE: 06.01.05 STRENGTH: M GED: R4 M3 L3 SVP: 6 DLU: 77*

### **721.361-010 INSPECTOR, MOTORS AND GENERATORS (elec. equip.)**

Examines electric motors, generators, and parts, such as coils, commutators, armatures, and stators, for compliance with specifications, using measuring devices and test equipment: Examines parts to detect defects, such as faulty insulation, broken wires, burrs, and nicks. Compares windings, soldered connections, and location of parts with schematics and blueprints to ensure compliance with specifications. Verifies dimensional specifications of parts and measures  $\$T3airgap\$T1$  between parts, using micrometers, verniers, calipers, and scale. Tests windings for resistance, shorts, and grounded wires, using testing apparatus. Tags rejected parts and assemblies for repair. Records inspection data.

*GOE: 06.01.05 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

### **721.381-010 ELECTRIC-MOTOR FITTER (railroad equip.) alternate titles: car repairer; motor assembler; motor overhauler**

Cleans, assembles, and tests motors of locomotives and streetcars: Disassembles motors by removing bolts and nuts from motor case heads, fastening crane hook to case heads and armatures, and directing HOISTING ENGINEER (any industry) to hoist parts from motor cases. Routes armatures to repair shop. Cleans case heads in hot ammonia bath. Scrapes inside of motor cases to remove grease and dirt, and applies insulating paint. Inspects motor lead wires and replaces worn insulation tape. Reassembles motors working with HOISTING ENGINEER (any industry) in handling heavy parts. Connects motor lead wires to power source and tests motor for r.p.m. and overheating, using speed gauges and thermometers.

*GOE: 05.05.05 STRENGTH: L GED: R4 M2 L3 SVP: 7 DLU: 77*

### **721.381-014 ELECTRIC-MOTOR-CONTROL ASSEMBLER (elec. equip.) alternate titles: control-panel assembler; panelboard assembler; power-panel assembler**

Assembles electric-motor control units, such as transmitters, relays, switches, voltage controls, and starters and mounts unit on panel according to drawings and specifications, using handtools and power tools: Cleans parts, using liquid cleaner, airhose, and cloth. Assembles units, using handtools, pneumatic nut runners, power press, and torque wrenches. Lays out and drills mounting holes and mounts units to panel, using scribes, rule, dividers, drill press, portable power drill, reamer, screwdrivers, and wrenches. Adjusts and aligns parts to maintain specified  $\$T3airgap,\$T1$  contact wipe, dimensions, and part movement, using feeler gauges and micrometers. Solders electric wire connections and secures spring guides, setscrews, and spring post to units, using soldering iron and acetylene torch. Tests electrical circuits for resistance, current, and potential difference, using instruments, such as ohmmeter, ammeter, and voltmeter. May be designated according to control assembled as Transmitter Assembler (elec. equip.); Voltage-Regulator Assembler (elec. equip.). May also operate sheet metal forming machines to fabricate

housing for synchro-units and be designated Synchro-Unit Assembler (elec. equip.).

*GOE: 06.01.04 STRENGTH: M GED: R4 M3 L2 SVP: 6 DLU: 77*

### **721.381-018 GOVERNOR ASSEMBLER, HYDRAULIC (elec. equip.)**

Assembles and adjusts mechanical and electrical parts to construct governors for hydraulic turbines, according to specifications, using pneumatic tools, handtools, gauges, and micrometers: Aligns motor mounts and motors on reservoir base and marks location. Removes motors and drills and taps foundation holes. Inserts steel pins in holes to secure motors to base. Positions mechanical parts, such as actuator, \$T3kaplan,\$T1 oil basket, strainers, oil ramp, hydraulic cylinder, valves, and subassemblies to base and inside of reservoir, to form governor unit subassembly. Joins frame, doors, trim, and deck plates to assemble metal cabinet, using handtools. Attaches governor unit subassembly to cabinet frame. Assembles meters, gauges, indicators, switches, and control panels and mounts on unit. Shapes conduit for electrical lines and laces electrical cables, using soldering iron to secure connections. Assembles pump and fits pipelines, valves, vents, and pressure lines, using plumbers' tools. Tests performance of completed unit for conformance to specifications. Disassembles unit and crates and wraps parts to prepare parts for shipping. Attaches name plates, marks, and other identification on items. May machine and fabricate parts to complete job when drawing changes occur.

*GOE: 06.01.04 STRENGTH: M GED: R4 M3 L2 SVP: 7 DLU: 77*

### **721.484-010 ELECTRIC-MOTOR WINDER (elec. equip.) alternate titles: armature-and-rotor winder; coil assembler**

Assembles and tests electric motor and generator stators, armatures, or rotors: Inspects cores for defects and aligns laminations, using hammer and drift. Files burrs from core slots, using hand file, portable power file, and scraper. Lines slots with sheet insulation and inserts coils into slots. Cuts, strips, and bends wire leads at ends of coils, using pliers and wire scrapers. Twists leads together to connect coils. Taps coil and end windings to shape, using hammer and fiber block. Tests windings for motor-housing clearance, grounds, and short circuits, using clearance gauge, growler, spring-steel blade, telephone receiver, insulation tester, and resistance bridge. Winds new coils on armatures, stators, or rotors of used motors and generators. May rewind defective coils. May be designated according to motor part wound as Armature Winder (elec. equip.); Rotor Winder (elec. equip.); Stator Winder (elec. equip.).

*GOE: 06.02.23 STRENGTH: M GED: R3 M2 L2 SVP: 6 DLU: 77*

### **721.484-014 FIELD-RING ASSEMBLER (elec. equip.) alternate titles: assembler dc field ring; assembler dc field yoke**

Assembles field poles and interpoles to steel housing ring (yoke) to build field rings for dc motors and generators: Slips insulated coils over pole piece and drives fiber spacing wedges between them. Bolts field poles and interpoles to inside face of yoke, adjusting airgap by measuring with micrometer and inserting shims. Lays out, cuts, drills, punches, and forms copper strap to connect coils of large units. Fastens coil connections with bolts.

*GOE: 06.02.23 STRENGTH: M GED: R3 M2 L2 SVP: 6 DLU: 77*

### **721.484-018 INSULATION CUTTER AND FORMER (elec. equip.)**

Cuts and forms insulation, gaskets, and wedges used in electric motors and generators, performing any combination of following duties: Measures and marks dimensions and holes on insulation material, such as felt, fiber, mica, and fiberglass, using specifications or template. Places sheet of insulation against shearing machine stops, depresses pedal to lower blade to cut strips, or inserts sheet under roller-type holddown and against stops of circular saw to cut strips. Places cut material into bending machine and depresses pedal to rotate movable section around fixed mandrel to shape sides. Holds flat and wedge insulation against pedestal grinder to grind U-shaped bevel in end or inserts mica sheets between drums of drum sander to wear down to specified thickness. Measures thickness of each mica sheet, using micrometer, and stacks sheets according to dimensions. May cut shaped wooden or fiber strips to lengths

for wedges, using bandsaw.

*GOE: 06.02.32 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

### **721.484-022 SKEIN WINDER (elec. equip.)**

Inserts loops of prewound skein of wire into slots of stators for fractional-horsepower motors: Loops skein end and inserts two sides in adjacent coil slots, manipulating wire with fingers. Forms additional loops in skein and inserts in other pairs of slots until entire skein is wound into core.

*GOE: 06.02.32 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

### **721.684-010 ARMATURE-WINDER HELPER, REPAIR (any industry)**

Assists ARMATURE WINDER, REPAIR (any industry) in repairing electric motors and generators: Burns old insulation from coils, using blowtorch, and strips old coils from armatures and stators, using handsaw and wirecutter. Scrubs mechanical parts of motors, such as shafts, gears, and laminations, using cleaning fluid, wire brush, and scraper. Guides compressed air stream on parts to dry and remove loose dirt. Winds coils, using coil winding machine. Tapes coils by hand or using machine. Dips armatures and stators in enamel or varnish tank to insulate coils and paints motor and generator housings, using brush. Performs other duties as described under HELPER (any industry) Master Title.

*GOE: 05.12.16 STRENGTH: M GED: R2 M1 L1 SVP: 3 DLU: 77*

### **721.684-014 ASSEMBLER, CARBON BRUSHES (elec. equip.) alternate titles: brush maker; carbon-brush maker; motor-and-generator-brush cutter**

Assembles carbon brushes by performing any of following tasks: Drills hole in precut carbon block, using drill press. Cuts copper wire to specified lengths, using hand shears. Positions and clamps block on workbench. Inserts wire into hole and wedges wire with copper pin, fastens wire with rivet or screw, or solders wire, using soldering iron. Attaches copper eyelet to free end of wire and solders eyelet to wire. Immerses brush in electroplating solution to cover brush with copper coating. Stamps manufacturer's name on brush, using die. May cut carbon to specified size.

*GOE: 06.02.23 STRENGTH: L GED: R3 M1 L2 SVP: 4 DLU: 77*

### **721.684-018 COIL CONNECTOR (elec. equip.) alternate titles: connector**

Twists ends of coil wires together to connect prewound coils of electric motor and generator parts, such as stators, rotors, and armatures, using soldering equipment and handtools: Lifts or hoists unit with crane to workbench or winding buck. Pounds coils, using hammer, block, and drift to compact and align coils in slots and form leads on strap coils. Cuts protruding insulating material, skins ends of coil wire, and splices lead connections of stator coils, using pliers. Places leads of armature coils into commutator bar slots and secures leads, using drift and hammer. Brazes or pours molten solder over connections, using brazing torch or soldering pot and ladle. Tapes connections, and laces and ties coil leads to stator end windings or commutator risers, using tape hook [LACER AND TIER (elec. equip.)]. May test unit for short circuit, grounds, and weak insulation. May be known according to motor part connected as Armature Connector (elec. equip.) I; Stator Connector (elec. equip.).

*GOE: 06.02.32 STRENGTH: M GED: R3 M2 L2 SVP: 5 DLU: 77*

### **721.684-022 ELECTRIC-MOTOR ASSEMBLER (elec. equip.) alternate titles: assembler; assembly hand**

Assembles subassemblies and parts of dynamotors, converters, and electric motors used in instruments, appliances, and power tools, performing any combination of following tasks, using power tools and handtools: Bolts field windings and brush holders into motor housings, using wrenches, screwdrivers, and holding fixtures. Presses bushings and bearings into motor head, using arbor press. Secures fans and gears to armature shaft, using nuts and lock washers, and places armature shaft in bearings. Solders or screws electrical leads to brushes, and switch and cord assembly, using soldering iron. Assembles end brackets and base to housing and fastens assembly with screws. Lubricates gears and other moving parts, using

oilcan, paddle, or grease gun. Turns shaft to ensure free movement of parts. May screw covers on motor ends to keep out dirt and moisture during shipment. When replacing defective parts in motors is designated Repairer, Electric Motors (elec. equip.). May be designated according to type motor assembled as Assembler, Instrument Motors (elec. equip.) or part assembled as Brush Holder Assembler (elec. equip.).

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

**721.684-026 SPIDER ASSEMBLER (elec. equip.) alternate titles: assembler, caterpillar spider; revolving field assembler; rotating field assembler**

Assembles coils, poles, and fastening devices to rotor spider to build rotating field for motors and alternators (generators): Aligns poles on spider and secures with nuts and lockwashers. Slips coil over insulated core (pole) and bolts pole shoe in place over coil and pole piece. Drills and taps holes to fasten clamps with bolts to secure connecting cable between coils. Secures collector rings to shaft, using keys, bolts, and washers or presses rings to shaft, using hydraulic press, or heats rings, using portable gas oven and allows to shrink. May cut, drill, and form copper and steel bar stock for leads and clamps, using electric drill, power saw, and forming fixture.

*GOE: 06.02.23 STRENGTH: M GED: R4 M2 L2 SVP: 6 DLU: 77*

**721.687-010 CLEANER AND PREPARER (elec. equip.)**

Cleans and applies paint and masking materials on motor and generator subassemblies to preserve surface for further processing: Brushes solvents onto parts or dips parts into caustic solutions to loosen paint, grease, dirt, and other foreign substances. Rinses parts with hot water. Removes loosened paint, using scraper, wire brush, or portable buffer. Brushes grease and masking compound on subassemblies, inserts cork plugs into holes, and tightens screws to keep insulating material or paint from specified areas. Coats parts with paint or insulating material, using spray gun or dipping tank.

*GOE: 06.04.33 STRENGTH: M GED: R1 M1 L1 SVP: 2 DLU: 77*

**722 OCCUPATIONS IN ASSEMBLY AND REPAIR OF COMMUNICATIONS EQUIPMENT**

This group includes occupations concerned with assembling and repairing wire and wireless telephone and telegraph equipment and parts, radio and television broadcasting equipment and parts, electronic field detection apparatus, light and heat emission operating apparatus, object detection apparatus and navigational electronic equipment, aircraft and missile control systems, electronic data processing equipment, and electronic and electric communication and signaling products.

**722.131-010 INSTRUMENT-SHOP SUPERVISOR (tel. & tel.)**

Supervises and coordinates activities of INSTRUMENT REPAIRERS (tel. & tel.) in repair and maintenance of telephone and telegraphic equipment: Examines and tests equipment, such as telephones, teletypewriters, station and switching apparatus, private-branch-exchange systems, and perforation equipment to determine repairs required, using electrical and electronic testing devices. Assigns workers to repair tasks. Supervises final inspection of equipment to ensure conformance to specifications. May be designated according to type of equipment maintained as Communications-Equipment Supervisor (tel. & tel.); Telegraphic-Instrument Supervisor (tel. & tel.); Telephone-Instrument Supervisor (tel. & tel.). Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 05.05.10 STRENGTH: L GED: R4 M2 L3 SVP: 7 DLU: 77*

**722.281-010 INSTRUMENT REPAIRER (tel. & tel.) alternate titles: shop repairer**

Repairs, tests, and modifies telephone and telegraphic equipment, such as telephones, teletypewriters, tickers, and switchboards, using handtools and power tools: Adjusts component parts of equipment, such as dials, coin tracks, springs, and relays to conform to specifications. Verifies wiring and location of parts, using schematic drawings. Tests and calibrates reassembled equipment, using electrical testing devices,

such as ohmmeter and circuit analyzers. Rewires and modifies equipment in accordance with engineering changes and traffic-handling requirements. Cleans instruments and parts, using specified solvents. Maintains daily record of instruments and equipment repaired. May assist in sorting, cataloging, and storing repaired parts and equipment.

*GOE: 05.05.10 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

### **722.381-010 ASSEMBLER (tel. & tel.) alternate titles: assembler, equipment; wirer**

Wires switchboards, operating tables, and other telegraph apparatus to specifications, using handtools and soldering iron. May test wiring installations, using meters.

*GOE: 06.01.04 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **722.381-014 INSTRUMENT INSPECTOR (aircraft mfg.; air trans.)**

Inspects, tests, and adjusts navigational and control instruments and components for aircraft and aerospace vehicles, according to blueprints, technical orders, manufacturers' data, and other specifications, using precision measuring instruments and testing equipment: Examines instruments and components for defects, such as broken dials and scratched surfaces. Tests functional and operational performance of instruments and components, such as altimeters, airspeed indicators, turn and bank indicators, radar beacon sets, and directional gyroscopes, to determine conformance to specifications, using testing equipment. Inspects, calibrates, and adjusts instruments and components, using precision instruments. Records inspection information. May contact vendors, customers, or others to exchange information or coordinate inspection activities. May interpret inspection information and recommend corrective action for recurring instrumentation problems. May be required to maintain Federal Aviation Administration certification to repair and adjust instruments. May be designated according to type of instruments inspected as Inspector, Radar And Electronics (aircraft mfg.).

*GOE: 06.01.05 STRENGTH: M GED: R4 M4 L3 SVP: 7 DLU: 88*

### **722.687-010 SWITCHBOX ASSEMBLER I (comm. equip.)**

Inserts metal dovetails of box sides into slots of metal box bottoms, and hammers to clamp parts together to form switchboxes for telephones.

*GOE: 06.04.23 STRENGTH: L GED: R1 M1 L1 SVP: 2 DLU: 77*

## **723 OCCUPATIONS IN ASSEMBLY AND REPAIR OF ELECTRICAL APPLIANCES AND FIXTURES**

This group includes occupations concerned with assembly and repair of small appliances, such as toasters, grills, mixers, and coffee makers; lighting fixtures; and cord sets, switches, sockets, and related products.

### **723.131-010 SUPERVISOR, SMALL APPLIANCE ASSEMBLY (house. appl.) alternate titles: supervisor, assembly line**

Supervises and coordinates activities of workers engaged in assembly, inspection, testing, repair, and packing of toasters, irons, percolators, and related small electrical appliances: Reviews inspection and test reports to determine causes of appliance defects, such as motors heating up, insufficient revolution per minute, and short and grounded circuits. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

### **723.132-010 SUPERVISOR, FABRICATION DEPARTMENT (light. fix.)**

Supervises and coordinates activities of workers engaged in fabricating and assembling wall lamps, floor lamps, and hanging fixtures. Requisitions parts and materials according to design sketches and knowledge of fixture making. Trains workers in operation of equipment. Performs other duties as

described under SUPERVISOR (any industry) Master Title.

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 8 DLU: 77*

### **723.361-010 MODEL MAKER, FLUORESCENT LIGHTING (light. fix.)**

Lays out and constructs experimental models of fluorescent lighting fixtures, such as those used in buildings and tunnels, following blueprints, designs, and engineering sketches: Computes dimensions and lays out outline of fixture on sheet metal, using rule, scribe, and drafting tools. Cuts and shapes metal, using hand and power brakes and shears, files, and mallets. Assembles fixture and installs electrical components and wiring, using spot-welding machine and handtools. Fastens glass or plastic lens in place, using clips, bolts, or screws, and tightens fluorescent tube in sockets. Connects fixture to electrical outlet and tests continuity of fixture's circuit, using circuit tester. Records dimensions, bending angles, hole locations, and other specifications, for use in production of fixture. May inspect installed fixtures and make minor repairs.

*GOE: 05.05.06 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

### **723.381-010 ELECTRICAL-APPLIANCE REPAIRER (any industry) alternate titles: appliance-service representative; small-appliance repairer**

Repairs electrical appliances, such as toasters, cookers, percolators, lamps, and irons, using handtools and electrical testing instruments: Examines appliance for mechanical defects and disassembles appliance. Tests wiring for broken or short circuits, using voltmeters, ohmmeters, and other circuit testers. Replaces defective wiring and parts, such as toaster elements and percolator coils, using handtools, soldering iron, and spot-welding equipment. May compute charges for labor and materials. May assist ELECTRICAL-APPLIANCE SERVICER (any industry) in repairing such appliances as refrigerators and stoves.

*GOE: 05.10.03 STRENGTH: L GED: R4 M2 L3 SVP: 6 DLU: 77*

### **723.381-014 VACUUM CLEANER REPAIRER (any industry)**

Repairs and adjusts vacuum cleaners, using handtools: Observes ammeter reading and listens to sound of cleaner motor to detect cause of faulty operation. Repairs, adjusts, or replaces defective brushes, belts, fans, control switches, extension cords, electric motors, or other mechanical or electrical parts, using handtools. Lubricates cleaner parts, using grease gun. May sell and demonstrate vacuum cleaners.

*GOE: 05.10.03 STRENGTH: M GED: R3 M2 L2 SVP: 6 DLU: 77*

### **723.584-010 APPLIANCE REPAIRER (house. appl.) alternate titles: repairer**

Repairs portable, household electrical appliances, such as fans, heaters, vacuum cleaners, toasters, and flatirons, on assembly line: Refers to inspector's checklist, or defect-symbol marked on appliance, to identify defective or malfunctioning part. Disassembles appliance to remove defective part, using power screwdrivers, soldering iron, and handtools. Installs new part, and reassembles appliance. Records nature of repair in log or on mechanical counting device. Maintains stock of replacement parts. May determine repair requirements by connecting appliance to power source or examining parts for defects while disassembling. May file or bend parts to remove burrs or to improve alignment and fit. May hold appliance against buffing or polishing wheel to remove scratches from metal surfaces. May touch up paint defects, using brush or spray gun. May be designated according to part repaired as Heating-Element Repairer (house. appl.); or appliance repaired as Electric-Frying-Pan Repairer (house. appl.); Food-Mixer Repairer (house. appl.); Toaster-Element Repairer (house. appl.); Vacuum-Cleaner Repairer (house. appl.).

*GOE: 05.10.03 STRENGTH: M GED: R3 M2 L2 SVP: 3 DLU: 77*

### **723.684-010 ASSEMBLER (house. appl.)**

Assembles parts and subassemblies to form portable electrical appliances, power tools, and other products, using fixtures, handtools, and power tools: Inserts screws, bolts, or rivets through holes in parts or subassemblies and tightens fasteners to secure components, such as field windings, fan blades, pulleys,



heating elements, thermostats, switches, and timers, using handtools and power tools. Reams bearing holes in housing assembly, using hand reamer, and places armature shaft in bearings of product. Turns setscrew to adjust end play of motor. Hooks lug ends of wires to terminals, tightens bolts, or solders connection to fasten instruments with burner, motor, or outlet cord. May be designated according to product assembled as Deep-Fryer Assembler (house. appl.); Electric-Fan Assembler (house. appl.); Electric-Heater Assembler (house. appl.); Food-Mixer Assembler (house. appl.); Power-Tool Assembler (house. appl.); Steam-Iron Assembler (house. appl.).

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

### **723.684-014 ASSEMBLER I (light. fix.) alternate titles: lamp wirer**

Assembles component parts to make subassemblies or completed units of lighting fixtures, such as chandeliers, lamps, shades, or reflectors: Threads and pulls wire through lighting fixture body or frame. Strips insulation from ends of wire and attaches ends to terminal or socket lugs, using knife, pliers or stripping tool, and screwdriver. Bolts or screws wired parts together, using screwdriver and other handtools. Inserts incandescent bulb or fluorescent tube into fixture and connects wire to electrical outlet to test unit. May be designated according to type of fixture assembled as Assembler, Fluorescent Lights (light. fix.); Assembler, Incandescent Lights (light. fix.).

*GOE: 06.02.23 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

### **723.684-018 ASSEMBLER II (light. fix.)**

Assembles metal lighting fixtures, using handtools and drill press: Screws together threaded parts by hand. Bores holes in fixtures, using drill press. Fastens together parts with bolts or screws by hand, or using tools, such as wrenches and screwdrivers. Inserts wire into fixture. May work from blueprints or sketches.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 77*

### **723.684-022 FLASHER ADJUSTER (light. fix.)**

Tests and adjusts flasher units used in automobile directional signals, using chuck, meter, and handtools: Inserts flasher into socket of chuck. Observes reading on meter and bends frame of flasher, using pliers, until meter reading is accurate.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

### **723.685-010 HEATING-ELEMENT WINDER (elec. equip.; house. appl.)**

Tends machine that winds spiral-spring resistance wire onto mica-plate core to form heating element: Inserts core in slotted shaft of winding motor, and hooks wire end to core. Depresses pedal to start motor that rotates core, and guides wire between thumb and fingers to seat turns of wire in slots at edge of mica plate. Controls core-rotation speed by pressure of hand on brake wheel attached to motor shaft, and stops motor when end of wire is reached. May test heating element, using ohmmeter.

*GOE: 06.04.20 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 77*

### **723.687-010 PATCHER (house. appl.)**

Covers wired electrical appliance components, such as thermostats used in heating pads, with insulating fabric: Tears piece of adhesive from dispenser roll, and places adhesive on workbench. Positions thermostat on fabric and arranges lead wires to prevent strain on soldered connections. Folds and seals fabric over thermostat, using fingers. May touch lead wires to test terminals and observe signal light to verify wiring continuity.

*GOE: 06.04.34 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

### **723.687-014 TESTER AND INSPECTOR, LAMPS (light. fix.)**

Inspects and tests lamps after assembly to determine if they are in satisfactory condition: Plugs lamp into electric outlet and turns on switch. Touches metal parts of lamp with exposed ends of live testing wires for indication of short circuit. Inserts metal test rod into lamp socket and touches contact point to ascertain continuity of circuit. Affixes gummed inspection ticket on each lamp found to be satisfactory.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 77*

### **723.687-018 TESTER, WASTE DISPOSAL LEAKAGE (house. appl.)**

Tests household waste disposal units for leaks, using air pressure device: Places unit on test stand and pulls lever to secure unit in place. Attaches airhose and fills unit with air. Observes warning light which indicates leakage. Places defective units on bench for rework. Hangs acceptable units on overhead conveyor.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

### **723.687-022 WIPER (light. fix.)**

Cleans copper or brass lamp components and assemblies to remove excess paint or smudge, using cloth and solvent: Removes tape around edges or rims of lamps, using wiper and solvent. Dips cloth into solvent and wipes around unpainted areas of lamp component or assembly. Stacks parts or lamps for removal to lacquering section.

*GOE: 06.04.39 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

## **724 OCCUPATIONS IN WINDING AND ASSEMBLING COILS, MAGNETS, ARMATURES, AND RELATED PRODUCTS**

This group includes occupations concerned with cutting, winding, taping, forming, stripping, connecting, and soldering wire to fabricate, assemble, and repair coils, magnets, armatures, and related products.

### **724.130-010 SUPERVISOR, ELECTRONIC COILS (elec. equip.; electron. comp.)**

Supervises and coordinates activities of workers engaged in winding, assembling, and testing electronic inductor devices, such as coils, filters, and transformers: Analyzes production schedule to plan assignments for section and assigns duties to workers. Examines product for conformance to manufacturing and quality standards. Demonstrates method and sequence for performing duties, and trains workers in operation and control of machines and equipment. Initiates or recommends personnel actions, such as hiring, transferring, promoting, or disciplining. Maintains records and prepares cost, yield and breakage, and maintenance reports. Inventories and requisitions tools, equipment, and supplies for department activities. May be required to set up, adjust, and repair machines and equipment. May be designated according to product assembled or activity involved, as Supervisor, Coil Winding (elec. equip.; electron. comp.); Supervisor, Filter Assembly (elec. equip.; electron. comp.); Supervisor, Test and Inspection (elec. equip.; electron. comp.).

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L4 SVP: 8 DLU: 87*

### **724.131-010 SUPERVISOR, COIL WINDING (elec. equip.) alternate titles: armature-and-field-assembly supervisor**

Supervises and coordinates activities of workers engaged in winding electric motors and generators: Plans and schedules department activities, utilizing knowledge of motor controls, winding machine operations, insulation characteristics, and types of windings. Plans and inspects machine adjustments. Assigns duties to utilize available machines to complete job order according to specifications, such as number of pieces, number of turns, size of coils or armatures, and type of wire. Schedules dipping and baking of coils and coil assemblies to group products requiring identical insulation and baking time. Adjusts work procedure for inserting prewound coils into rotors and stators, connecting coil groups, and testing wound assembly to utilize abilities of available workers. Performs other duties as described under

SUPERVISOR (any industry) Master Title.

*GOE: 06.02.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

#### **724.131-014 TRANSFORMER SHOP SUPERVISOR (any industry)**

Supervises and coordinates activities of TRANSFORMER REPAIRERS (any industry) and other workers engaged in testing and repairing distribution, street light, and instrument transformers. Trains new employees. Performs duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 05.05.10 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 77*

#### **724.281-010 TRANSFORMER TESTER (utilities)**

Tests insulation, current resistance, loss of current, and performance of transformers and tests insulating strength of transformer oil, using electrical testing mechanisms: Attaches transformer wires to terminal board mounting various testing meters and to live wire for energizing transformer. Adjusts testing-meter indicators at settings governed by test to be made and volt specifications on transformer tested, employing extensive knowledge of transformers. Successively turns switches which control transmission of current through transformer to testing meters, such as voltmeter, ammeter, and ohmmeter, for testing insulation, resistance, and loss of current. Notes action of circuit breaker which automatically stops flow of current if transformer does not react correctly to test applied. Tests insulating strength of transformer oil by passing current through oil sample placed in box containing two electrodes. Notes whether current will break down oil, causing arc between electrodes, actuating dielectric meter and indicating oil is of insufficient insulating strength. Tests fuse strength by regulating switch and sending excessive current through transformer. Diagnoses transformer defects and routes rejected transformers for repairs.

*GOE: 06.01.05 STRENGTH: M GED: R4 M3 L3 SVP: 7 DLU: 77*

#### **724.360-010 SET-UP MECHANIC, COIL-WINDING MACHINES (elec. equip.)**

Sets up, adjusts, and maintains machines used to wind, tape, form, strip, or connect wire for electrical coils, using setup charts and handtools: Changes fixtures in automatic coil-winding machines and core-insulating machines, replaces wire supply, and threads wire or insulating paper through tension devices to accommodate different size coils and windings. Turns screws and knobs to adjust settings of electrical switches and counters in automatic armature-and-field-coil-winding machines, using wrenches and screwdriver. Tightens bolts to align pulleys and adjust belt tension. Removes winding jaws from automatic winding machines and holds against powered buffing wheel to smooth surfaces, using \$T3lapping compound.\$T1 Changes forming dies and holding devices in coil forming presses and changes cutting blades in wire-stripping machine to accommodate different sizes of wire. Replaces defective parts. Operates power grinder to make specialty tools used in winding department, such as picks, winding hooks, and scrapers.

*GOE: 06.01.02 STRENGTH: M GED: R4 M3 L4 SVP: 6 DLU: 87*

#### **724.362-010 WIRE COILER (house. appl.)**

Sets up and operates wire-coiling machine to coil wire for electrical appliance heating element: Selects wire of specified thickness. Bolts coiling disks to machine to make coils of specified size. Positions electric eye to activate automatic cutting mechanism, allowing for trimming of coil ends, using handtools. Threads wire through guides and between disks and starts machine. Hangs coil of each run to contacts of testing device, pulls switch, and reads watt and voltage input on meters. Resets electric eye, changes disks, or threads different gauge wire into machine to correct discrepancies. May cut wire at end of coil, using wire snips, watching meter for desired length. May use wire-cutting-and-stripping machine [LEAD FORMER (elec. equip.) 691.685-018].

*GOE: 06.02.02 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 77*

#### **724.364-010 WINDING INSPECTOR AND TESTER (elec. equip.)**

Performs any combination of following tasks to inspect and test stators, armatures, or rotors wound with prewound coils, using electrical testing equipment: Tests armatures, rotors, or stators for misconnected leads and insulation breakdown, using oscilloscope or test panel. Determines test hook-up from work ticket and connects coded stator leads to test clips. Turns dials to select specified voltage and current. Closes circuit and observes meter reading or oscillograph pattern. Interprets readings and patterns and records data. Touches one lead from high voltage source to stator or armature core and other lead to each coil lead in stator or armature. Watches for spark which indicates grounded circuit. Places spring steel blade of growler against inside face of stator or drum of armature and rotates over circumference. Observes steel blade for vibration which indicates shorted coils. Inspects lead and end windings for mechanical damage and conformance to specifications, using gauge, rule, or template to measure length and shape. Taps steel die to stamp code on core, using hammer. May inspect alignment of stacked commutators. May bunch and wrap stator leads to protect them until further assembly. May be designated according to item tested and inspected as Armature Tester (elec. equip.) III; Inspector And Shaper, End Windings (elec. equip.); Stator Tester (elec. equip.).

*GOE: 06.03.01 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

#### **724.381-010 ADJUSTER, ELECTRICAL CONTACTS (elec. equip.)**

Adjusts contacts and springs of electrical apparatus, such as relays and switches, to permit opening and closing of circuits and flow of current: Examines apparatus for defects, such as damaged coil cover, bent springs and contacts, misaligned armatures and contacts, and missing parts. Verifies clearance and tension of parts, using feeler and tension gauges and shadowgraph. Turns dials of test equipment to specified settings. Positions apparatus in holding fixture, shadowgraph, or test board and presses control buttons to activate test equipment. Observes meters and lights on test equipment to determine factors, such as amperage required to close contacts, operating sequence and release timing of contacts, and electrical continuity. May verify mechanical operation of apparatus by manipulating apparatus with fingers. Bends parts, such as armature, contacts, and tension springs, to assure apparatus operates as specified, using handtools. Stamps and sorts defective and adjusted apparatus into stock pans for repair or further processing. May be designated according to type of apparatus adjusted as Crossbar-Switch Adjuster (elec. equip.); Relay Adjuster (elec. equip.); Switch Adjuster (elec. equip.); Wire-Spring-Relay Adjuster (elec. equip.). May verify adjustment of relays on sample basis and be designated Relay Checker (elec. equip.). May adjust fluorescent lamp starters and be designated Starter Adjuster (light. fix.).

*GOE: 05.10.03 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 77*

#### **724.381-014 COIL WINDER, REPAIR (any industry)**

Winds coils for repair of electric motor and generator parts, such as rotors, stators, and armatures, using original winding as guide to determine number of turns and size of wire: Winds coil on machine or directly into slots of rotors, stators, and armatures or pounds heavy copper over template to form coils. Operates coil spreading machine to shape rigid coils for placement into slots. Tends coil taping machine or winds tape around coils by hand to insulate coils. Cuts and forms sheet insulation to fit slots, using paper cutter and forming fixture. Inserts coils into slots and pounds, using mallet and block, to compress and shape windings. Twists coil leads together to form groups of coils according to original winding and solders connections, using soldering iron. May paint coils with insulating varnish or enamel. May be designated according to coil wound as Field-Coil Winder (any industry).

*GOE: 06.02.32 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **724.381-018 TRANSFORMER REPAIRER (any industry) alternate titles: transformer assembler; transformer rebuilder**

Cleans and repairs distribution, streetlight, and instrument transformers: Disassembles transformers, using handtools, and opens valve to drain oil. Boils metal transformer case and cover in chemical solution to remove grease, rinses with hose, and dries with cloth to remove dirt and oil. Reassembles transformer, replacing worn or defective parts, using handtools. Solders input and output wires in position and pours compound in transformer-case terminal openings to seal out moisture. Pours oil into transformer until

coils are submerged.

*GOE: 05.10.03 STRENGTH: M GED: R3 M2 L2 SVP: 7 DLU: 77*

#### **724.384-010 ARMATURE TESTER I (elec. equip.) alternate titles: tester, armature or fields; rotor-and-armature bander**

Tests armatures and field assemblies for motors to locate short, open, or grounded circuits, using electrical test apparatus that shows defects on panel meters or oscillograph patterns: Places armature in fixture equipped with brush contactors or touches test prods to commutator bars to make bar-to-bar and similar tests. Compares meter readings with fixed calibration on meter to determine shorts, opens, and grounds. Connects master unit, such as armature or field assembly, to terminals of winding tester. Looks into oscilloscope to compare test pattern of each unit tested with master unit. Turns dials to create different test situations and recognizes differences from master pattern. Inspects unit for mechanical defects. Scrapes chips and dirt from commutator slots, using brush and pick. Records quantity and classification of rejects and total number tested. May replace and revarnish string bands, reconnect leads, and resolder connections to repair armatures.

*GOE: 05.10.03 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

#### **724.384-014 STATIC BALANCER (any industry)**

Tests products, such as armatures, fans, and rotors for balance, using static balancer, and adds or removes metal from product to correct imbalance: Rolls parts on two parallel, level, knife edges or rotates part on two pairs of overlapping, narrow, faced rollers and observes point of rest. Removes excess metal from heavy areas, using drill press, bench grinder, chisel and hammer, or files. Adds rivets, washers, or metal wedges to light areas, using handtools to correct balance. May attach parts to mandrel for balancing. May be designated according to part balanced as Armature Balancer (elec. equip.); Fan Balancer (elec. equip.); Rotor Balancer (elec. equip.).

*GOE: 06.03.01 STRENGTH: M GED: R3 M2 L2 SVP: 3 DLU: 77*

#### **724.684-010 ARMATURE BANDER (any industry)**

Winds steel wire around coil slots in armature core to hold coils in position when armature rotates, using banding machine: Lifts or hoists armature to horizontal spindle of banding machine. Shapes exposed parts of coils to specified size, using rawhide hammer. Mounts spool of specified wire and threads wire through guides of machine. Wraps sheet of insulation around core and attaches wire to pin wedged in core or twists first turn around armature, using pliers. Inserts metal clips under wire and turns crank to rotate armature or starts machine that winds wire around armature. Guides wire manually or mechanically to maintain tension. Turns ends of metal clips over wire and solders to hold wires in place. Solders armature leads to commutator and caps riser, using electric soldering iron. May shape coils [COIL SHAPER (any industry)].

*GOE: 06.02.24 STRENGTH: M GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **724.684-014 ARMATURE CONNECTOR II (elec. equip.)**

Inserts lead wires of armature coils into commutator slots to connect armature to commutator. Places armature in holding fixture on workbench and strips insulation from ends of coil wires, using wire scraper or knife. Bends wire leads to conform with curvature of armature and inserts leads into commutator slots, using handtools. Winds and ties cord around coil leads to hold in specified commutator slots. Cuts excess wire from leads, using wirecutter or scissors. May shape end windings, using hammer and fiber block. May test connected armatures by touching contact points to test light. May repair connections by splicing, reconnecting, or reinsulating wires. May dip commutator into solder pot to solder wires into commutator slots. May press commutator on armature shaft, using arbor press. May be designated according to coil leads connected as Primary Connector, Armature (elec. equip.); Secondary Connector, Armature (elec. equip.).

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

**724.684-018 ARMATURE WINDER, REPAIR (any industry) alternate titles: armature repairer**

Winds new coils on armatures of used generators and motors: Cuts insulating material to fit slots on armature core. Places insulating material in bottom of core slots. Cuts wire to length and winds in place, or counts turns of wire in coil being replaced and winds on corresponding number. Occasionally inserts and hammers readymade coils in place. May test armatures, solder ends of coils to commutator segments, wind field coils, test motors for defects, and perform other duties pertaining to motor repairing. May wind new coils on armatures for use in motor vehicles and be designated Armature Winder, Automotive (automotive ser.).

*GOE: 06.02.24 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

**724.684-022 COIL SHAPER (any industry) alternate titles: coil spreader**

Spreads and shapes coils to fit armature, rotor, and stator slots, using coil-spreading machine: Moves levers and handwheels to position side clamps, end clamps, spreader bars, or forming blocks which set specified span and angle of knuckle. Places coil in clamp holders and closes clamps, using hand lever. Depresses pedal or pulls levers to spread and shape coils. Aligns and curves coil ends, using rawhide hammer. Releases hand clamps, removes coils, and verifies dimensions of coil, using rule or template.

*GOE: 06.02.24 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 77*

**724.684-026 COIL WINDER (elec. equip.; electron. comp.)**

Winds coils used in electrical equipment and instruments or as electronic components, according to wiring diagrams, sample coil, or work order, using coil-winding machines and handtools: Reviews wiring diagrams and work order or examines sample coil to ascertain type and size of wire specified, and type, size, length, circumference, and primary and secondary windings of coil to be wound. Selects coil-forming device for specified coil and fastens device onto machine arbor, mandrel, or spindle or fastens device between chuck and tail stock. Threads end of wire from reel through tension device, guides, and spreader, bends wire ends to form lead, and attaches lead to coil core. Turns setscrews to adjust tension on wire and sets counter for number of turns specified. Starts machine and manually feeds wire over coil core or spreader to obtain even and uniform winding and shape of coil. Observes counter and stops machine at specified number of coils. Wraps insulation between layers and around wound coil or inserts plastic blocks between turns to form cooling ducts. Cuts wire to form leads, using wire or bolt cutters. Pounds coil with hammer or mallet to shape end windings or remove coil from fixtures. Winds asbestos, cotton, glass mica, paper, or tape around coil, and brushes varnish on coil or dips coil in varnish, epoxy, or wax to reinforce and seal coil. Strips insulation from end of lead wires, threads lead wires through insulating sleeves or slides sleeves over leads, and solders lead wires to terminals. May test coils for winding continuity, using test lamp. May cut and form insulating materials and be known as Insulator Cutter And Former (elec. equip.); or insert insulation in core slots and be known as Insulator (elec. equip.). May wind heavy ribbon, strap, or round wire over fixture to form coil and be designated Coil Former, Template (elec. equip.); Coil Winder, Open Slot (elec. equip.); Coil Winder, Strap (elec. equip.). May be designated according to type of coil wound or work station as Armature Coil Winder (elec. equip.); Audio-Coil Winder (electron. comp.); Bender, Armature Coil (elec. equip.); Bobbin-Coil Winder (electron. comp.); Coil Finisher (elec. equip.; electron. comp.); Coil Taper (elec. equip.). May be designated: Coil Winder, Hand (electron. comp.); Field-Coil Winder (elec. equip.); Filament-Coil Winder (electron. comp.); Helix-Coil Winder (elec. equip.; electron. comp.); Resistor Winder (elec. equip.; electron. comp.); Transformer-Coil Winder (elec. equip.; electron. comp.).

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 4 DLU: 88*

**724.684-030 COMMUTATOR ASSEMBLER (elec. equip.) alternate titles: commutator presser; regulator assembler; swedger**

Fabricates and undercuts commutators for electric motors and generators, using stacking and holding fixtures, handtools, metalworking machines, and measuring devices: Cuts copper bars of specified thickness into designated lengths and widths, and cuts sheet mica into separators, sleeves, and collars,

using power saw. Stacks bars, separated by mica inserts, in stacking sleeve and aligns bars, using dial indicator and mallet. Places bar and mica assembly in fixture and presses assembly together, using hydraulic press. Heats assembly in oven to soften insulation and presses heated assembly to specified circumference, using press. Positions mica collars at ends of bar assembly, and if V-ring is used, presses ring against collar, using arbor press. Secures assembly with bolts and nuts or threaded ring, using wrenches or hammer and drift. Mounts assembly in \$T3indexing\$T1 fixture on circular saw or slotting machine, and undercuts mica or slots commutator risers to specified depth. Removes burrs, chips, and foreign matter from commutator, using picks, knives, cloths, solvent, or compressed air. Connects leads to power source for testing commutator. Touches leads from bars onto steel frame to ensure that commutator is not grounded or shorted. May braze or solder resistor or capacitor leads to commutator. May be designated according to operation performed as Commutator Undercutter (elec. equip.); Commutator V-Ring Assembler (elec. equip.).

*GOE: 06.02.24 STRENGTH: M GED: R3 M2 L2 SVP: 5 DLU: 77*

#### **724.684-034 MAGNET-VALVE ASSEMBLER (elec. equip.)**

Fits together bushings, needle valve, springs, washers, and coil into housing to assemble electromagnet valves used to control flow of liquids or gases in diesel equipment: Presses washer-type ring over needle stem to assemble valve stem. Slides collar over stem and turns one-fourth turn to seat ring. Clamps valve stem in fixture and inserts needle valve and spring. Adjusts setscrew to hold needle valve in specified position shown on dial indicator. Inserts assembled valve stem into housing and plugs with bottle cap to hold in position temporarily. Clamps housing in holding fixture, removes bottle cap, and seats brass bushing in opening in valve housing around valve stem, using special tool and hammer. Dips plastic washer and bottom of magnet coil into varnish to form insulation between coil and housing. Wraps coil in paper and bolts and screws coil, springs, and washers, to inside of housing, using ratchet wrench and screwdriver.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **724.684-038 MOTOR-AND-GENERATOR-BRUSH MAKER (elec. equip.) alternate titles: wire-brush maker**

Cuts, winds, and presses wire gauze to fabricate brushes of specified size for collecting and distributing electric current in generators and motors, using hand shear, mandrel, and hydraulic press: Cuts wire gauze to specified lengths, using hand shears. Winds cut gauze on mandrel to form roll of several thicknesses. Adjusts setscrews on bed of hydraulic press and positions rolled gauze in bed of press which compresses gauze to specified width and thickness. Immerses compressed brush into molten lead, using tongs, and solders end of gauze to fasten exposed flap. Holds gauze against bandsaw to bevel brush end.

*GOE: 06.02.24 STRENGTH: L GED: R3 M2 L1 SVP: 4 DLU: 77*

#### **724.685-010 ELEMENT WINDING MACHINE TENDER (elec. equip.; inst. & app.)**

Tends wire winding machine that automatically winds elements used in electrical and electronic components, equipment, instruments, and devices, following work orders and wiring diagrams, using handtools: Reads work orders and specifications to determine materials required. Loads wire spools onto machine spindles and adjusts machine controls at specified positions, following machine setup instructions and wiring diagrams. Threads specified wire through winding guides or over coil, using handtools, such as tweezers, hook, or spreader. Clamps element or coil onto machine fixture and attaches wire to element or coil, using handtools, such as tweezers, hook, flux, soldering iron, and microscope. Sets winding counter or tension adjustments, and manipulates hand or foot controls to start machine. Observes and monitors machine winding to detect deviations from standards, and to stop or ensure automatic shut-off of machine after specified number of windings. Severs wire manually, using scissors, wire snippers, or cutters, or pushes lever to activate automatic machine wire cutting. May record production information. May mix and apply cement, glue, or varnish to element or coil and heat element or coil in curing oven to reinforce, insulate, and prevent raveling of wire. May test and measure elements and coils for resistance factors and

linearity, using ohmmeter, computer, and calipers.

*GOE: 06.04.09 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 90*

#### **724.685-014 WELD INSPECTOR (elec. equip.)**

Tends machine that tests welds of contact disks to spark-breaker arms used in automobile distributors: Positions arm in machine that strikes contact disk with hammer. Discards spark-breaker arms if contact disks break off. Weighs out spark-breaker arms in lots, using scales, and places parts in cartons.

*GOE: 06.03.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 77*

#### **724.687-010 LACER AND TIER (elec. equip.) alternate titles: binder**

Laces and ties cotton tape to cover joint formed by soldering coil leads of adjacent coils in one pole phase group: Laces tape through and over wires of joint, loops tape around open leads, and ties tape.

*GOE: 06.04.23 STRENGTH: M GED: R1 M1 L1 SVP: 2 DLU: 77*

### **725 OCCUPATIONS IN ASSEMBLY OF LIGHT BULBS AND ELECTRONIC TUBES**

This group includes occupations concerned with fabricating and assembling filaments, grids, plates, masks, guns, and other parts and inserting them into bulbs to complete electron tubes and light bulbs.

#### **725.381-010 TUBE REBUILDER (electron. comp.) alternate titles: television-picture-tube rebuilder**

Rebuilds cathode ray tubes used in television receivers and display instruments according to specifications, applying knowledge of electronics: Inspects tube for physical defects, such as cracks, scratches, burns, and pits to determine if tube is repairable. Tests display function, such as horizontal fade, color purity, and convergence to locate cause of malfunction, using test equipment. Cuts off glass neck holding electron gun, using hot wire or gas torch. Paints dag (graphite paint) inside bulb to provide conductive surface, using brush. Places bulb and replacement electron gun in lathe equipped with gas torch to weld and anneal parts together. Operates ovens and pumps to seal and evacuate tube. Places rebuilt tube in chamber to age (stabilize) tube. Coats exterior surface of tube with dag, using spray gun. Tests tube function and operation for conformance to specifications. Buffs and polishes display screen surface to remove scratches, using power buffer and abrasive compound.

*GOE: 05.05.10 STRENGTH: M GED: R4 M3 L4 SVP: 6 DLU: 88*

#### **725.384-010 TUBE ASSEMBLER, ELECTRON (electron. comp.)**

Performs any combination of following tasks to fabricate parts and assemble custom or production electron tubes: Reads work orders, receives verbal instructions, and follows drawings and sample assemblies to fabricate and assemble parts. Winds wire around grid core or mandrel to form filaments, grids, and heaters, using manual or automatic winding machines. Stretches and presses wound grid cores to designated shape, and cuts cores to specified size, using manual or power tools. Forms parts, such as grids, stems, and leads, using special purpose automatic machines. Coats designated parts with specified materials to change conductive properties of parts or provide electrostatic shield for tube elements, using spray equipment, paint brush, pressurized needle, or other coating method. Positions parts, such as grids, spacers, plates, caps, shields, stems, heaters, and radiators, in specified relationship to one another. Mounts parts in holding fixtures and bonds parts together, using welding and brazing techniques and equipment. Fills bases or top caps of designated tubes with adhesive and attaches bases or caps to glass bulbs and metal shells. Places assembled tube in equipment to remove impurities, create vacuum, and seal tube. Stamps and etches identifying information on tube and tube parts, using printing or etching equipment. Polishes designated parts and assemblies, using buffing wheel. Tends ovens that cure adhesives, inks, and coatings. Assembles parts for cathodes, using microscope. Tests and inspects parts and assemblies for conformance to specifications, using test equipment, precision measuring instruments, and microscope. Tends electronic ageing equipment that stabilize electrical characteristics of tubes. May be designated by duties performed as Electron Gun Assembler (electron. comp.); Stem-Lead Former (electron. comp.);



Tube-Component Assembler (electron comp.); Tube Fitter (electron. comp.).

*GOE: 06.02.23 STRENGTH: L GED: R2 M2 L2 SVP: 2 DLU: 88*

### **725.684-010 COILED-COIL INSPECTOR (light. fix.)**

Examines tungsten filament coils of electric light bulbs for concentricity and burrs by rolling coils under fingers on workbench, using tweezers to separate coils. Measures length of coils, using metric scale. Determines brittleness of coils by stretching occasional coil to breaking point. Places approved coils in labeled glass jars and sets aside rejected coils. Maintains record of material examined.

*GOE: 06.03.01 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 77*

### **725.684-014 MOUNTER, HAND (light. fix.)**

Mounts tungsten filament coils on bead mounts or stems used in incandescent lamps by either of following methods: (1) Positions hooked ends of pair of stem lead wires on bed of press, slips filament coil ends under hooks with tweezers, and presses pedal to lower die on stem that clamps hooks over ends of coil. May clamp tungsten filament coil to lead wires which have no end hooks. (2) Slips one end of filament coil through lead wire hook of bead mount, using tweezers and magnifying glass, and clamps part in place, using press. Twists filament through loop in bead-mount anchor wire, through tip of other lead wire, and clamps part in place, using press. Pulls tip of anchor wire to tighten loop around filament coil, using tweezers. Inserts two completed mounts in each light bulb.

*GOE: 06.04.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

### **725.684-018 STEM MOUNTER (light. fix.)**

Fastens tungsten wire (filament) to glass stem to form mount for electric light bulb: Loops wire over hooks on glass stem held in revolving table and clinches hooks in place, using pliers. Cements ends to lead wires, using brush and carbon cement.

*GOE: 06.04.23 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 77*

### **725.684-022 TUBE ASSEMBLER, CATHODE RAY (electron. comp.)**

Performs any combination of following tasks to assemble cathode-ray tubes used in television and display equipment: Removes funnel from rack and places funnel onto conveyORIZED washing, rinsing, and drying equipment. Positions funnel in rotatable holding chuck to secure funnel for painting. Inserts brush into rotating funnel and paints dag (conductive graphite) coating as indicated by chuck guide to provide electric conductivity. Verifies that aperture mask and display screen fit together according to corresponding numbers. Examines aperture mask and screen in light box to detect misaligned color dots, using microscope. Positions funnel in rotatable chuck equipped with automatic frit dispenser. Moves controls that index frit dispenser around edge of funnel mouth to dispense sealant. Removes frit-coated funnel from chuck and secures funnel in jig for joining display screen assembly onto funnel. Positions display screen assembly on funnel edge and aligns screen with reference points on funnel. Pushes jig onto conveyor leading into oven to fuse funnel and display screen assembly into bulb. Places bulb on holding fixture of sprayer to coat interior surface of bulb with protective layer of lacquer. Places bulb onto holding fixture of evaporation equipment to apply aluminized coating to interior surface of bulb. Places bulb onto conveyor that carries bulb through processing stations to preheat bulb, insert and fuse gun to neck of bulb to form tube, and anneals and cools tube assembly. Places tube onto cart or conveyor for further processing. Inspects tube for imperfections, such as blemishes, coating defects, scratches, bubbles, or stains, using magnifier, ultraviolet light, inspection booth, or unaided vision. May be designated according to duties performed as Aluminizer (electron. comp.); Bulb Assembler (electron. comp.); Dag Coater (electron. comp.); Frit Coater (electron. comp.); Funnel Coater (electron. comp.); Gun-Sealing-Machine Operator (electron. comp.); Lacquer Sprayer (electron. comp.).

*GOE: 06.02.23 STRENGTH: M GED: R2 M1 L1 SVP: 3 DLU: 89*

### **725.684-026 CATHODE RAY TUBE SALVAGE PROCESSOR (electron. comp.)**

Performs any combination of following duties to disassemble salvaged cathode ray tubes for reprocessing: Removes vacuum and electron gun from bulb of salvaged cathode ray tube, using portable air drill. Places bulb on fixture of deband machine and activates machine that cuts metal band that surrounds joint between funnel and viewing screen of bulb. Places debanded bulb on conveyor that carries bulb through series of acid and water baths to loosen and dissolve frit that bonds funnel to viewing screen. Positions bulb on chuck of machine and presses pedal on machine that pneumatically separates funnel from viewing screen. Places funnel and screen in vats of acid and water to remove remaining frit from parts. Examines funnel and screen to ensure all frit was removed during acid processing. Places funnel and screen on cart for further processing.

*GOE: 06.02.32 STRENGTH: H GED: R2 M1 L1 SVP: 3 DLU: 88*

#### **725.685-010 DISPLAY-SCREEN FABRICATOR (electron. comp.)**

Tends equipment that forms and prepares aperture masks and display screens for oscilloscope and television picture tubes: Feeds specified sections of sensitized steel between plates in photographic printing chase to flatten sheet to specification. Sets timer for specified exposure and turns on heliarc lamp to imprint pattern of aperture mask from photographic plate onto steel. Verifies alignment of plates, using microscope. Tends furnace that blackens aperture masks and rings. Feeds mask through series of rollers that flatten mask. Positions mask on bed of forming press and lowers die to form mask. Tends processing equipment to clean, dry, and coat phosphor on inside face of display screen. Positions aperture mask and screen on fixture over time-cycled light source to print color-emitting dots on phosphor coating. Starts cycle to expose coating to light through mask aperture. Marks mating screen and aperture mask with matching numbers for future assembly. Fastens screen in holder on conveyor that carries screen through equipment that develops exposed phosphor, removes unexposed phosphor, and dries screen. May be designated according to process as Aperture-Mask Etcher (electron. comp.); Mask Former (electron. comp.); Screener (electron. comp.).

*GOE: 06.04.19 STRENGTH: M GED: R2 M2 L2 SVP: 2 DLU: 89*

#### **725.687-010 BEAD INSPECTOR (light. fix.)**

Inspects molded glass beads, used in incandescent lamps, for defects: Scoops up beads on prongs of metal forklike device. Examines beads to determine if beads are whole. Moves beads up and down on prongs to gauge diameter; rejects beads that do not slide easily. Breaks or puts aside defective beads, and pours satisfactory beads into containers.

*GOE: 06.03.02 STRENGTH: S GED: R2 M2 L2 SVP: 3 DLU: 77*

#### **725.687-014 COILER (light. fix.)**

Tests incandescent lamps for air leaks, using high-frequency electric ray gun: Spreads completed lamps on table, three sides and top of which are covered by black hood. Depresses switch on high-frequency ray gun which releases electric current through exposed wire protruding from gun. Passes exposed wire over lamps and observes each to ascertain its turning specified shade of blue on contact. Segregates defective lamps from those meeting standards.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 77*

#### **725.687-018 FOCUSER (light. fix.)**

Observes magnified shadow of lamp filament projected on coordinate lines of dark screen to determine if coil has been properly centered within bulb. Pulls stem to center filament, using tweezers.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 3 DLU: 77*

#### **725.687-022 GETTERER (light. fix.)**

Applies getter (chemical solution) to stems of lead wires used in making incandescent lamps: Picks stem from tray and applies getter on lead wires, using brush. Places stem in tray to dry. Adds thinners to

getter and stirs mixture to maintain specified consistency.

*GOE: 06.04.33 STRENGTH: S GED: R1 M1 L1 SVP: 2 DLU: 77*

## **725.687-026 QUALITY-CONTROL INSPECTOR (light. fix.)**

Examines machine-made light bulbs for defects: Selects sample carton from each lampmaking unit, tests lamps (bulbs) for lighting, and visually examines bulbs for other defects. Records number of defectives and informs department supervisor when percentage of defective lamps exceeds allowable limits, requiring inspection of entire unit output. May open tips of sample bulbs with knife, immerse bulbs in water, measure amounts of water remaining in bulbs, and compare amounts with standard chart to determine whether sufficient gas is injected by machine.

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 77*

## **726 OCCUPATIONS IN ASSEMBLY AND REPAIR OF ELECTRONIC COMPONENTS AND ACCESSORIES, N.E.C.**

This group includes occupations, not elsewhere classified, concerned with fabricating resistors, inductors, transformers, capacitors, crystals, diodes, semiconductors (solid state), potentiometers and controls, printed circuitry, harness, and similar products for electronic end products, and assembling and repairing accessories, such as speakers, antennas, and related items.

### **726.130-010 SUPERVISOR, ELECTRONICS PRODUCTION (comm. equip.; electron. comp.; office machines)**

Supervises and coordinates activities of workers engaged in fabricating, assembling, testing, inspecting, and repairing electronic products, systems, subassemblies, components, or parts: Analyzes manufacturing requirements, prepares production schedule, and distributes work assignments according to order priorities and worker availability. Reviews work orders, product specifications, and technical instructions to determine facility requirements, and requisitions tools, equipment, and supplies to meet production goals. Demonstrates work methods, such as machine setup, wire routing, assembly, inspection sequence, repair, and test equipment operation. Examines product for defects, utilizing knowledge of manufacturing and quality standards, to ensure conformance to product specifications. Performs other tasks described under SUPERVISOR (any industry) Master Title. May assist subordinates to adjust and repair machines and equipment. May confer with interdepartmental personnel to discuss production procedures and resolve problems. May be designated according to function supervised as Quality Assurance Supervisor (office machines); Supervisor, Electronics Assembly (electron. comp.; office machines); Supervisor, Electronics Inspection (electron. comp.); Supervisor, Electronics Testing (electron. comp.); Supervisor, Television-Chassis Repair (comm. equip.).

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L3 SVP: 7 DLU: 88*

### **726.131-014 SUPERVISOR, HEARING-AID ASSEMBLY (protective dev.)**

Supervises and coordinates activities of workers engaged in assembling and repairing hearing aids: Reads assembly orders and repair tickets to determine work priorities, and assigns work to those workers responsible for assembly or repair. Records production, such as type of hearing aids to be assembled, number of units, and date assigned. Monitors work in progress to determine whether production is maintained according to schedule. Confers with workers' representatives to resolve grievances. Demonstrates job tasks to train new workers and assigns experienced workers to assist in training. Compiles weekly and monthly production reports of hearing aids assembled and repaired. Requisitions supplies and equipment as required. Performs other duties as described under SUPERVISOR (any industry) Master Title.

*GOE: 06.01.01 STRENGTH: L GED: R3 M3 L3 SVP: 7 DLU: 86*

### **726.131-018 SUPERVISOR, PRINTED CIRCUIT BOARD TESTING (electron. comp.) alternate titles: supervisor, electronic testing; supervisor, functional testing; supervisor, in-circuit testing**

Supervises and coordinates activities of workers engaged in repairing and testing performance of printed circuit boards (PCB's) during and after assembly, applying knowledge of electronic theory and circuitry, test procedures, and documentation: Directs training of workers in areas such as test procedures and equipment operation, troubleshooting and repairing, and interpretation of specifications and documentation. Coordinates testing and repair work to ensure completion of work assignment. Monitors repair activities to verify PCB's conform to documentation standards. Performs other duties as described under SUPERVISOR (any industry) Master Title. May supervise activities of workers engaged in assembling PCB's.

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L4 SVP: 8 DLU: 86*

## **726.134-010 SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.)**

Supervises and coordinates activities of workers engaged in assembling, testing, and inspecting printed circuit boards: Directs training of workers in interpreting shop specifications, component recognition, equipment operation, and performance of job duties to ensure conformance to assembly standards. Plans and coordinates work assignments to meet production goals. Examines assembled printed circuit boards, applying knowledge of assembly and quality standards, to ensure specifications are met. Performs other duties as described under SUPERVISOR (any industry) Master Title. May be designated according to stage of assembly as Supervisor, Final (electron. comp.); Supervisor, Post-Wave (electron. comp.); Supervisor, Pre-Wave (electron. comp.). May be designated according to function supervised as Supervisor, Assembly (electron. comp.); Supervisor, Quality Control (electron. comp.); Supervisor, Testing (electron. comp.).

*GOE: 06.01.01 STRENGTH: L GED: R4 M3 L4 SVP: 7 DLU: 88*

## **726.261-010 ELECTRONICS ASSEMBLER, DEVELOPMENTAL (any industry) alternate titles: developer-prover, electrical; electrical and electronics development mechanic; prototype assembler, electronics**

Assembles, tests, and modifies prototype or custom electronic parts, systems, and apparatus to develop assembly methods and techniques for use by production workers, applying knowledge of electronic theory and assembly techniques: Reads blueprints, wiring diagrams, process sheets, and assembly and schematic drawings, and receives verbal instructions regarding work assignment. Aligns and assembles parts, such as leads, coils, wires, tabs, and terminals into housing, using handtools, power tools, soldering iron, brazing fixture, and welding head. Routes and laces cables [CABLE MAKER (elec. equip.; electron. comp.) 728.684-010]. Installs components and parts, such as switches, coils, transformers, relays, transistors, and semiconductor circuits on chassis, circuit boards, panels, and other units, using handtools, power tools, soldering and welding equipment, and thermocompression bonding, wave soldering, or resistance welding techniques. Routes and attaches wires and connectors to form circuitry and connects assembly to power supply sources, switch panels, or junction boxes. Attaches hardware and seals assembly, using rivets, screws, handtools, power tools, resistance welder or thermocompression bonding. Examines parts for defects, such as pinholes or chips. Test-operates unit to locate defects, measure performance, determine need for adjustment, and verify specified operation, using ohmmeter, oscilloscope, signal generator, and other electronic test instruments. Replaces defective components and wiring, using handtools and soldering iron. Calibrates unit according to specifications. Enters information on production records, logs, and other report forms. May assemble prototype microelectronic units, using binocular microscope. May repair defective units rejected by inspection or test personnel [ELECTRONIC EQUIPMENT REPAIRER (comm. equip.; electron. comp.) 726.381-014].

*GOE: 05.05.05 STRENGTH: L GED: R4 M4 L4 SVP: 7 DLU: 89*

## **726.261-014 ELECTRICIAN, RESEARCH (aircraft mfg.)**

Develops, lays out, fabricates, tests, and modifies radio, electrical, and electronic systems and assemblies, and test equipment, for aeronautical and aerospace developmental test projects: Plans method and sequence of operations for developmental test project. Lays out, fabricates, and assembles radio, electrical, and electronic systems and assemblies, following engineering data, sketches, and blueprints,

utilizing knowledge of electrical and electronic theory, using measuring instruments, handtools, and shop equipment. Sets up and operates test equipment to evaluate performance of developmental parts, assemblies, or systems under simulated operating conditions. Records, analyzes, and interprets test information. Collaborates with engineering and other personnel to solve developmental problems. Modifies parts, assemblies, and systems as required. Constructs, maintains, repairs, calibrates, and modifies test equipment. May develop and fabricate tooling for developmental projects.

*GOE: 05.03.05 STRENGTH: M GED: R4 M4 L3 SVP: 7 DLU: 88*

**726.261-018 ELECTRONICS TESTER (any industry) alternate titles: quality-control-assembly-test technician; technician, test systems; tester, systems; test technician; trouble shooter**

Performs variety of electronic, mechanical, and electromechanical tests on electronic systems, subassemblies, and parts to ensure unit functions according to specifications or to determine cause of unit failure, using electronic test instruments: Reads test schedule, work orders, test manuals, performance specifications, wiring diagrams, and schematics to determine testing procedure and equipment to be used. Tests functional performance of systems, subassemblies, and parts under specified environmental conditions, such as temperature change, vibration, pressure, and humidity, using testing devices, such as temperature cabinets, shake-test machines, and centrifuges. Calibrates test instruments according to specifications. Connects unit to be tested to test equipment, such as signal generator, frequency meter, or spectrum analyzer. Reads dials or digital displays that indicate electronic characteristics, such as voltage, frequency, distortion, inductance, and capacitance. Compares results with specifications and records test data or plots test results on graph. Analyzes test results on defective units to determine cause of failure, applying knowledge of electronic theory and using electronic test equipment. Replaces defective wiring and components, using handtools and soldering iron, or records defects on tag attached to unit and returns unit to production department for repair. Confers with engineers, technicians, production personnel, and others regarding testing procedures and results and to resolve problems. May write computer programs to control semiconductor device and electronic component test equipment prior to testing, utilizing knowledge of programming techniques, electronics, test equipment, and testing specifications. May explain and demonstrate testing procedures to other workers. May verify dimensions of pins, shafts, and other mechanical parts, using calipers, vernier gauges, and micrometers. May operate x-ray equipment to verify internal assembly and alignment of parts according to specifications. May devise test equipment setup to evaluate performance and operation of nonstandard or customer returned units. May be designated according to unit tested as Memory-Unit Test Technician (electron. comp.); Television-Receiver Analyzer (electron. comp.); Transmitter Tester (electron. comp.); Tube-Test Technician (electron. comp.).

*GOE: 06.01.05 STRENGTH: M GED: R4 M4 L3 SVP: 7 DLU: 90*

**726.361-014 GROUP LEADER, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.)**

Assists SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.) 762.134-010, in coordinating activities of workers engaged in assembling printed circuit boards (PCB's), applying knowledge of PCB assembly techniques, specifications, and production scheduling: Confers with SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.), and reviews production schedules, specifications, and priorities to plan department work assignments. Requisitions, obtains, and distributes supplies and materials, such as PCB's, electronic components and parts, solder and flux, antistatic bags and wristbands, and schematic drawings and work orders. Assigns duties to assembly workers and oversees department activities. Revises work assignments to meet production schedules and contract priorities. Explains and demonstrates PCB assembly line procedures and techniques to workers. Interprets schematic drawings, specifications, and work orders for workers. Assists workers in resolving technical problems and advises SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.) of complex production problems. Reads, prepares, collects, and maintains reports, such as individual and department production reports, employee time and attendance records, and component waste reports. Substitutes for absent workers or assists workers to alleviate work overload situations. May assemble sample PCB's, using schematic drawings, handtools, and soldering equipment, to use as work

aids. May preform lead wires for electronic components, using forming machines or handtools, and supply preformed parts to assemblers.

*GOE: 06.02.23 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 88*

## **726.361-018 GROUP LEADER, PRINTED CIRCUIT BOARD QUALITY CONTROL (electron. comp.)**

Assists SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.) 726.134-010 in coordinating activities of workers engaged in inspecting, testing, and repairing printed circuit boards (PCB's), applying knowledge of electronic theory, test procedures, repair techniques, and quality standards: Confers with SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.), and reviews production schedules to determine quantity and type of PCB's to be inspected, tested, or repaired. Compiles list of test and inspection personnel and assists in planning department work assignments. Assigns duties to inspection, test, and repair personnel, using knowledge of workers' experience and capabilities. Collects PCB's and components for processing from receiving and assembly departments and distributes PCB's and components to inspection, test, or repair personnel. Oversees department activities and revises work assignments to meet production schedules and contract priorities. Explains inspection, test procedures, and specifications, and demonstrates use of testing equipment and PCB repair techniques to workers. Interprets schematic drawings, procedure changes, and work orders for workers. Assists workers in resolving technical problems, utilizing knowledge of electronic theory, test procedures, and specifications. Confers with technical personnel and department supervisors to report and resolve assembly and testing problems, and reports unresolved problems to SUPERVISOR, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.). Requisitions, obtains, and distributes supplies, materials, and equipment, such as electronic components and parts used for repair work, test and inspection specifications and test equipment, fixtures, and handtools. Inspects test equipment to verify equipment functions according to standards. Reports substandard equipment performance to supervisor or maintenance personnel. Reads, prepares, collects, and maintains reports, such as individual and department production reports and test results, employee time and attendance records, and product waste reports. Maintains vendor files. Substitutes for absent workers and assists workers to alleviate work overload situations.

*GOE: 06.03.01 STRENGTH: L GED: R3 M3 L3 SVP: 6 DLU: 88*

## **726.361-022 REPAIRER, PROBE TEST CARD, SEMICONDUCTOR WAFERS (electron. comp.)**

Replaces and realigns broken, worn, or misaligned probes on probe test cards, using handtools and equipment, to maintain probe cards for wafer probe (electrical test) equipment: Reads specification sheets, manuals, and diagrams to determine probe card wiring and probe positions. Inspects probe cards, using microscope, to detect defects, such as loose wiring and loose, split, or worn probes. Removes, replaces, and re-solders defective wiring and probes, using tweezers and soldering iron. Observes probe card through microscope and aligns probes in specified position over test wafer, using tweezers. Aligns probes on even plane, using tweezers and test equipment. Maintains repair and replacement records. Maintains probe and inventory records, using computer terminal.

*GOE: 06.01.04 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 86*

## **726.362-010 GROUP LEADER, SEMICONDUCTOR TESTING (electron. comp.) alternate titles: production aide**

Assists SUPERVISOR, ELECTRONICS TESTING (electron. comp.) 726.130-010 in coordinating and monitoring activities of workers engaged in testing electronic devices (components), such as integrated circuits (ICs), transistors, and diodes, on semiconductor wafers, utilizing knowledge of equipment, procedures, and test specifications: Answers questions from workers pertaining to test procedures and test equipment operation. Monitors and expedites flow of materials through testing cycle. Enters test program into test equipment, using computer terminal, and examines test equipment printout to verify test equipment is functioning according to company and manual specifications. Notifies maintenance workers of test equipment malfunctions. Operates or tends equipment to substitute for absentee workers. Maintains

production records. Trains workers in equipment operation and test procedures.

*GOE: 06.01.05 STRENGTH: S GED: R3 M2 L2 SVP: 7 DLU: 86*

**726.362-014 WAVE-SOLDERING MACHINE OPERATOR (comm. equip.; electron. comp.; inst. & app.; office machines) alternate titles: flow-solder machine operator**

Controls wave-soldering machine or system to solder electronic components onto printed circuit boards (PCB's), according to processing specifications: Reads production schedules and operations manuals and receives verbal instructions regarding sequential start up and operation of wave-soldering machine or system. Moves controls to activate machine or equipment, such as preheater, lead wire cutter, wave-soldering units, and conveyors. Adjusts controls of machines to regulate operating speed and temperature and height of flux, wax, and solder waves. Verifies specific gravity of flux, using hydrometer. Adjusts dimensions of conveyor pallets and rails used to hold and transport PCB's through wave-soldering process, using precision instruments and handtools. Places loaded master pallet and production pallets on conveyor line of wave soldering machine or system and monitors pallets moving through process to verify that timing, temperatures, and dimensions are set according to standards. Observes heat-sensitive color marks or strips placed on PCB's to verify boards have been preheated to specified temperatures. Observes meters, gauges, and indicator lights to ensure that soldering of PCB's conforms to processing standards. Examines samples of soldered boards to detect substandard soldering. Discusses quality of soldering with supervisor and adjusts controls according to instructions. Cleans parts and interiors of machines and replenishes fluids in machines and equipment. Performs preventive maintenance on machines and equipment, using handtools. May return substandard boards to workers for repair. May feed or off bear boards or pallets to or from conveyor system.

*GOE: 06.02.19 STRENGTH: M GED: R3 M2 L3 SVP: 4 DLU: 88*

**726.364-010 LEAD HAND, INSPECTING AND TESTING (electron. comp.)**

Assists supervisor in coordinating activities of workers engaged in inspecting and testing electronic components for compliance to company standards: Receives boxes of components and records identifying information on specified forms. Collects random lot samples, according to lot volume and following company guidelines. Distributes components to workers responsible for testing specific components. Instructs new workers in testing equipment operation, component testing sequence, and specification sheet interpretations. Modifies workers' assignments to meet priorities and to adjust work loads according to worker absenteeism. Completes requisition forms to obtain items requested and delivers items to workers. Observes calibration maintenance sheets to verify maintenance of test equipment and notifies designated personnel of unscheduled verification of equipment as warranted by questionable test results. Maintains records that indicate material discrepancies and records information on vendor history forms.

*GOE: 06.03.02 STRENGTH: M GED: R3 M2 L3 SVP: 6 DLU: 86*

**726.364-014 TEST FIXTURE DESIGNER (electron. comp.)**

Plots and draws schematics for test fixture heads used in testing printed circuit boards (PCB's) for electrical shorts and breaks, utilizing knowledge of printed circuit design, electronics, and customer specifications: Reviews blueprint to determine customer requirements and beginning and end points of PCB conductor paths. Confers with engineer to resolve questions concerning design of test fixture heads. Refers to blueprint and method sheets and chooses electrical points to be tested, making sure to include critical points along conductor path. Plots electrical points to be tested on layout sheet, using pencil. Chooses drill size to be used in drilling test head, according to test design and engineering specifications. Forwards layout of test points with requested drill size to numerical-control drilling department to be used as guide to drill test head. Reviews blueprints to determine logical and most efficient method to wire test head to frame of test fixture. Draws schematics for TEST FIXTURE ASSEMBLER (electron. comp.) 726.684-098 to follow in wiring test head to test fixture frame. May review schematics with assembler to answer questions regarding correct wiring procedures. May monitor building of test fixture by assembler. May record data regarding completed job.

*GOE: 05.03.02 STRENGTH: S GED: R4 M3 L3 SVP: 7 DLU: 86*

**726.364-018 ELECTRONICS UTILITY WORKER (comm. equip.; electron. comp.) alternate titles: setup worker, electronics**

Arranges layout of work stations for workers engaged in fabricating, processing, or assembling electronic equipment and components, such as semiconductor devices, printed circuit boards (PCB's), chassis assemblies, and wire harnesses and cables: Reads specifications, such as process guide, bill of material, wiring diagram, mechanical print, and schematic diagram, to determine materials and equipment needed, such as component parts, chemicals and gases, tools, test instruments, and jigs and fixtures, for work stations. Prepares and submits requisitions for equipment, parts, or tools required to initially set up or resupply work stations. Positions materials and equipment in specified arrangement at work stations. May explain or demonstrate work procedures to other workers in fabricating, processing, and assembly functions. May perform fabricating, processing, or assembly work in absence of line worker. May set and adjust controls for processing, fabricating, and assembly line equipment, such as furnaces, process chambers, power supplies, timers, and multimeters. May test assemblies, using testing machines or instruments, such as meters, resistance bridges, and automatic component testers. May repair or rework assembled items by removing, adding, or replacing parts or resoldering or rebonding defective connections, using handtools or power tools.

*GOE: 06.04.34 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 88*

**726.367-010 GREEN INSPECTOR (elec. equip.)**

Inspects newly extruded (green) carbon electrodes to detect defects, such as cracks and blisters, and to determine disposition of electrodes: Notifies other personnel to investigate cause of defective electrodes. Weighs and measures dimensions of electrodes to determine if specifications are met, using scale, calipers, and straightedge. Marks disposition of electrodes on parts, using chalk, and records findings and disposition of electrodes. May compute density of electrodes, according to plant formula, using slide rule. May inspect samples of graphitized electrodes or green carbon stock impregnated with pitch or linseed oil and be designated Impregnation Inspector (elec. equip.).

*GOE: 06.03.01 STRENGTH: L GED: R3 M2 L2 SVP: 4 DLU: 77*

**726.380-010 ELECTRONIC EQUIPMENT SET-UP OPERATOR (electron. comp.)**

Sets up and operates equipment, such as shearing machine, laminator, and drill, to fabricate single- and multi-layer printed circuit boards (PCB's), following diagrams and specifications: Determines dimensions and tolerances of boards, sequence of operations, and tools and equipment required, according to diagrams and specifications, and measures and marks dimensions and reference points to lay out boards for machining. Sets up and operates shearing machine and drills to cut, form, and drill holes into boards according to specifications. Bevels edge connectors, using slotter, and verifies dimensions and tolerances, using calipers. Sets up and controls laminating and other plating equipment, to apply copper plating and photoresist to boards. Photographs design image and exposes film to produce and develop acid resisting circuitry pattern, using photographic equipment. Etches and retouches circuitry on boards, using etcher. Bonds two or more PCB's together to form multilayer boards, using laminating press.

*GOE: 06.01.03 STRENGTH: L GED: R4 M4 L3 SVP: 6 DLU: 88*

**726.381-010 ELECTRONICS INSPECTOR (comm. equip.; electron. comp.; inst. & app.) alternate titles: quality control inspector; systems inspector**

Performs any combination of following tasks to inspect electronic systems, assemblies, subassemblies, components, and parts for conformance to specifications, following blueprints, drawings, and production and assembly manuals: Examines layout and installation of wiring, cables, subassemblies, hardware, and components to detect assembly errors. Compares assembly with parts list to detect missing hardware. Examines joints, using magnifying glass and mirror, and pulls wires and cables to locate soldering defects. Examines alignment of parts and measures parts for conformance to specified dimensions, using precision measuring instruments, such as micrometers, vernier calipers, and gauges. Twists dials, knobs, shafts, and gears to verify freedom of movement. Traces cables and harness assemblies, following cable wiring



diagram, to verify routing of wires to specified connections and conformance of cable lacing and insulation to manufacturing standards. Measures plated areas for uniformity and thickness, using micrometers or dial indicators. Verifies location of bolt and rivet holes, using templates, check fixtures, and precision measuring instruments. Examines parts for surface defects, such as chips, scratches, and pinholes. Examines production documents to ensure that all assembly, inspecting, and testing steps were performed according to specifications. Calculates percentage of defective parts, using calculator. Records inspection data, such as serial number, type and percent of defects, and rework required. Resolders broken connections on components and parts. Performs functional and operational tests, using electronic test equipment such as frequency meter, oscilloscope, and signal generator [ELECTRONICS TESTER (any industry) 726.261-018], or performs destructive tests to determine tensile strength of product or part. May inspect and lay out optic axis of raw quartz crystals, using optical inspection equipment, and be designated Inspector, Raw Quartz (electron. comp.). May inspect parts at random and be designated Check Inspector (electron. comp.). May inspect units on assembly line and be designated In-Process Inspector (electron. comp.) or final product and be designated Final Inspector (electron. comp.). May be designated according to type of unit inspected as Inspector, Subassemblies (electron. comp.); Inspector, Tubes (electron. comp.).  
*GOE: 06.01.05 STRENGTH: L GED: R4 M4 L4 SVP: 6 DLU: 89*

**726.381-014 ELECTRONIC EQUIPMENT REPAIRER (comm. equip.; electron. comp.) alternate titles: production repairer**

Repairs electronic equipment, such as radio and television receivers, radio transmitters, speakers, amplifiers, and related antenna and cable assemblies, according to product specifications, manufacturing instructions and diagrams, using test equipment, handtools, and soldering iron: Reads inspection tag and examines unit to locate defects, such as broken wires, burned-out components, or scratches on cabinet, using model schematics and electronic test equipment. Inspects wiring and removes broken wires from units, using soldering iron and pliers. Cuts new wires to specified lengths, using wire cutters, or obtains precut wires and re-routes and solders wires to specified terminals, following wiring diagram. Repairs defective soldering, using soldering iron. Removes, repairs, or replaces defective components, such as resistors, transformers, and capacitors, using soldering iron and handtools. May brush touch-up paint on cabinet or case, and varnish on exposed wiring.

*GOE: 05.10.03 STRENGTH: H GED: R3 M3 L3 SVP: 6 DLU: 88*

**726.382-010 SEQUENCING-MACHINE OPERATOR (electron. comp.)**

Sets up and operates sequencing machine to insert electronic components in programmed sequence onto paper tape for use in machine insertion of components onto printed circuit boards (PCB's): Reads instructions to determine sequence, quantity, and types of components required. Mounts supply reels of components on spindles and threads component supply reel tape through machine. Installs and spaces holding devices on machine according to number of components to be sequenced, using wrench. Mounts paper tape reels onto spindles of machine to receive sequenced components. Keys data into computer terminal to enter program number that controls release of components in prescribed sequence onto paper tape. Presses button to activate machine and observes panelboard light indicators to verify sequencing procedures and to detect machine stoppages. Clears jams in holding devices and splices tapes, using handtools and adhesive tapes. Straightens bent wire leads or cuts damaged component from supply tape, using wire snips. Replaces defective components. Records production information. May operate sequencing machine equipped with verifier that automatically identifies faulty components.

*GOE: 06.02.20 STRENGTH: L GED: R3 M2 L3 SVP: 5 DLU: 86*

**726.384-014 INSPECTOR, CIRCUITRY NEGATIVE (electron. comp.) alternate titles: film inspector**

Inspects circuitry film negatives (artwork) for conformance to specifications and touches up defects on negatives to prepare negatives for use in printed circuit board (PCB) fabrication: Compares size and location of hole images on circuitry negative with drilled holes in sample PCB panel to verify conformance of negative to specifications, using light table. Examines circuitry negatives to detect defects, such as under-exposure or over-exposure of negatives, circuitry width, and spacing, using light

table and microscope. Fills nicks, scratches, and gaps in circuitry pattern on negatives with pen or plastic tape, removes excess ink from negatives with cotton swab, and cuts flaws and excess film from circuitry negatives to correct and prepare negatives for use in PCB fabrication, using utility knife. Measures circuitry negative for conformance to specified dimensions, using precision-measuring instruments.

*GOE: 06.03.01 STRENGTH: L GED: R3 M3 L3 SVP: 5 DLU: 86*

### **726.384-018 INSPECTOR, SEMICONDUCTOR WAFER PROCESSING (electron. comp.)**

Inspects semiconductor wafers, using microscope, to identify processing defects: Places wafers on stage of microscope, using tweezers or vacuum wand. Examines surface of wafer and test patterns on wafers, using microscope, and compares wafers to specification diagrams to identify processing defects, such as scratches, contamination, pattern misalignment, photoresist peel, and circuit bridges. Measures specified dimensions of test patterns on wafers, using electronic measuring devices attached to microscope at work station, to verify that wafers meet company specifications. Routes defective wafers to engineering department. Records observations onto processing sheets and log. Cleans inspecting area, using cleaning solution.

*GOE: 06.03.01 STRENGTH: S GED: R3 M2 L2 SVP: 4 DLU: 86*

### **726.384-022 PHOTO MASK INSPECTOR (electron. comp.) alternate titles: mask inspector**

Inspects master or production photo mask plates used in fabrication of semiconductor devices for defects and to ensure conformance to specifications: Positions photo mask plate on stage of microscope or computer-aided inspection equipment. Focuses and aligns lens with predetermined coordinates on photo mask plate. Inspects photo mask plate for defects, such as misalignment of design, contamination, cracks, pinholes, and streaking, and compares photo mask pattern to original design to verify conformance to specifications. Enters commands to activate computer-aided inspection equipment that automatically scans surface of photo mask plate to locate and record defects. Records inspection information, and sorts photo mask plates according to inspection results. May measure critical dimensions of pattern on photo mask plate and compares dimensions to design requirements, using microscopes with attached calibrated viewing or image shearing apparatus. May photograph surface of defective photo mask plate, using instant-print camera. May operate laser-beam equipment to repair circuitry defects on photo mask plate [LASER-BEAM-TRIM OPERATOR (electron. comp.) 726.682-010]. May tend equipment that removes contaminants and photoresist from surface of photo mask plate [PHOTO MASK CLEANER (electron. comp.) 590.684-034].

*GOE: 06.01.05 STRENGTH: L GED: R4 M3 L4 SVP: 6 DLU: 86*

### **726.682-010 LASER-BEAM-TRIM OPERATOR (electron. comp.)**

Operates computer-controlled laser machine to trim excess material from electronic components: Reads production sheet to determine specified operation code and enters commands, using control console, to retrieve programmed instructions. Inserts electronic component into holding fixture of laser machine, using tweezers, and presses console buttons to actuate laser beam that automatically trims excess metal and glass from component. Observes light indicator on control panel or monitor to determine if component meets specifications. Removes trimmed component from holding fixture and examines component for defects and completeness of trim, using microscope. May repair holding fixture on laser machine, using handtools, such as allen wrench, wire strippers, hand drill, and soldering iron.

*GOE: 06.02.02 STRENGTH: L GED: R3 M3 L3 SVP: 4 DLU: 89*

### **726.682-014 WIRE-WRAPPING-MACHINE OPERATOR (electron. comp.)**

Operates computer-controlled semiautomatic machine that wraps wires around electronic-pin connectors: Mounts connector panel on machine pallet that moves panel along programmed path, using wrench and screwdriver. Depresses specified button to start automatic programmed tape for pin sequence and observes panel lights that indicate size of wire prescribed in program. Selects and mounts specified wire on machine spindle. Threads wire through bit of wire-wrap gun, positions gun in support to align gun

with pins on connector panel, and depresses trigger of wire-wrap gun to wrap wire on pins. Observes directional lights of machine to determine movement of pallet and gun support. Inspects wire-wrap of completed panels for tightness, neatness of fold, or broken wire.

*GOE: 06.02.09 STRENGTH: L GED: R3 M3 L3 SVP: 2 DLU: 86*

#### **726.682-018 COORDINATE MEASURING EQUIPMENT OPERATOR (electron. comp.) alternate titles: mechanical inspector**

Operates coordinate measuring equipment to measure dimensions of printed circuit boards (PCB's). Reads blueprints to determine dimensions and tolerance specifications for selected PCB's. Positions PCB's on measuring table of equipment, views PCB's on monitor screen, and turns calibrated cranks on equipment to position control bar, with attached camera, over specified sections of PCB's. Flips toggles to lock camera in position, activates digital readout equipment, and records specified measurement of PCB's on inspection sheets. Repeats process to cover all sections of PCB's, including locations of specified drilled holes and samples of routed PCB's. Compares recorded measurements to blueprint dimensions and tolerances and notifies specified persons of discrepancies.

*GOE: 06.03.02 STRENGTH: L GED: R3 M3 L2 SVP: 3 DLU: 86*

#### **726.682-026 SAW OPERATOR (electron. comp.)**

Operates battery of circular saws to cut plastic blocks containing ceramic-coated aluminum rods to length for processing into electronic resistors. Reads job order to determine length of rods required. Secures blocks in clamps of automatic-feed saw, preset to specified length. Closes safety cover and depresses controls to start saw and activate automatic feed. Loads additional saws and monitors sawing operations to detect machine malfunctions. Removes sawed blocks from saws at end of automatic cycle. Holds sawed block against stop of manual-feed saw, starts saw, and feeds block into blade to complete specified cuts. Holds cut blocks under running water to remove debris. Measures cut and washed blocks to verify conformance with job order, using calipers and micrometers. Periodically replaces cog in automatic-feed saw to change length of cut, following identification number on cog and using wrench. Replaces worn or damaged saw blades, using handtools. Cleans work area. Records specified data on production report. May assist maintenance personnel with saw maintenance and repair.

*GOE: 06.02.09 STRENGTH: M GED: R3 M2 L1 SVP: 4 DLU: 86*

#### **726.684-010 CAPACITOR-PACK-PRESS OPERATOR (elec. equip.) alternate titles: pack-press operator**

Presses metal capacitor container over paper-wound packs, using power press. Adjusts fixture according to size of capacitor, using handtools. Folds fiber insulation around pack and bends electrodes by hand to position electrodes for pressing. Places open end of container over pack in holding fixture of machine, engages ram, and depresses pedal to start machine that presses packs into can. Lifts capacitor from machine, straightens electrodes by hand, fills out process tag, and clips tag to capacitor.

*GOE: 06.04.34 STRENGTH: M GED: R2 M1 L1 SVP: 4 DLU: 77*

#### **726.684-014 ELECTRONIC-SCALE SUBASSEMBLER (office machines)**

Assembles parts to make electronic subassemblies for scales. Assembles color-coded wires, tube sockets, resistors, capacitors, terminal strips, and printed circuit boards following diagrams, instruction sheets, or samples, using handtools, such as wire stripper and soldering iron.

*GOE: 06.02.23 STRENGTH: L GED: R3 M1 L1 SVP: 3 DLU: 77*

#### **726.684-018 ELECTRONICS ASSEMBLER (comm. equip.; electron. comp.; inst. & app.)**

Performs any combination of following tasks to assemble electronic components, subassemblies, products, or systems. Reads work orders, follows production drawings and sample assemblies, or receives verbal instructions regarding duties to be performed. Positions and aligns parts in specified relationship to each other in jig, fixture, or other holding device. Crimps, stakes, screws, bolts, rivets, welds, solders,

cements, press fits, or performs similar operations to join or secure parts in place, using handtools, power tools, machines, and equipment. Mounts assembled components, such as transformers, resistors, transistors, capacitors, integrated circuits, and sockets, on chassis panel. Connects component lead wires to printed circuit or routes and connects wires between individual component leads and other components, connectors, terminals, and contact points, using soldering, welding, thermocompression, or related bonding procedures and equipment. Installs finished assemblies or subassemblies in cases and cabinets. Assembles and attaches hardware, such as caps, clamps, knobs, and switches, to assemblies. Performs intermediate assembly tasks, such as potting, encapsulating, sanding, cleaning, epoxy bonding, curing, stamping, etching, impregnating, and color coding parts and assemblies. Tends machines that press, shape, or wind component parts. Adjusts or trims materials from components to achieve specified electrical or dimensional characteristics. Performs on-line go-not-go testing and inspection, using magnifying devices, measuring instruments, and electronic test equipment, to ensure parts and assemblies meet production specifications and standards. May perform assembly operations under microscope or other magnifying device. Occupations related to assembly of printed circuit boards and fabrication of integrated circuit chips are defined under separate definitions.

*GOE: 06.02.23 STRENGTH: L GED: R2 M1 L2 SVP: 4 DLU: 89*

### **726.684-022 ELECTRONICS INSPECTOR (electron. comp.) alternate titles: checker; inspector, component parts; line inspector**

Inspects electronic assemblies, subassemblies, parts, and components for defects, following samples, production illustrations, or using comparator: Examines unit for physical defects, such as broken or missing leads, excess solder, holes in sealing material, unevenly wound coil, coating and plating blemishes, oil leaks, faulty welds, scratches, cracks, and chips. Compares hardware on assemblies, subassemblies, and parts to parts list to verify installation. Examines hardware for specified contact with conductor area. Rejects faulty assembly, part, or component and records type and quantity of defects. May measure parts to verify accuracy of dimensions, using precision measuring instruments. May sort defective components and parts for salvage or scrap. May inspect parts, using microscope or magnifier. May be designated according to item inspected, as Capacitor Inspector (electron. comp.); Electron Gun Inspector (electron. comp.); Filter Inspector (electron. comp.); Resistor Inspector (electron. comp.); Tube Inspector (electron. comp.).

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 88*

### **726.684-026 ELECTRONICS TESTER (comm. equip.; electron. comp.; inst. & app.; office machines)**

Tests function of electronic assemblies, components, and parts according to established procedures, using computerized or standard test equipment: Connects electronic assembly, component, or part to test instrument, such as ohmmeter, voltmeter, ammeter, resistance bridge, or oscilloscope, or to automatic or computerized test equipment, and turns switch to actuate test equipment. Reads instrument dial or scope, or observes viewing screen, that indicates resistance, capacitance, continuity, and wave pattern or defect, such as short circuit or current leakage. Compares instrument reading or monitor display with standard and rejects defective units. Records type and quantity of defect. May verify dimensions of parts, using standard gauges. May examine assembly, component, or part for defects, such as short leads, bent plate, or cracked seal. May tend equipment that subjects unit to stress prior to testing. May replace defective components or repair defective wiring after testing. May operate burn-in oven to elevate printed circuit board temperature prior to testing. May adjust circuits in radios and televisions for maximum signal response. May be designated according to unit tested or test equipment used as Auto-Test Equipment Operator (electron. comp.); Solid State Tester (electron. comp.); Tester, Printed Circuit Boards (electron. comp.); Tube Tester (electron. comp.).

*GOE: 06.03.02 STRENGTH: L GED: R3 M3 L3 SVP: 3 DLU: 89*

### **726.684-034 ASSEMBLER, SEMICONDUCTOR (electron. comp.) alternate titles: microelectronics processor**

Assembles microelectronic semiconductor devices, components, and subassemblies according to drawings and specifications, using microscope, bonding machines, and handtools, performing any combination of following duties: Reads work orders and studies assembly drawings to determine operation to be performed. Observes processed semiconductor wafer under scribing machine microscope and aligns scribing tool with markings on wafer. Adjusts scribing machine controls, according to work order specifications, and presses switch to start scribing. Removes scribed wafer and breaks wafer into dice (chips), using probe. Places dice under microscope, visually examines dice for defects, according to procedures, and rejects defective dice. Positions mounting device on holder under bonding machine microscope, and adjusts bonding machine controls according to work order specifications. Positions die (chip) on mounting surface according to diagram. Presses switch on bonding machine to bond die to mounting surface. Places mounted die into holding fixture under microscope of lead bonding machine. Adjusts bonding machine controls according to work order specifications. Views die and moves controls to align and position bonding head for lead bonding according to diagram. Presses switch to bond lead and moves bonding head to points indicated in bonding diagram to attach and route leads as illustrated. Inserts and seals unprotected assembly into designated assembly container device, using welding machine and epoxy syringe, to protect microelectronic assembly and complete device, component, or subassembly package. Examines and tests assembly at various stages of production, using microscope, go-not-go test equipment, measuring instruments, pressure-vacuum tanks, and related devices, according to standard procedures, to detect nonstandard or defective assemblies. Rejects or routes nonstandard components for rework. Cleans parts and assemblies at various stages of production, using cleaning devices and equipment. Maintains records of production and defects. Bonds multiple dice to headers or other mounting devices. Important variations are kinds of equipment used, such as thermal compression, wedge, wire ball, and wobble bonders, items assembled, or procedure performed.

*GOE: 06.02.23 STRENGTH: S GED: R3 M2 L2 SVP: 3 DLU: 86*

#### **726.684-042 DIE ATTACHER (electron. comp.)**

Attaches \$T3dies\$T1 to empty integrated circuit (IC) packages to assemble complete semiconductor packages, using welding and gluing equipment: Places empty IC packages on heated chuck of equipment, using tweezers. Deposits bonding material, such as epoxy or gold alloy, on specified location of empty packages, and positions and aligns dies on bonding material in packages, using equipment or handtools. Removes packages with attached dies from chuck and places packages in trays, using tweezers. May place loaded trays in oven to set bonding material. May view positioning of epoxy and die in empty packages through microscope.

*GOE: 06.04.23 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 88*

#### **726.684-050 FILM TOUCH-UP INSPECTOR (electron. comp.)**

Inspects and repairs circuitry image on photoresist film (separate film or film laminated to fiberglass boards) used in manufacture of printed circuit boards (PCB's): Inspects film under magnifying glass for holes, breaks, and bridges (connections) in photoresist circuit image. Removes excess photoresist, using knife. Touches up holes and breaks in photoresist circuitry image, using photoresist ink pen. Removes and stacks finished boards for transfer to next work station. Maintains production reports. May place lint free paper between dry film sheets to avoid scratching circuit images on film.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L1 SVP: 2 DLU: 86*

#### **726.684-054 INSPECTOR, CRYSTAL (electron. comp.) alternate titles: crystal evaluator**

Inspects, measures, and tests semiconductor crystal ingots to determine compliance with specifications, using measuring devices and test equipment: Transports ingot to workbench by cart or by hand. Measures ingot \$T3flat\$T1, diameter, and length, using calipers and ruler. Weighs ingots on scales and calculates weight loss due to grinding and sawing. Tests ingot resistivity, using electronic probes. Records weights, measurements, and other test results in logbook and on labels, and attaches labels to ingots. May operate saws to cut off ends of crystal or to cut sample wafers. May tend furnace that heat-treats ingots to alter resistivity to meet specifications. May determine \$T3crystal orientation\$T1, using x-ray machine. May

operate grinding machine to bevel ends of crystals. May operate sandblasting machine to remove glaze from ingot surface. May tend equipment that etches ingots to remove surface material. May calculate proportion of impurities, using resistivity readings and specified formula.

*GOE: 06.03.02 STRENGTH: H GED: R3 M2 L2 SVP: 4 DLU: 86*

#### **726.684-058 INSPECTOR, INTEGRATED CIRCUITS (electron. comp.)**

Inspects integrated circuit (IC) assemblies, semiconductor wafers, and IC \$T3dies\$T1 for conformance to company standards, using microscope: Reads work order to determine inspection criteria. Places group of items in trays on microscope stage, or positions items individually on stage for inspection, using vacuum pencil or tweezers. Turns knobs on microscope to adjust focus and magnification as required to view items for inspection. Views and inspects items according to company standards to detect defects, such as broken circuit lines, bridged circuits, misalignments, symbol errors, and missing solder. Discards defective items. May remove contaminants from items, using brush or airhose. May use magnifying glass to inspect electronic items.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

#### **726.684-062 INSPECTOR, PRINTED CIRCUIT BOARDS (electron. comp.) alternate titles: circuit board inspector; touch-up inspector, printed circuit boards**

Performs any combination of following tasks to inspect and repair printed circuit boards (PCB's): Inserts plug gauges into drilled holes of PCB panels to verify conformance to specified dimensions. Measures thickness and dimensions of plating on PCB panels to verify that plating meets specifications, using micrometers, dial indicators, calipers, rulers, eye loupes, and electronic measuring devices. Examines PCB circuitry to detect defects, such as shorts, breaks, excess or missing solder, scratches, cracks, and incorrect layout, using \$T3light table\$T1, eye loupe, magnifier, or microscope. Brushes solder mask ink on PCB's to repair defects in screen printing. Scrapes excess plating, or solder mask ink from PCB's, using utility knife. Repairs broken circuitry, using soldering iron or circuit bonding equipment. Records type and quantity of defective PCB's. Tests adherence of solder mask ink to PCB's, using tape. Tests continuity of PCB circuits, using bare board tester. May inspect inner layers of multilayer PCB's to verify that internal alignment and location of drilled holes meet specifications and be designated X-Ray Technician, Printed Circuit Boards (electron. comp.).

*GOE: 06.03.01 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 86*

#### **726.684-066 INSPECTOR, SEMICONDUCTOR WAFER (electron. comp.)**

Performs any of following duties to inspect, measure, and test semiconductor wafers for conformance to specifications: Inspects wafers under high intensity lamp to detect surface defects, such as scratches, chips, stains, burns, or haze. Measures thickness and resistivity of wafers, using electronic gauges or automated sorting machine. Measures diameter and \$T3flat\$T1 of wafers, using calipers. Inspects bow or flatness of wafers, using electronic gauges, or examines surface of wafers under high intensity lamp. Tests for positive or negative conductivity of wafers, using electronic probe and gauge. Determines \$T3crystal orientation\$T1 of wafers, using x-ray equipment. Encloses containers of inspected wafers in plastic bags for protection, using heat sealer. Records inspection data on production records or in computer, using computer terminal. May tend equipment that cleans surface of wafers [WAFER CLEANER (electron. comp.) 590.685-102].

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 3 DLU: 86*

#### **726.684-070 PRINTED CIRCUIT BOARD ASSEMBLER, HAND (comm. equip.; electron. comp.; inst. & app.; office machines)**

Performs any combination of following duties in assembly of electronic components onto printed circuit boards (PCB's) according to specifications, using handtools: Reads worksheets and wiring diagrams, receives verbal instructions, or follows sample board to determine assembly duties, and selects components, such as transistors, resistors, relays, capacitors, and integrated circuits. Twists, bends, trims,

strips, or files wire leads of components or reams holes in boards to insert wire leads, using handtools. Inserts color-coded wires in designated holes and clinches wire ends, using pliers. Press-fits (mounts) component leads onto board. Places plastic insulating sleeves around specified wire leads of components and shrinks sleeves into place, using heat gun. Crimps wire leads on underside of board, using handtools or press. Applies sealer or masking compound to selected parts of board to protect parts from effects of wave solder process. Solders wire leads and joints on underside of board, using soldering iron, to route and connect lead wires to board and between individual components. Installs heat sinks, sockets, faceplates, and accessories on boards, using handtools. May be designated according to unit installed as Socket Assembler (electron. comp.) or stage of production as Post-Wave Assembler (electron. comp.); Pre-Wave Assembler (electron. comp.). May assist other workers in wave-soldering PCB's.

*GOE: 06.02.23 STRENGTH: L GED: R3 M1 L2 SVP: 4 DLU: 88*

#### **726.684-074 PRINTED CIRCUIT BOARD COMPONENT TESTER, CHEMICAL (electron. comp.)**

Tests electronic components for compliance to company standards, using chemicals and soldering equipment: Places droplets of acid on surface of petri dish to prepare for lead (metal) test, using eyedropper. Positions wire lead of component or pin on integrated circuit in acid, places acid-coated wire lead or pin on chemically prepared filter paper, and observes reaction on paper that indicates lead content. Soaks components that do not pass lead test in freon to remove acid from wire leads or pins and repeats test. Refers to vendor list to determine whether components are listed as acceptable. Dips wire leads of components in beaker of liquid flux, solder pot, and beaker of freon to conduct solderability test on wire leads, using metal tongs. Observes solder on wire leads for questionable conditions, such as bending of solder, discoloration, or no solder present, using magnification lamp. Sets aside components of questionable acceptance for approval by engineer. Maintains record of test results.

*GOE: 06.03.02 STRENGTH: M GED: R3 M2 L2 SVP: 5 DLU: 86*

#### **726.684-078 PRINTED CIRCUIT BOARD COMPONENT TESTER, PRE-ASSEMBLY (electron. comp.)**

Tests electronic function of components preparatory to printed circuit board (PCB) assembly for compliance to company standards, using test equipment: Selects and positions test fixture on test equipment panel according to type of component being tested. Keys data into computer keyboard or turns dials and presses buttons to set tolerances on equipment, following company standards guide. Positions components in test fixture or mounts reels containing components on tape onto machine spindle and threads component tape through test machine guides. Activates equipment to start test and observes colored panel lights on equipment to determine whether components meet specifications. Replaces defective components. Verifies dimensions of components, using calipers and specification book. Obtains vendor history file for reference when excessive component defects result during testing. Maintains records of test results. May solder electronic components to test boards prior to testing. May be designated according to unit tested as Capacitor Tester (electron. comp.); Hybrid Tester (electron. comp.); Inductor Tester (electron. comp.); Relay Tester (electron. comp.); Resistor Tester (electron. comp.); Transformer Tester (electron. comp.).

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 5 DLU: 86*

#### **726.684-082 PRINTED CIRCUIT BOARD INSPECTOR, PRE-ASSEMBLY (electron. comp.)**

Inspects printed circuit boards (PCB's) preparatory to assembly for compliance to company guidelines, using test equipment: Examines PCB's on light table for breaks in copper foil circuits. Examines PCB's to detect circuit shorts, using magnification lamp. Measures dimensions of PCB's, using ruler. Views inside edges of solder holes to detect irregular surfaces, using eye loupe. Inserts leads to components in solder holes to verify spacing of holes and ease of component insertion. Verifies plating integrity of copper foil circuits and composition of solder through solder holes, using electronic test equipment. May record inspection results to maintain vendor history files.

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L2 SVP: 6 DLU: 86*

#### **726.684-086 PRINTED CIRCUIT BOARD ASSEMBLY REPAIRER (electron. comp.)**

Performs any combination of following tasks to repair defective printed circuit board (PCB) assemblies, using soldering and desoldering equipment: Examines PCB's under magnifying lamp and reads inspection tags to locate defects, such as insufficient or excess solder and missing or defective components and parts. Solders or resolders missed or defective connections, joints, wiring, and terminals found to be defective or missing after original soldering process. Removes excess solder from connections and clears solder from component holes, using desoldering equipment. Repositions misaligned components, such as resistors, capacitors, and integrated circuits (IC's), and removes and replaces damaged or missing components. Trims long leads, replaces eyelets and rivets, and repairs damaged substrate, using handtools and power tools. Modifies PCB's following shop instructions, using handtools and soldering equipment. Tests soldered connections on PCB's to detect open circuits or shorts, using continuity tester.

*GOE: 06.02.23 STRENGTH: L GED: R3 M1 L3 SVP: 4 DLU: 86*

#### **726.684-090 REWORKER, PRINTED CIRCUIT BOARD (electron. comp.) alternate titles: reworker**

Repairs defective surfaces and circuitry on printed circuit boards (PCB's), using power and handtools, utilizing knowledge of electronic repair techniques: Reads work orders to determine number of PCB's to be repaired, type of repairs required, and method and tools to be used in reworking. Positions PCB's under microscope to examine circuitry. Cuts and removes defective wires, using knife, and positions replacement wire on circuit, using magnetic tweezers. Repairs defective circuitry, using handtools and soldering or welding equipment. Repairs board surface faults, such as excess solder on board or gold plating on connectors, using handtools, and washes solder or liquid gold over specified areas to restore board surfaces. Cleans repaired boards with solvent, using brush and rags. Inspects boards to determine that repairs meet specifications. Removes and stacks repaired boards on racks for movement to next work station. Places PCB's in industrial oven to cure solder mask. May prepare production reports.

*GOE: 06.02.23 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

#### **726.684-094 SOLDER DEPOSIT OPERATOR (electron. comp.)**

Cleans assembled semiconductor packages, coats package leads with flux, and applies solder to package leads, using solder dip machine, to complete semiconductor package assembly: Places packages in holding cases and immerses cases in series of acid baths to clean packages. Places packages in holding fixtures and immerses loaded fixtures in flux bath to coat leads of packages. Pushes button to activate solder pumps of solder-dip machine and places loaded fixtures on conveyor of machine that deposits solder on leads of packages to enhance electrical conductivity of leads. Removes fixtures from conveyor, inspects leads of packages for uniform soldering, and removes solder from top of packages, using needle-nose pliers. Places loaded fixtures in baskets and immerses baskets in series of acid and soap baths to clean packages. Removes packages from fixtures, places packages on trays, and positions loaded trays in oven to dry packages. Removes tray from oven and loads packages into lot box and cleans and maintains solder pot of machine. Maintains production records.

*GOE: 06.04.10 STRENGTH: L GED: R2 M2 L2 SVP: 2 DLU: 86*

#### **726.684-098 TEST FIXTURE ASSEMBLER (electron. comp.)**

Assembles test fixtures used to test electrical circuitry of printed circuit boards (PCB's), according to diagram instructions: Receives test fixture kits, work orders, and diagrams. Positions test fixture boards on worktable and inserts copper sleeves in designated holes of boards as indicated on diagrams. Positions pins flush with fixture board surface, using mallet. Places copper test pins in sleeves previously inserted and positions spacer blocks in prescribed pattern on top and bottom of boards. Inserts screws in spacer blocks and secures blocks to boards, using screwdriver. Positions wires against pins and blocks, following specified pattern, and secures wires around pins or blocks, using wire wrapping gun. Positions fixture cover over spacer blocks on top of test fixture boards and positions metal back on assembled test fixture. Secures cover and back, using screws and screwdriver.

*GOE: 06.04.23 STRENGTH: M GED: R3 M2 L2 SVP: 3 DLU: 86*

#### **726.684-102 TESTER, SEMICONDUCTOR WAFERS (electron. comp.)**



Tests electrical characteristics of circuits on semiconductor wafers, using test equipment: Reads processing documents to determine test specifications. Obtains specified probe cards from inventory and slides probe cards into designated slot on testing equipment. Activates testing equipment and places wafer on chuck of test equipment, using tweezers. Observes wafer through test equipment microscope and aligns wafer under probes of test equipment. Pushes buttons to activate test cycle. Records test readings from printouts or display screen in test log. Compares test readings with specifications manual to identify wafers failing electrical tests. Maintains production records. May clean and maintain test equipment.

*GOE: 06.03.02 STRENGTH: S GED: R2 M2 L2 SVP: 3 DLU: 86*

#### **726.684-106 TESTER, WAFER SUBSTRATE (electron. comp.)**

Tests semiconductor wafer substrate, using testing equipment, such as probe tester, spectrophotometer, and curve tracer, to evaluate electrical characteristics of wafer substrate: Places wafer, using tweezers, on test equipment that measures electrical characteristics of wafer substrate, such as resistivity, capacitance, and voltage. Starts equipment and observes equipment readout to determine wafer electrical measurements. Records measurements in production log. Compares measurements with specification sheets to determine if wafer substrate meets company standards. Sorts, boxes, and labels tested wafers. Delivers wafers and process sheets to production line workers. Maintains production records. May inspect wafer substrate surfaces, using ultraviolet lamp, to detect scratches and contamination.

*GOE: 06.03.02 STRENGTH: L GED: R3 M2 L3 SVP: 4 DLU: 86*

#### **726.684-110 TOUCH-UP SCREENER, PRINTED CIRCUIT BOARD ASSEMBLY (electron. comp.)**

Inspects printed circuit board (PCB) assemblies for defects, such as missing or damaged components, loose connections, or defective solder: Examines PCB's under magnification lamp and compares boards to sample board to detect defects. Labels defects requiring extensive repairs, such as missing or misaligned parts, damaged components, and loose connections, and routes boards to repairer. Performs minor repairs, such as cleaning boards with freon to remove solder flux; trimming long leads, using wire cutter; removing excess solder from solder points (connections), using suction bulb or solder wick and soldering iron; or resoldering connections on PCB's where solder is insufficient. Maintains record of defects and repairs to indicate recurring production problems. May reposition and solder misaligned components. May measure clearances between board and connectors, using gauges.

*GOE: 06.03.02 STRENGTH: S GED: R2 M1 L2 SVP: 2 DLU: 86*

#### **726.685-010 MAGNETIC-TAPE WINDER (recording) alternate titles: cartridge loader**

Tends machines that wind magnetic tape into reels or cassette hubs for use in communication and control equipment, instruments, and computers: Positions tape supply reels or cassette hubs on letoff and windup spindles of tape winding machines. Loops tape from supply reels through machine guides and into blank reels or hubs. Turns knob of footage counter devices that automatically cut tape and stop machines when specified length of tape has been wound into blank reels or hubs. Pushes switches to start individual machines and removes wound reels or hubs when machines stop. Scrapes detected surface defects from tape with knife. Splices tape ends together to form continuous loops in cassettes, using bench splicer. Inserts filled and blank hubs into cassettes and attaches covers. Packs reels and cassettes into containers and labels containers for shipment.

*GOE: 06.04.02 STRENGTH: L GED: R2 M1 L1 SVP: 2 DLU: 86*

#### **726.685-014 INSERTION MACHINE TENDER, ELECTRONIC COMPONENTS (comm. equip.; electron. comp.; office machines) alternate titles: automatic component insertion operator; component insertion operator**

Tends computer-controlled machine that automatically inserts electronic components, such as resistors, capacitors, diodes, and integrated circuits, into holes of printed circuit boards (PCB's): Inserts specified program tape into machine or types commands on keyboard to enter program that directs machine to insert components in specified sequence and location on PCB's. Positions paper tape reels or plastic tubes

containing components into feeding mechanism to load machine. Positions PCB's on machine bed holding fixtures, starts machine, and monitors machine operation. Removes assembled PCB's from machine bed and inspects PCB's for defects, such as missing components or incomplete insertion. Stops machine and notifies supervisor or maintenance mechanic of machine malfunctions. Records production information such as production levels, machine downtime, and defects. May make minor machine adjustments and clear machine jams. May manually insert missing components or route defective boards to repair department. May tend semiautomatic or manually controlled machines and position PCB's or components on board by hand.

*GOE: 06.04.09 STRENGTH: L GED: R3 M2 L3 SVP: 4 DLU: 88*

#### **726.685-018 BREAK-AND-LOAD OPERATOR (electron. comp.)**

Tends machine that breaks resistor plates along previously scored lines and loads resistors into magazines for further processing: Attaches guides of specified size to track on machine that feeds resistors into magazine, using allen wrench. Snaps magazine onto machine. Breaks scrap edges from plates. Places plates into feed mechanism of machine and starts machine that automatically breaks plates into columns of resistors which slide down track. Taps column of resistors at bottom of track, using plastic rod, to break column into single resistors that fall into magazine. Clears machine jams, using plastic rod or tweezers. Breaks plates by hand to remove premarked, defective resistors. Fills out job order and production report. Cleans machine and work station, using brush. Carries magazines to storage room and picks up box of plates for next work order.

*GOE: 06.04.19 STRENGTH: L GED: R2 M1 L1 SVP: 3 DLU: 86*

#### **726.685-022 DEFLASH AND WASH OPERATOR (electron. comp.)**

Tends equipment that automatically removes rubber \$T3flash\$T1 from resistor ladders (rubber encased resistors) and cleans ladders: Loads resistor ladders into feed chute of machine and starts machine that automatically conveys resistor ladders through abrading chamber that removes flash from ladders. Visually inspects ladders to ensure that flash has been removed. Turns knob to adjust conveyor speed, if necessary, to increase or decrease abrading time. Clears jams on conveyor, using tweezers. Hits chamber of machine with mallet to loosen packed plastic abrading beads. Removes deflashed resistor ladders from conveyor, by hand, and places ladders in wire basket for subsequent cleaning and rinsing. Hangs basket of ladders on travel arm of wash equipment and starts equipment that ultrasonically cleans and rinses deflashed ladders in chemical baths.

*GOE: 06.04.19 STRENGTH: M GED: R2 M1 L1 SVP: 3 DLU: 86*

#### **726.685-026 DIE ATTACHING MACHINE TENDER (electron. comp.)**

Tends \$T3die\$T1 attaching machine that bonds dies to semiconductor packages: Loads package carriers, magazines containing dies, and gold pieces, used to attach dies to packages, into designated slots of machine. Starts machine that automatically positions and melts gold on packages and positions dies in packages to form assembled semiconductor packages. Observes operation of machine to ensure that alignment of packages, gold, and dies meets company specifications, using video monitor. Turns knobs on machine to adjust alignment of parts assembled, regulate operation speed, and set temperature of molten gold. Removes magazines of packages for further processing.

*GOE: 06.04.09 STRENGTH: L GED: R2 M1 L2 SVP: 2 DLU: 86*

#### **726.685-030 DIE TESTER (electron. comp.)**

Tests voltage of \$T3dies\$T1 containing individual devices, such as diodes and transistors, using computerized testing system, to ensure that dies meet company and manufacturer specifications: Reads production sheets and computer code books to determine test instructions and codes. Keys instructions and codes into computer, using computer terminal. Pours dies into equipment bowl that automatically conveys each die to probe, tests voltage of each die, and sorts dies into specified bottles. Observes equipment operation to detect misfeeds, using built-in microscope. Maintains production records. Records voltage

reading on bottle labels. Cleans and maintains testing equipment.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

#### **726.685-034 LEAK TESTER, SEMICONDUCTOR PACKAGES (electron. comp.)**

Tends testing equipment that detects leaks in semiconductor packages: Loads tubes containing semiconductor packages into canister. Places loaded canister in equipment that replaces air in canister with liquid freon or flushes canister with radioactive isotopes. Pushes buttons and flips switches to activate equipment. Removes loaded canister and places either canister or tube of semiconductor packages in leak testing equipment, such as bubble pot or geiger counter tank, that detects gross and fine leaks in semiconductor packages. Inspects tube of packages in bubble pot, using magnifying glass, to identify packages with bubbles, indicating gross leaks. Observes control panel of geiger counter tank to identify radioactive semiconductor packages, indicating fine leaks. Removes tubes and canisters from leak detection equipment and places defective semiconductor packages in containers, using tweezers. Places accepted semiconductor packages in tubes, using tweezers. Maintains production records.

*GOE: 06.03.02 STRENGTH: M GED: R2 M1 L2 SVP: 2 DLU: 86*

#### **726.685-038 REFLOW OPERATOR (electron. comp.)**

Tends reflow equipment that melts solder on printed circuit boards (PCB's) to redistribute and fuse solder on boards to improve appearance, hardness, and solderability for PCB component assembly: Immerses boards in cleaning solution or places boards in cleaning machine that cleans and removes contaminants from boards before reflow process. Starts reflow equipment and adjusts conveyor speed and temperature of infrared heating units to meet specifications. Feeds PCB's onto conveyor of equipment that applies liquid flux and infrared heat to boards to melt, redistribute, and fuse existing solder on boards and cleans, rinses, and dries boards following reflow process. Observes boards moving on conveyor to monitor flow and operation of reflow process. Removes boards upon completion of process and inspects boards for reflow process defects. May add chemicals to flux solution. May tend soldering equipment. May tend reflow equipment that automatically cleans, rinses, and dries boards before and after reflow process.

*GOE: 06.04.19 STRENGTH: M GED: R2 M2 L2 SVP: 2 DLU: 86*

#### **726.685-042 ROD TAPE OPERATOR (electron. comp.)**

Tends rod tape machine that separates and tapes ceramic coated aluminum rods and winds tape containing rods onto reels for subsequent processing: Places rods onto feed tray of taping machine that aligns rods in parallel configuration, applies tape to secure rods in place, and winds taped rods onto reel. Monitors operation of machine to detect malfunctions. Replaces empty tape rolls and removes full reels of taped rods from machine. May perform duties as described under SCREENER OPERATOR (any industry) 599.685-082 to separate defective slugs (rods cut to specified lengths, approximately one inch or less).

*GOE: 06.04.19 STRENGTH: M GED: R2 M1 L1 SVP: 3 DLU: 86*

#### **726.685-046 SAW OPERATOR, SEMICONDUCTOR WAFERS (electron. comp.) alternate titles: scribe**

Tends sawing machine that automatically scribes semiconductor wafers prior to separating wafers into individual \$T3dies\$T1: Flips switches and presses buttons to activate sawing machine. Places wafer mounted on laminated plastic onto moveable chuck of sawing machine, using tweezers. Presses buttons and turns knobs and dials to adjust saw to specifications and to start sawing cycle. Monitors sawing cycle, using magnified viewer or TV monitor, to verify that wafers are scribed according to specifications and adjusts controls if required. Removes scribed wafer from machine and places wafer in container, using tweezers. May mount wafers on plastic laminate, using mounting device. May visually inspect wafers to identify misalignment of scribe lines. May maintain and clean sawing machine. May separate sawn wafers into dies [WAFER BREAKER, SEMICONDUCTORS (electron. comp.) 726.687-046]. May clean sawn wafers or dies, using cleaning equipment and solutions.

*GOE: 06.04.09 STRENGTH: L GED: R2 M1 L2 SVP: 3 DLU: 88*

**726.685-050 SOLDER-LEVELER, PRINTED CIRCUIT BOARDS (electron. comp.)**

Tends processing equipment that prepares and applies solder to copper circuit areas of printed circuit boards (PCB's) or panels: Reads process specifications and activates equipment units, such as conveyors, sprayers, pumps, brushes, air knives (blower mechanism), and solder bath. Adjusts equipment controls to regulate processing factors, such as temperatures, pressures, and speeds, according to specifications. Feeds boards on motorized conveyor leading into series of processing units, such as sprayers, brushes, dryers, and flux rollers, that clean copper circuit areas and apply flux preparatory to solder application. Removes boards from precleaning equipment conveyor and clamps boards to feeding mechanism of solder leveling equipment. Pushes button to activate equipment that automatically lowers board into molten solder bath, lifts boards out of bath, and moves boards past hot-air knives that smooth solder off noncopper areas. Monitors equipment operation and corrects minor malfunctions, such as board misfeeds, conveyor speeds, and temperature settings. Removes board from solder equipment and visually examines boards for completeness of soldering. Notifies supervisor of equipment malfunctions and board defects, such as discolored, missing, or unlevel solder. May reroute defective boards through processing equipment to correct defects. May maintain production records.

*GOE: 06.04.21 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

**726.685-054 TESTER, SEMICONDUCTOR PACKAGES (electron. comp.)**

Tends automatic equipment that test functions of semiconductor packages: Reads production documents to determine test specifications. Inserts specified test program (magnetic card) in test equipment to program equipment. Places tubular magazines containing semiconductor packages in feeder mechanism of equipment. Flips switch to activate test cycle. Monitors operation of test equipment to detect misfeeds. Sorts tested semiconductor packages into specified containers. Maintains production records. May tend centrifuge or temperature-cycle machine that places semiconductor packages under stress to cause circuit failure of weak sections during subsequent testing.

*GOE: 06.03.02 STRENGTH: L GED: R2 M2 L2 SVP: 3 DLU: 86*

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