



Multicraft Maintenance Mechanic – Work Process Schedule

Job Description: Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of a building in repair. Duties involve plumbing installation and maintenance; HVAC installation and maintenance; electrical system installation; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

RAPIDS Code: 0310HY **O*NET Code:** 49-9071.00

Estimated Program Length: 3901 - 4422

Apprenticeship Type: Competency-Based Time-Based Hybrid

General

A. Perform work in compliance with safety procedures to include obtaining required safety certifications

1. Formal training in safety procedures in accordance with OSHA regulations, including hazardous materials and work environment.
2. Identify and properly use of safety equipment including Personal Protective Equipment (PPE)
3. Attain OSHA-10 Construction certification
4. FM Electrical Safety Training

B. Order materials, supplies, or equipment.

1. Demonstrate knowledge of proper terminology of occupational equipment, tools and equipment and effectively communicate these to internal and external customers.
2. Demonstrate the independent ability to gather needed parts, supplies, or equipment from internal areas or through organizational channels to perform needed task in advance of deadlines

C. Demonstrate understanding of equipment or component configurations.

1. Read and understand blueprints or other construction drawings as they pertain to building layout, machine components or systems, and all affected trades.

D. Record and communicate information about parts, materials, maintenance, or repair procedures.

1. Record type and cost of maintenance or repair work.
2. Effectively manage assigned duties within designated timelines.
3. Determine and effectively communicate matters regarding equipment wear and potential problems requiring preventative maintenance.

E. Remove snow.

F. Clean work areas.

1. Demonstrate workplace organization through the care and organization of personally assigned tools and equipment.
2. Perform general cleaning of buildings and properties.

G. Perform minor repair of structural components

1. Reading of drawings to determine location, dimension of interior walls.
2. Use of tools, materials, and equipment.
3. Repair locks, door hardware, soap and towel dispensers, sash cords and other building fixtures.

H. Demolition

1. Perform demolition of interior and exterior walls, floors, other structural members, or other mechanical components.

I. Measure distances or dimensions.

1. Inspect used parts to determine changes in dimensional requirements, using rules, calipers, micrometers, or other measuring instruments.

Electrical

J. Install electrical components, equipment, or systems.

1. Splice cables utilizing all types of connectors and compressions fittings.
2. Install indoor and outdoor fixtures, switches, and outlets.

K. Assemble electrical components, subsystems, or systems. (Installation and Wiring Methods)

1. Install rigid, EMT and PVC conduit, or other wire raceways.
2. Install conduits exposed, concealed, or underground utilizing appropriate fittings.
3. Pull wires through raceways manually and with cable pulling machines.
4. Bend Conduit.

L. Repair electrical circuits or wiring. (Preventative Maintenance and Trouble Shooting)

1. Relamp light fixtures and changing ballasts in all types of fixtures.
2. Perform preventive maintenance on all types of equipment utilizing PM sheets.
3. Troubleshoot and perform minor repairs.
4. Hammer and chisel openings in block walls using power and hand tools.
5. Bore wood and metal joists for conduits and cables.

M. Estimate costs for labor or materials.

1. Reading and understanding blueprints as they pertain to building layout and all affected trades
2. Estimate costs to repair machinery, equipment, or building structures.

HVAC

N. Replace worn, damaged, or defective mechanical parts.

1. Perform routine maintenance, such as inspecting drives, motors, or belts, checking fluid levels, replacing filters, or doing other preventive maintenance actions.
2. Demonstrate proper use, care, and maintenance of hand tools and portable power tools used in the HVAC trades.

O. Clean equipment, parts, or tools to repair or maintain them in good working order.

1. Install and replace air filters.

P. Adjust equipment to ensure optimal performance. (Air Conditioning and Refrigeration Control Systems)

1. Adjust functional parts of devices or control instruments, using hand tools, levels, plumb bobs, or straightedges.
2. Demonstrate thorough understanding of how electronic control systems are used to control HVAC equipment.
3. Demonstrate general understanding of pneumatic control systems including valves, actuators, thermostats, transmitters, and air compressors.
4. Read and interpret control system shop drawings.
5. Demonstrate thorough understanding of how to upgrade, retrofit, and replace existing control systems, including sensors, low voltage wiring, controllers, and safety circuits.
6. Test and calibrate electric controls including flow switches, thermostats, and pressure switches.

Q. Read technical information needed to perform maintenance or repairs. (Refrigeration evaporator, condenser, and bypass systems)

1. Diagnose mechanical problems and determine how to correct them, checking blueprints, repair manuals, or parts catalogs, as necessary.
2. Properties of refrigerants (pressure/temperature relation).
3. Theory of refrigeration and the use of the psychometric chart.
4. Complete explanation of the basic refrigeration cycle.
5. Air conditioning and refrigeration compressors. (Reciprocating, centrifugal and rotary.)
6. Air conditioning and refrigeration evaporators including capacity, metering devices, defrosting and maintenance.
7. Air conditioning and refrigeration condensers and cooling towers, including air and water-cooled condensers, evaporative condensers, and water treatment.
8. Air conditioning and refrigeration piping including hot gas bypass, piping sizes, piping materials and fittings.

R. Troubleshoot equipment or systems operation problems.

1. Troubleshooting electrical control circuits.
2. Troubleshoot refrigeration systems as it pertains to their mechanical components.

S. Lubricate equipment to allow proper functioning.

1. Use of bearing lubricants and demonstrate understanding of lubricant characteristics.
2. Use of refrigeration oils, dryers, and filters.

T. Install energy-efficient heating, ventilation, or air conditioning (HVAC) equipment. Maintenance and installation of hydronic equipment.

1. Install equipment to improve the energy or operational efficiency of residential or commercial buildings.
2. Install ductwork.
3. Maintain or install fans in air handling equipment.
4. Maintain or install drive components including couplings, v-belts, and gears.
5. Demonstrate understanding of the selection, maintenance, and application of water pumps.
6. Demonstrate understanding of static pressure and formulas associated with air and water movement.
7. Maintain or repair piping systems.
8. Maintain or install bearing.
9. Maintain humidifiers.

U. Assemble mechanical components or machine parts.

1. Assemble boilers, water tanks, pressure tanks or HVACR equipment at installation sites, using tools such as levels, plumb bobs, hammers, torches, or other hand and power tools.

V. Fabricate parts or components.

1. Fabricate ductwork.

W. Install insulation in equipment or structures.

1. Insulate ductwork.

X. Disassemble equipment for maintenance or repair.

1. Dismantle machines, equipment, or devices to access and remove defective parts, using hoists, cranes, hand tools, or power tools.

Y. Align equipment or machinery. (Electricity as it Pertains to HVAC and Refrigeration)

1. Use electrical measuring devices including voltmeters, amp meters, ohmmeters, and recorders.
2. Demonstrate compliance with safety measures required when making electrical measurements.
3. Importance of electrical protection devices including fuses, circuit breakers, overload relays and grounding.
4. Demonstrate understanding of operating principle: starting and maintenance of single-phase motors.
5. Demonstrate understanding of operating principle starting and maintenance of three phase motors.
6. Operate and maintain of air conditioning control equipment including motor starters, timers, relays, and motor control centers.
7. Drawing wiring diagrams for single phase and three phase circuits. Understanding diagrams and the symbols used.
8. Demonstrate understanding of transformer connections and their applications.
9. Demonstrate understanding of basic electronics as it applies to control circuits.
10. Demonstrate understanding of demo systems.
11. Demonstrate general understanding of how to perform controls point-to-point checks from sensors to controllers.

Plumbing

BB. Plan work procedures involving mechanical piping systems.

1. Plan, lay out, and perform repair work, using diagrams, drawings, blueprints, maintenance manuals, or schematic diagrams.
2. Independently identify and install proper pipes and fittings for various applications to include the practical application of the following pipe and joint types:
 - a. screw type
 - b. soldered
 - c. braised
 - d. glue
 - e. no-hub
 - f. mechanical
 - g. welded
 - h. Gas piping.
 - i. Air lines.
 - j. Vacuum.
 - k. Chilled water piping.
 - l. Heating systems.

Z. Lay out work according to specifications for waste, vent & storm sewer piping systems including maintenance, installation and troubleshooting

1. Plan and lay out work, using diagrams, drawings, blueprints, maintenance manuals, or schematic diagrams.
2. Demonstrate understanding of materials and why they are necessary for specific tasks by independently selecting appropriate materials for various work.
3. Perform proper grading.
4. Demonstrate the ability to accurately perform rough-in measurements.
5. Maintain diverse types of venting systems.

AA. Install machine, equipment, or system replacement parts.

1. Install, replace, or repair pumps
2. Install, replace, or repair traps
3. Install, replace, or repair manifolds
4. Install, replace, or repair air systems
5. Install, replace, or repair backflow devices

CC. Maintain work equipment, machinery, or systems.

1. Perform routine maintenance on Hospital piping and equipment to include various fixtures.
2. Perform routine maintenance of lab equipment to include various fixtures.
3. Perform routine maintenance or installation of lab vacuum systems.

DD. Inspect mechanical equipment or systems to locate damage, defects, or wear for hot and cold water domestic systems.

1. Inspect, operate, or test machinery or equipment to diagnose machine or system malfunctions.
2. Inspect, troubleshoot, and perform maintenance on potable or non-potable systems.
3. Inspect, troubleshoot, and perform maintenance on cross-section protection devices.
4. Inspect, troubleshoot, and perform maintenance on fixtures and devices.
5. Demonstrate knowledge of diverse ways to obtain hot water.

EE. Test or treat fluids to identify or prevent contamination or other problems.

1. Sanitize water lines with approved chemicals.

FF. Operate welding or braising equipment.

1. Operate cutting torches, welding or braising equipment to cut or join metal parts.

GG. Grind parts to required dimensions.

1. Grind and reseal valves, using valve-grinding machines, tools, or equipment.

Instrumentation & Controls

HH. Test mechanical equipment to ensure proper functioning.

1. Inspect, operate, or test machinery or equipment to diagnose machine malfunctions.

II. Maintain electronic equipment.

1. Modify, maintain, or repair electronics equipment or systems to ensure proper functioning.
2. Replace defective components or parts, using hand tools and precision instruments.
3. Assemble, test, or maintain circuitry or electronic components, according to engineering instructions, technical manuals, or knowledge of electronics, using hand or power tools.
4. Install or maintain electrical control systems, industrial automation systems, or electrical equipment, including control circuits, variable speed drives, or programmable logic controllers.

JJ. Test performance of electrical, electronic, mechanical, or integrated systems or equipment.

1. Set up and operate specialized or standard test equipment to diagnose, test, or analyze the performance of electronic components, assemblies, or systems.
2. Assemble, test, or maintain circuitry or electronic components, according to engineering instructions, technical manuals, or knowledge of electronics, using hand or power tools.

KK. Review technical documents to plan work.

1. Read blueprints, wiring diagrams, schematic drawings, or engineering instructions for assembling electronics units, applying knowledge of electronic theory and components.

LL. Install instrumentation or electronic equipment or systems.

1. Install or maintain electrical control systems, industrial automation systems, or electrical equipment, including control circuits, variable speed drives, or programmable logic controllers.

MM. Assemble equipment or components.

1. Assemble electrical systems or prototypes, using hand tools or measuring instruments.
2. Assemble, test, or maintain circuitry or electronic components, according to engineering instructions, technical manuals, or knowledge of electronics, using hand or power tools.

NN. Interpret design or operational test results.

1. Interpret test information to resolve design-related problems.

OO. Select tools, equipment, or technologies for use in operations or projects.

1. Select electronics equipment, components, or systems to meet functional specifications.