



Appendix A15

WORK PROCESS SCHEDULE

AND

RELATED INSTRUCTION OUTLINE

FOR THE OCCUPATION OF:

MAINTENANCE TECHNICIAN

(Existing Title: Industrial Manufacturing Technician)

O*NET-SOC CODE: 17-3026.00 RAPIDS CODE: 2031CB



Appendix A15

WORK PROCESS SCHEDULE MAINTENANCE TECHNICIAN (Existing Title: Industrial Manufacturing Technician) O*NET-SOC CODE: 17-3026.00 RAPIDS CODE: 2031CB

This schedule is attached to and a part of these Standards for the above identified occupation.

1. APPRENTICESHIP APPROACH

Time-based Competency-based Hybrid

2. TERM OF APPRENTICESHIP

The term of the occupation shall be defined by the attainment of all competencies of the position, which would be reasonably expected to occur within 2 to 3 years of OJL, supplemented by 175 hours of related instruction during the apprenticeship. The sponsor may recognize prior-learning achievements or demonstration of competencies to account for related instruction or OJL hours.

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is: 1 Apprentices to 1 Journeyworker per worksite.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages. Apprentices' starting wage should be a minimum of \$14.77 per hour. The journeyworker wage is \$16.83 per hour, which is to be paid to the apprentice after completion of the apprenticeship. The starting wage and journeyworker wage may be adjusted to accommodate each employer and shall be uploaded into the Rapids database. This wage scale is specifically for Denver, CO, and may vary based on minimum wage laws in different geographic locations, which will be indicated on Appendix D.

Term:

1 st Period	Starting Wage (0-18 months)	\$14.77/hr
2 nd Period	On level (18-36 months)	\$15.87/hr
Completion	Full Competency	\$16.83/hr

5. PROBATIONARY PERIOD

Every apprentice selected for apprenticeship will serve a probationary period of 500 hours.

6. SELECTION PROCEDURES

Please see page 16.



WORK PROCESS SCHEDULE
MAINTENANCE TECHNICIAN
(Existing Title: Industrial Manufacturing Technician)
O*NET-SOC CODE: 17-3026.00 RAPIDS CODE: 2031CB

Description: Maintenance Technicians work to ensure that a company's equipment and facility are in proper working order. Maintenance Technicians engage in preventative maintenance to keep equipment and systems from breaking down. They also engage in reactive maintenance to fix equipment and systems when they do break down. Experienced Maintenance Technicians have a broad base of knowledge with mechanical, electrical, pneumatic, hydraulic, piping, plumbing, ventilation, and robotic systems.

On-The-Job Training: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on the job and will not necessarily be in the order listed.

Ratings are:

- (4) Exceeds Expectations (Advanced)
- (3) Meets Expectations (Proficient)
- (2) Meets Some Expectations (Emerging)
- (1) Does Not Yet Meet Expectations (Novice)
- (0) Not applicable (No Skill)

4. Exceeds Expectations (Advanced): Consistently exceeds performance standard established for the time in position. Achieves results above and beyond what is required. Extends themselves in their roles to exceed personally and as a team to achieve exceptional results.

3. Meets Expectations (Proficient): Employee meets all expectations in a fully satisfactory way and is proficient in the outlined competencies.

2. Meets Some Expectations (Emerging): Meets the performance standards established for time in position. Handles routine tasks & some unexpected situations with the usual amount of supervision. Can continue to develop with coaching, training or more experience to gain proficiency.

1. Does Not Yet Meet Expectations (Novice): Occasionally meets some of the objectives related to this goal but does not meet others in a fully satisfactory way. This performance level generally indicates the need for additional coaching, training or other plan for performance improvements.

0. Not Applicable (No Skill): Training in this competency has not yet begun.

Apprentices need to receive a "3" or better in each competency in order to complete the apprenticeship.



Apprentice Competency Evaluation

Core Competencies	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Safety <i>Understands and upholds safe workplace practices in a manufacturing environment.</i></p> <ul style="list-style-type: none"> ● Adheres to employer's safety protocols, including those relating to personal protective equipment (PPE), equipment guards, lock-out/tag-out, and material handling. ● Uses, stores, and maintains tools, equipment, and chemicals according to OSHA and EPA standards. ● Identifies potential safety hazards and reports them to the appropriate personnel. 				
<p>Organization <i>Conducts general housekeeping and cleanup. Maintains a tidy, organized workspace.</i></p> <ul style="list-style-type: none"> ● Conducts housekeeping and clean up when assigned or reminded. ● Conducts housekeeping and clean up when a workspace becomes dirty and disorganized. ● Maintains a clean workspace with tools and equipment that are ready for the next job. 				
<p>Work Orders <i>Reads and interprets work orders to plan out maintenance activity.</i></p> <ul style="list-style-type: none"> ● Knows how and where to access work orders, whether they are available digitally or as paper copies. ● Identifies basic information on work orders including customer name, order number, part number, and anticipated ship date. ● Interprets work orders to obtain the raw materials and tools necessary for the production run. 				
<p>Task Management <i>Understands the sequence of tasks involved in maintenance work. Coordinates with coworkers to complete these tasks on time and in the right sequence.</i></p>				



<ul style="list-style-type: none"> ● Assists senior maintenance personnel as they complete steps in a maintenance work order. ● Follows work order steps to complete maintenance activity. ● Seeks guidance as necessary when questions arise around work order steps. ● Identifies and checks out parts from tool crib. ● Coordinates with coworkers and other departments to complete maintenance projects. ● Submits parts orders to vendors and/or the company's purchasing department. 				
<p>Technical Drawings <i>Reads and interprets technical drawings, including dimensions and tolerances.</i></p> <ul style="list-style-type: none"> ● Identifies dimensions on technical drawings. ● Identifies tolerances on technical drawings. ● Understands building and process layout drawings. ● Visualizes connection between views on simple drawings. ● Communicates with others effectively regarding information contained in technical drawings. 				
<p>Reporting and Record Keeping <i>Records maintenance activity in and Enterprise Resource Planning (ERP) system, Computer Maintenance Management System (CMMS), or similar system.</i></p> <ul style="list-style-type: none"> ● Accesses the company's ERP or CMMS system ● Understands the importance of accurate reporting and record keeping. ● Accurately documents the movement of material and steps accomplished throughout the production process. ● Navigates the company's ERP or similar system to enter data. 				
<p>Basic Mechanical Systems <i>Monitors, tests, troubleshoots, installs, and repairs basic mechanical systems.</i></p> <ul style="list-style-type: none"> ● Explains the fundamentals and operation of mechanical systems such as types of bearings, drive systems, pumps, and valves. ● Assists senior maintenance personnel as they perform preventative and reactive mechanical maintenance. 				



<ul style="list-style-type: none"> • Tests mechanical equipment to ensure proper functioning. • Inspects damaged machine parts. • Marks defective areas or advises supervisors of repair needs. 				
<p>Basic Electrical Systems <i>Monitors, tests, troubleshoots, and repairs basic electrical systems.</i></p> <ul style="list-style-type: none"> • Understands electrical power and control system safety rules and procedures. • Explains the fundamentals of electrical systems, including AC vs DC, common components, low voltage circuits, electrical symbols, diagrams, schematics, and electrical motors. • Assists senior maintenance personnel as they perform preventative and reactive electrical maintenance • Reads and interprets electrical control and power schematics. • Measures voltage, current and resistance in an electrical circuit to verify system operation and power levels. • Installs and tests fuses. • Tests electric motors, electrical relay power components, and electro-fluid control components • Tests and repairs machine electrical ground. • Adjusts limit switches and electronic sensors 				

In addition to completing all core competencies, an apprentice based on the employer's assigned role will complete the following additional competencies.

Optional Competencies	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Basic Hydraulic Systems <i>Monitors, tests, troubleshoots, and repairs basic hydraulic systems.</i></p> <ul style="list-style-type: none"> • Explains the fundamentals of hydraulics, including basic hydraulic principles, reading and interpreting hydraulic drawings and symbols. • Assists senior maintenance personnel as they perform preventative and reactive hydraulic maintenance. 				



<ul style="list-style-type: none"> ● Reads and interprets fluid power schematics. ● Starts up and shuts down a hydraulic system and adjust system pressure using a fixed displacement pump. ● Installs and tests components in a basic hydraulic circuit. ● Adds, changes, and properly disposes of waste hydraulic fluid. ● Adjusts hydraulic actuator speed using a flow control valve. 				
<p>Basic Pneumatic Systems <i>Monitors, tests, troubleshoots, and repairs basic pneumatic systems.</i></p> <ul style="list-style-type: none"> ● Explains the fundamentals of pneumatics, including basic pneumatic principles, reading and interpreting pneumatic drawings and symbols. ● Assists senior maintenance personnel as they perform preventative and reactive pneumatic maintenance. ● Reads and interprets pneumatic schematics. ● Starts up and shuts down a pneumatic system and adjusts system pressure. ● Installs and tests components in a basic pneumatic circuit. ● Adjusts pneumatic actuator speed using a flow control valve. 				
<p>Piping and Plumbing Systems <i>Monitors, tests, troubleshoots, and repairs piping and plumbing systems.</i></p> <ul style="list-style-type: none"> ● Understands safety, health, and environmental rules and regulations for piping and plumbing systems. ● Explains the fundamentals of piping and plumbing systems. ● Assists senior maintenance personnel as they perform preventative and reactive piping and plumbing maintenance. ● Reads and interprets piping schematics including specifications and fittings. ● Identifies and selects correct piping materials for a repair. ● Accurately measures, cuts and prepares piping for installation. 				
<p>HVAC Systems <i>Monitors, tests, troubleshoots, and repairs heating, ventilation, and air conditioning (HVAC) systems.</i></p> <ul style="list-style-type: none"> ● Explains the fundamentals of HVAC systems, including basic knowledge of 				



<p>refrigeration, chillers, boilers, air handlers, and Variable Air Volume (VAV) dampers</p> <ul style="list-style-type: none"> ● Assists senior maintenance personnel as they perform preventative and reactive HVAC maintenance. ● Reads and interprets HVAC schematics. ● Monitors HVAC control systems. ● Adjusts air flows and the efficiency of an HVAC system. 				
<p>Electronic and Process Control System <i>Monitors, tests, troubleshoots, and repairs basic electronic and process control systems, such as Programmable Logic Controllers (PLCs).</i></p> <ul style="list-style-type: none"> ● Understands safety, health, and environmental rules and regulations for electronic power and control systems. ● Explains the fundamentals of Programmable Logic Controllers (PLC), including symbols, ladder logic interpretation, basic programming. ● Assists senior maintenance personnel as they adjust and troubleshoot PLCs. ● Reads and interprets ladder logic on PLC schematics. ● Completes PLC component replacements independently. ● Adjusts and repairs AC drive to control motor speed and torque. ● Connects and tests a DC power supply to ensure proper operation. ● Installs and tests solid-state AC and DC discrete and analog relays. 				
<p>Robotic Systems <i>Monitors, tests, troubleshoots, and repairs robotic systems.</i></p> <ul style="list-style-type: none"> ● Explains the fundamentals of robotic systems, including end of arm tools, uses, etc. ● Reads and interprets robotic system schematics. 				
<p>Maintenance Welding and Fabrication <i>Performs maintenance welding and fabrication to manufacture or repair parts, equipment, and other materials.</i></p> <ul style="list-style-type: none"> ● Understands safety, health, and environmental rules and regulations for welding. ● Explains the fundamentals of different welding technologies, including Mig, Tig, SMAW, GMAW, etc. 				



<ul style="list-style-type: none"> Assists senior maintenance personnel with welding. Reads and interprets welding prints. Prepares parts to be welded including degreasing, cleaning, grinding and inspecting. Uses Shielded Metal Arc Welding (SMAW) to make basic welds on flat stock. 				
---	--	--	--	--

Apprenticeship Competencies – Career Readiness

In addition to mastering all the essential technical competencies outlined in the work processes, an apprentice must consistently demonstrate growth and proficiency in the following career readiness competencies to complete the apprenticeship.

Apprentices will be evaluated in these competencies semi-annually, and the supervisor will initial and date the accomplishment of the career ready competency at each review.

Ratings are:

- (4) Exceeds Expectations (Advanced)
- (3) Meets Expectations (Proficient)
- (2) Meets Some Expectations (Emerging)
- (1) Does Not Yet Meet Expectations (Novice)
- (0) Not applicable (No Skill)

4. Exceeds Expectations (Advanced): Consistently exceeds performance standard established for the time in position. Achieves results above and beyond what is required. Extends themselves in their roles to exceed personally and as a team to achieve exceptional results.

3. Meets Expectations (Proficient): Employee meets all expectations in a fully satisfactory way and is proficient in the outlined competencies.

2. Meets Some Expectations (Emerging): Meets the performance standards established for time in position. Handles routine tasks & some unexpected situations with the usual amount of supervision. Can continue to develop with coaching, training or more experience to gain proficiency.

1. Does Not Yet Meet Expectations (Novice): Occasionally meets some of the objectives related to this goal but does not meet others in a fully satisfactory way. This performance level generally indicates the need for additional coaching, training or other plan for performance improvements.

0. Not Applicable (No Skill): Training in this competency has not yet begun.

Apprentices need to receive a “3” or better in each competency in order to complete the apprenticeship.

ENTREPRENEURIAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Critical Thinking/Problem Solving				



<ul style="list-style-type: none"> Recognize that problems can be identified, and possible solutions can be generated Define the problem using a variety of strategies Make connections between information gathered and personal experiences to apply and/or test solutions 				
Creativity / Innovation <ul style="list-style-type: none"> Demonstrate curiosity, imagination and eagerness to learn more Build on personal experience to specify a challenging problem to investigate Engage in novel approaches, moves, directions, ideas and/or perspectives 				
Inquiry <ul style="list-style-type: none"> Recognize and describe cause-and-effect relationships and patterns in everyday experiences Investigate to form hypotheses, make observations and draw conclusions Test hypotheses/prototype with planned process for getting feedback 				
Risk Taking <ul style="list-style-type: none"> Demonstrate a willingness to try new things Demonstrate flexibility, imagination and inventiveness in taking on tasks and activities Innovate from failure, connect learning across domains and recognize new opportunities 				

PERSONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Self-Management / Self Awareness <ul style="list-style-type: none"> Accurately recognize one's own emotions, thoughts and values and how they influence behavior Appropriately express one's own emotions, thoughts and values and identify how they influence behavior Assess personal strengths and limitations, with a well-grounded sense of confidence, optimism and a 'growth mindset' 				
Self-Direction <ul style="list-style-type: none"> Recognize personal characteristics, preferences, thoughts and strengths Pursue opportunities to engage and learn interests Apply knowledge to set goals, make informed decisions and transfer to new contexts 				



<p>Adaptability / Flexibility</p> <ul style="list-style-type: none"> Recognize emotional response to ideas that differ from one's own Regulate reactions to differing perspectives Look for and value in different perspectives expressed by others 				
<p>Perseverance / Resilience</p> <ul style="list-style-type: none"> Resist distractions, maintain attention, and continue the task at hand through frustration or challenges Set goals and develop strategies to remain focused on learning goals Focus on learning goals by employing motivation and familiar strategies for engagement and evaluate progress, making necessary changes to stay the course 				

CIVIC/INTERPERSONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Collaboration / Teamwork</p> <ul style="list-style-type: none"> Recognize how personal actions have had a positive or negative impact on others with feedback as needed Recognize how members of a community rely on each other, considering personal contributions as applicable Follow a process identified by others to help generate ideas, negotiate roles and responsibilities, and respects consensus in decision making 				
<p>Communication</p> <ul style="list-style-type: none"> Articulate personal strengths and challenges using different forms of communication to express oneself Consider purpose, formality of context and audience, and distinct cultural norms when planning content, mode, delivery and expression Establish goals for communication and plan out steps accordingly 				
<p>Global / Cultural Awareness</p> <ul style="list-style-type: none"> Compare attitudes and beliefs as an individual to others Identify and explain multiple perspectives (cultural, global) when exploring events, ideas and issues Plan and evaluate complex solutions to global challenges that are appropriate to their contexts using multiple disciplinary 				



perspectives (such as cultural, historical and scientific)				
Ethics <ul style="list-style-type: none"> • Takes great care with organizational data • Does not disclose any kind of personal or sensitive organizational information; understands that all data is confidential • Demonstrates honesty and integrity in all interactions. If an error is made, prioritizes minimal impact to the organization over their own reputation 				

PROFESSIONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Task/Time Management <ul style="list-style-type: none"> • Articulate task requirements and identify deadlines • Develop and utilize basic task and time-management strategies effectively • Demonstrate task-management attributes associated with producing high-quality products including the abilities to: 1) Work positively and ethically 2) Manage time and projects effectively 3) Multi-task 4) Clearly communicate with others 				
Self-Advocacy <ul style="list-style-type: none"> • Appropriately express a range of emotions to communicate personal ideas/needs • Ask questions to develop further personal understanding • Demonstrate confidence in sharing ideas/feelings 				
Work Ethic <ul style="list-style-type: none"> • Complete tasks with ongoing support • Seek clarity on tasks and needs occasional support • Demonstrate skill in assigned tasks and completes with little or no support 				

ACADEMIC SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Core Academic Foundation <ul style="list-style-type: none"> • Begins to use math and literacy skills to inform work • Uses math and literacy skills to perform job tasks with frequent checks by supervisor 				



<ul style="list-style-type: none">Independently and consistently use math and literacy skills to perform tasks (with occasional checks for quality)				
---	--	--	--	--



RELATED INSTRUCTION OUTLINE
MAINTENANCE TECHNICIAN
(Existing Title: Industrial Manufacturing Technician)
O*NET-SOC CODE: 17-3026.00 RAPIDS CODE: 2031CB

Related instruction - The curriculum is defined as a variety of classes, around which the exams and projects are based. By defining the related instruction this way, all related instruction competencies required of the students are met through a combination of coursework and/or hands-on exercises. Employers will select relevant courses for related instruction in the topics outlined below, totaling **at least 144 hours** over the duration of the apprenticeship. Selection of required topics and associated training time may vary by employer and apprentice. Employer may add additional occupation specific courses as necessary over and above those specified below.

RELATED INSTRUCTION	Approximate Hours
Apprenticeship Orientation	15
Workplace Essentials	45
Employer Onboarding	10
Safety	10
Organization	5
Work Orders	5
Task Management	5
Technical Drawings	10
Reporting and Recordkeeping	10
Basic Mechanical Systems	30
Basic Electrical Systems	30
TOTAL RI HOURS	175

COURSE DESCRIPTIONS

Apprenticeship Orientation (15 hours)

Introduction to career-readiness to prepare students for working in a professional environment: apprenticeship and workplace expectations with a focus on growth mindset.

Workplace Essentials (45 hours)

Skills in common computer applications, effective workplace communication, time management, and conflict resolution.

Employer Onboarding (10 hours)

Orientation training provided to new employees by the employer

Safety (10 hours)

Understands and upholds safe workplace practices.

Organization (5 hours)

Conducts general housekeeping and cleanup. Maintains a tidy, organized workspace.



Work Orders (5 hours)

Reads and interprets work orders to plan out maintenance activity.

Task Management (5 hours)

Understands the sequence of tasks involved in maintenance work. Coordinates with coworkers to complete these tasks on time and in the right sequence.

Technical Drawings (10 hours)

Reads and interprets technical drawings, including dimensions and tolerances.

Reporting and Recordkeeping (10 hours)

Records maintenance activity in an Enterprise Resource Planning (ERP) system, Computer Maintenance Management System (CMMS), or similar system.

Basic Mechanical Systems (30 hours)

Monitors, tests, troubleshoots, installs, and repairs basic mechanical systems.

Basic Electrical Systems (30 hours)

Monitors, tests, troubleshoots, and repairs basic electrical systems.



SELECTION PROCEDURES

1. Apprenticeship opportunities are shared with students enrolled in CareerWise and its affiliated programs.
 2. Interested applicants complete the application process outlined in the apprenticeship recruitment notice. All suitably qualified applicants can apply to the apprenticeship opportunity.
 3. All applicants that meet the minimum qualifications will be selected for an employer interview.
 4. At the time of interview, applicants will be asked the same set of questions to ensure each applicant is treated equally.
 5. Applicants shall be rated and ranked based on interview scores.
- If required by the employer, the top candidates may be invited for a second interview.
6. The applicants will be notified of the hiring decision in a timely manner and all applicants will be treated equally with regard to notifications.
 7. All records regarding the selection of apprentices will be forwarded to and maintained by the Sponsor (see Sponsor Requirements Guide).

Direct Entry:

The Sponsor may allow direct entry applicants that are part of an employer's incumbent workforce, a qualified pre-apprenticeship program, or Job Corps graduates whose training, similarly, qualifies them for the occupation.