

Minnesota Dual-Training Pipeline

Competency Model for Advanced Manufacturing Occupation: Maintenance and Repair Worker

Employer-Specific Requirements

Occupation-Specific Competencies*

Mechanical Power Transmissions
 Hydraulic/Pneumatic Systems
 Compressors Laser Shaft Alignment
 Industrial Belting Boring Mills
 Machinery Alignment Grinders
 Optical Alignment CNC
 Supplemental Skills: Metal Fabrication
 Welding (SMAW/GMAW/GTAW),
 Oxy-Acetyl Cutting Scaffold Use

Industry-Sector Technical Competencies*

Ergonomics Preventative Maintenance	Lubricants, Lubrication Systems	Troubleshooting and Analysis	Robotics Inspection Criteria	Motor Controls, PLC	Electrical, Fluid, Pneumatic Power Systems	Blueprint Reading
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Industry-Wide Technical Competencies

Manufacturing Process Design & Development	Production	Maintenance, Installation and Repair	Supply Chain Logistics	Quality Assurance, Continuous Improvement	Sustainable and Green Manufacturing	Health, Safety, Security and Environment
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Workplace Competencies

Business Basics	Teamwork	Adaptability and Flexibility	Marketing, Customer Focus	Planning and Organizing	Problem Solving, Decision Making	Working with Tools, Technology	Checking, Examining and Recording	Sustainable Practices
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Academic Competencies

Science	Basic Computer Skills	Mathematics	Reading and Writing	Communication: Listening & Speaking	Critical & Analytic Thinking	Information Literacy
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Personal Effectiveness Competencies

Interpersonal Skills	Integrity	Professionalism	Initiative	Dependability and Reliability	Lifelong Learning
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Based on: Advanced Manufacturing Competency Model Employment and Training Administration, United States Department of Labor, April 2010.

*Pipeline recommends the Industry-Specific Technical Competencies as formal training opportunities (provided through related instruction) and the Occupation-Specific Competencies as on-the-job training opportunities.



Competency Model for Advanced Manufacturing

Maintenance and Repair Worker

Manufacturing maintenance and repair workers maintain and repair factory equipment and other industrial machinery, such as conveying systems, production machinery, and packaging equipment.

Industry-Sector Technical Competencies

- Ergonomics – Knowledge of how to modify machines so operation is safe and productive for operator.
- Preventative maintenance – Training to anticipate and prevent potential malfunction of tools and machinery.
- Lubricants/lubrication systems – Understanding of why lubricants and lubricant systems are used and when it is most beneficial to use them.
- Troubleshooting and analysis – Training in troubleshooting issues with machinery using tools and knowledge of machinery.
- Robotics – Understand how to maintain and repair robotic devices.
- Inspection Criteria – Know how to do proper machine inspection.
- Motor Controls and PLCs – Understanding of how to program motor controls and PLCs and how to use them for interfacing, operation, and programming.
- Blueprint reading - Training on how to interpret blueprints and use those blueprints to build reliable and serviceable objects.
- Electrical, Fluid, Pneumatic Power systems – Instruction on how electrical, fluid, and pneumatic power systems function, and how to maintain them.

Occupation-Specific Competencies

- Mechanical power transmissions – Demonstrate machine operation with power transmissions and how to maintain and repair them.
- Hydraulic/Pneumatic systems – Demonstrate function and operation of hydraulic and pneumatic systems and how to maintain and repair them.
- Machinery alignment – Ability to align machinery for proper operation.
- Optical Alignment – Ability to align advanced optical systems.
- CNC – Perform maintenance and repair on CNC machines.
- Compressors – Perform repair and maintenance on factory compressors.

- Laser Shaft Alignment – Demonstrate proper alignment principles and practices including troubleshooting by use of a laser shaft alignment tool.
- Industrial Belting – Maintain and repair industrial belting assembly systems.
- Boring Mills - Maintain and repair boring mills.
- Grinders – Perform grinding on parts as needed, as well as maintain grinding equipment.

Supplemental Skills – may be required depending on employer

- Welding - Exhibit knowledge of the safe operation of welding equipment and the welding skills needed to perform repair to machines.
- Metal Fabrication – As needed, know how to perform metal fabrication.
- Oxy-Acetyl Cutting - As needed, know how perform oxy-acetyl cutting.
- Scaffold use - Demonstrate how to safely ascend and perform job functions while using a scaffold.

Maintenance and Repair Worker Occupational Competency Training Plan

Related Instruction means an organized and systematic form of instruction designed to provide the apprentice with the knowledge of the theoretical and technical subjects related to the apprentice's trade of occupation, or industrial courses or, when of equivalent value, by correspondence, electronic media, or other forms or self-study approved by the commissioner.

	Course	Course Description	Credit/Non-Credit	Hours Spent on Competency
Ergonomics				
Preventative maintenance				
Lubricants/lubrication systems				
Troubleshooting and analysis				
Robotics				
Inspection Criteria				
Motor Controls and PLCs				
Blueprint reading				

Electrical, Fluid, Pneumatic Power systems				
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On-The-Job Training is the work experience and instruction. Training experience need not be in the exact order as listed below.

	Trainer/Instructor	Name of person responsible for verifying competency mastery	Hours spent on competency
Mechanical power transmissions			
Hydraulic/Pneumatic systems			
Machinery alignment			
Optical Alignment			
CNC			
Compressors			
Laser Shaft Alignment			
Industrial Belting			
Boring Mills			
Grinders			
<i>Supplemental Skills</i>			
Welding			
Metal Fabrication			
Oxy-Acetyl Cutting			
Scaffold use			