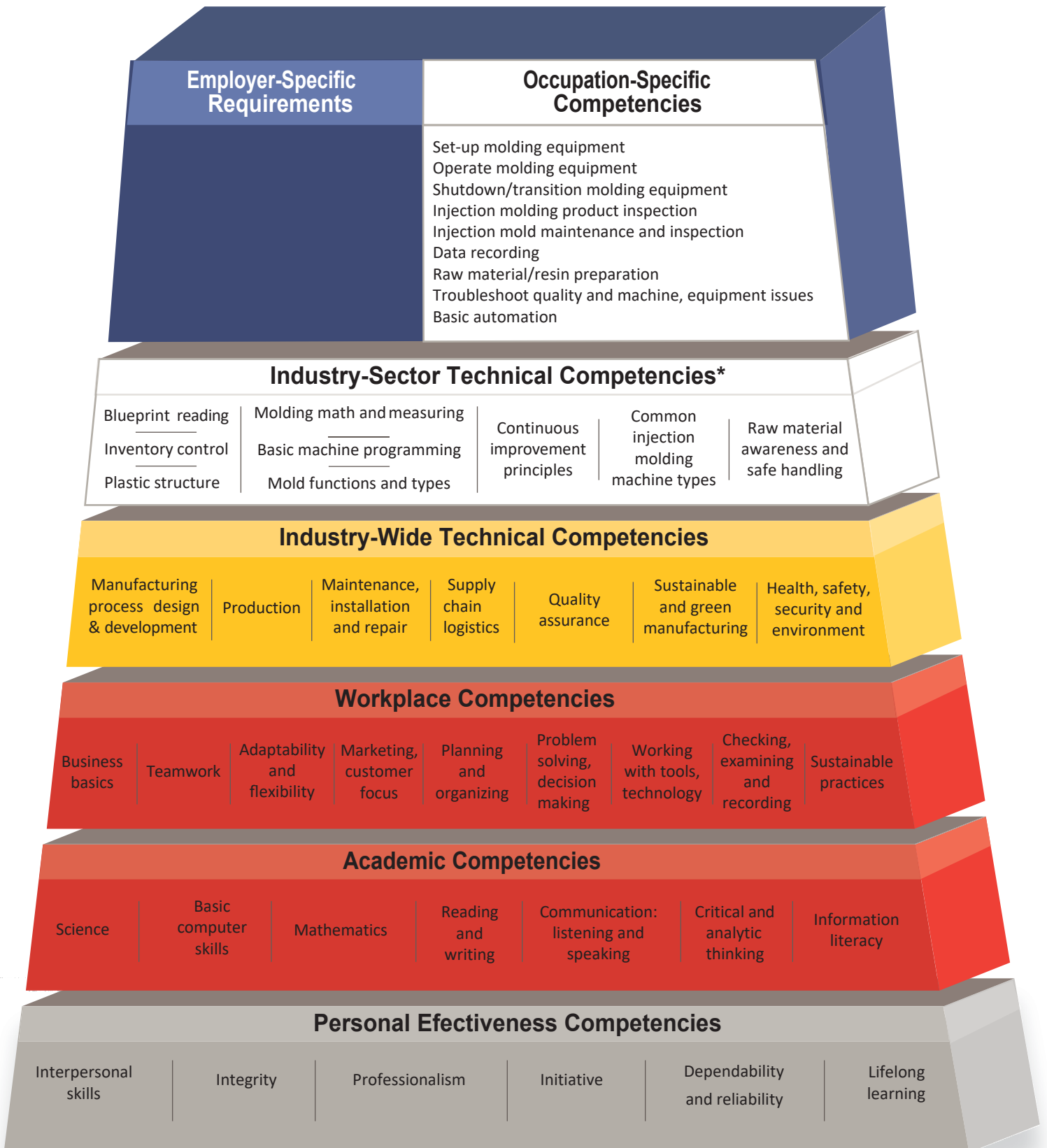


Minnesota Dual-Training Pipeline

Competency Model for Advanced Manufacturing

Occupation: Injection Molding Technician



Based on: Advanced Manufacturing Competency Model Employment and Training Administration, United States Department of Labor, April 2010.

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



Injection Molding Technician – This position is responsible for overseeing the operating of injection molding machines to guarantee that the parts produced are up to the standards set by the company and the customer. The Injection Molding Technician knows how to set up the molds, troubleshoots problems in production, makes corrections, ensures quality controls and that the product readily removes from the molds as well. Injection Molding Technician also knows how to ensure safe operation throughout entire set up, operation, shut down and any subsequent waste removal processes.

Industry-Sector Technical Competencies

- Blueprint Reading – Develop the skills necessary to interpret working drawings common to the molding field.
- Molding Math and Measuring – Knowledge to apply basic math skills, make accurate measurements and use measuring tools regarding various aspects of the molding process.
- Inventory Control – Training in how to manage stock materials as well as track and purchase necessary items in order to seamlessly support the overall manufacturing process.
- Mold Functions and Types – Know how molds typically allow chilled water to flow through plastic, how to do cooling of the plastic and the extraction of the plastic part from the mold. Also, have general understanding of operation of the common types of molds such as two-plate molds, three-plate molds, cold runner terminology and runnerless molds.
- Common Injection Molding Machine Types – General understanding of the operation and properties associated with using electric injection molding machines such as servo motor drive systems, ball screw drive mechanism, precision of molding machines and hydraulic pressure vs. plastic pressure-based machinery.
- Continuous Improvement Principles - Understands how to look for ways to minimize and reduce process wastes, to notice and correct machine abnormalities, to maintain records and to adapt to process changes such as cycle times, set-ups and tooling.
- Raw Material Awareness and Safe Handling – General understanding of the different raw materials possibly involved in injection molding and how certain machine settings, temperatures, etc. can potentially impact different materials and plastics. Know how to safely remove excess materials as well as how to manage any environmental concerns with material removal.
- Plastic structure – Understanding of the basic types of plastic structures such as thermoplastic, thermoset, copolymer and blends.
- Basic Machine Programming – Understand how to do basic programming and automation functions for assembly machines.

Occupation-Specific Competencies

- Set-up molding equipment – Ability to select correct tools and materials, perform mechanical set-up according to company standards and equipment specifications, tests and validates set-up before going to full production.
- Operate molding equipment - Ability to operate injection molding equipment during production cycle, knowing how to monitor quality, document processes and adjustments, monitor machine settings and safely operate machinery during entire production cycle.
- Shutdown/ Transition molding equipment – Knowledgeable in how to safely and effectively shut down injection machining to maintain tooling and lessen time necessary to transition to new production set-up while disassembling equipment and components if necessary.
- Injection Molding Product Inspection – Demonstrate how to identify defects, confirm product is up to customer molding standards, and use appropriate tools to accomplish mold inspections.
- Injection Mold Maintenance & Inspection – Know how to properly care for, store, operate and do routine maintenance to individual molds.
- Data Recording – Know how to regularly maintain records of materials used, products made and timing for set-up, operation cycle time and change over to new / different product(s).
- Raw Material/ Resin Preparation – In addition to knowing the technical aspects of raw material/ resin handling, it is also important to know how to properly dry and feed the material throughout the manufacturing process.
- Troubleshoot Quality and Machine/ Equipment Issues - Know how to strategically think through what may be causing quality defects as well as machine / equipment issues and quickly brainstorm and implement approaches to address these concerns.
- Basic Automation- Understand how to operate equipment and oversee tasks that are automated with machinery and/or robotics such as axis robotics and sprue pickers for example.

Injection Molding Technician Occupational Competency Training Plan

Related Instruction means an organized and systematic form of instruction designed to provide the dual trainee with the knowledge of the theoretical and technical subjects related to their trade, occupation, or industry.

	Course	Course Description	Credit/Non-Credit	Hours Spent on Competency
	Blueprint Reading			
	Molding Math and Measurement			
	Inventory Control			
	Mold Function and Types			
	Continuous Improvement Principles			
	Raw Material Awareness and Safe Handling			
	Plastic structure			
	Basic Machine Programming			
	Common Injection Molding Machine Types			

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
	Set-up Molding Equipment		
	Operate Molding Equipment		
	Shutdown/ Transition Molding Equipment		
	Injection Molding Product Inspection		

Injection Mold Maintenance and Inspection			
Data recording			
Raw Material/ Resin preparation			
Troubleshoot quality and machine/ equipment issues			
Basic Automation			