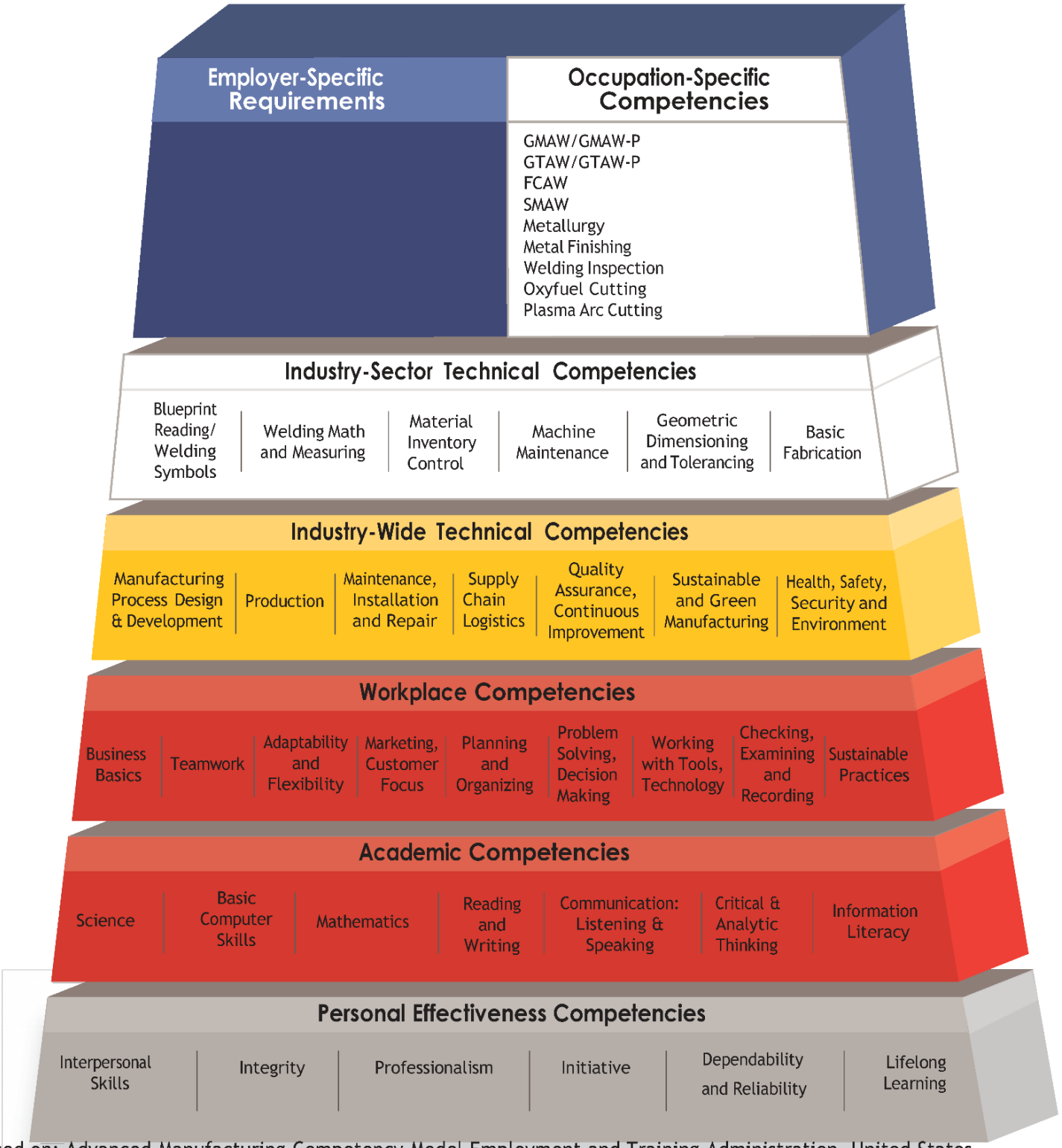
Minnesota Dual-Training Pipeline

Competency Model for Advanced Manufacturing Occupation: Welder



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.

Competency Model for Welder

Welder – This position is responsible for the proper, productive, and safe fitting and joining of metal and various components/parts together with select welding processes and procedures within a manufacturing environment.

Industry-Sector Technical Competencies

Related Instruction for dual training means the organized and systematic form of education resulting in the enhancement of skills and competencies related to the dual trainee's current or intended occupation.

- **Blueprint reading/welding symbols** – Develop the skills necessary to interpret working drawings common to the metalworking field. Focus on orthographic projection drawings and interpreting specified welding information and symbols.

- **Welding math and measuring** – Know how to apply basic math skills, make accurate measurements, and use measuring tools throughout various aspects of the welding process.

- **Material inventory control** – Training in how to manage stock materials as well as track and purchase necessary items to seamlessly support the overall manufacturing process.

- **Machine maintenance** – Know how to complete appropriate and thorough maintenance procedures to keep welding machines running safely and dependably.

- **Geometric dimensioning and tolerancing** – Knowledge of the symbolic way that specific tolerances on blueprint drawings are referenced and how this impacts the manufactured part.

- **Basic fabrication** –Understanding of metal fabrication by cutting, altering, and shaping steel or other materials through use of different tools, techniques, and processes prior to welding.

Occupation-Specific Competencies

On-the-Job Training (OJT) is hands-on instruction completed at work to learn the core competencies necessary to succeed in an occupation. Common types of OJT include job shadowing, mentorship, cohort-based training, assignment-based project evaluation and discussion-based training.

- **Metallurgy** – Ability to select the appropriate welding process for a particular application, choose or adjust welding parameters and techniques to optimize weldment properties for metals and know the cause of weld defects and how to avoid them.

- **Metal finishing** – Able to refine welds without compromising the integrity of the part and welded joint.

- **Oxyfuel cutting** – Aptitude to produce high quality cuts on a variety of materials using correct procedures for the product. Practice safe working procedures for handling the equipment and cylinders in the oxyfuel process.

- **Plasma arc cutting** - Aptitude to produce high quality cuts on a variety of materials using the correct procedures. Practice safe working procedures for handling the equipment and cylinders in the plasma arc process.

- **GMAW/GMAW-P** – Demonstrate welding using gas metal arc welding or pulsed gas metal arc welding (GMAW-P) safely and correctly.

- **GTAW/GTAW-P** – Demonstrate welding using gas tungsten arc welding or pulsed gas tungsten arc welding (GTAW-P) safely and correctly.

- **FCAW** - Demonstrate welding using flux cored arc welding (FCAW) safely and correctly.

- **SMAW** - Demonstrate welding using shielded metal arc welding (SMAW) safely and correctly.

- **Welding inspection** – Demonstrate how to identify weld defects, confirm product is up to customer welding standards, and use appropriate tools to accomplish weld inspection.

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