



# 2021-2022

## Technical Skills Assessment

### Automated Manufacturing

## Results by Standard

Legend (%)		
0-50%	51-75%	76-100%

Assessment: Automated Manufacturing Number tested: 23	% Correct 18-19	% Correct 20-21	% Correct 21-22
<b>CONTENT STANDARD 1.0: LAB ORGANIZATION AND SAFETY PROCEDURES</b>	76.19%	73.33%	70.48%
<b>Performance Standard 1.1: General Lab Safety Rules and Procedures</b>	74.55%	75.45%	73.09%
1.1.1. Describe general shop safety rules and procedures.	20.00%	50.00%	52.00%
1.1.3. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop	65.00%	65.00%	68.00%
1.1.4. Operate lab equipment according to safety guidelines.	100.00%	60.00%	60.00%
1.1.5. Identify and use proper lifting procedures and proper use of support equipment.	100.00%	100.00%	96.00%
1.1.6. Utilize proper ventilation procedures for working within the lab/shop area.	100.00%	100.00%	100.00%
1.1.7. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.	80.00%	70.00%	56.00%
1.1.9. Identify the location of the posted evacuation routes.	80.00%	100.00%	92.00%
1.1.10. Identify and wear appropriate clothing for lab/shop activities.	50.00%	60.00%	72.00%
1.1.11. Secure hair and jewelry for lab/shop activities.	100.00%	100.00%	96.00%
1.1.13. Locate and interpret safety data sheets (SDS).	60.00%	60.00%	44.00%
<b>Performance Standard 1.2: Hand Tools</b>	65.00%	66.67%	60.00%
1.2.1. Identify hand tools and their appropriate usage.	53.33%	56.67%	48.00%
1.2.2. Identify standards and metric designation.	80.00%	50.00%	68.00%
1.2.3. Demonstrate the proper techniques when using hand tools.	50.00%	80.00%	52.00%
1.2.5. Identify proper cleaning, storage and maintenance of tools.	100.00%	100.00%	96.00%
<b>Performance Standard 1.3: Power Tools and Equipment</b>	97.50%	77.50%	79.00%
1.3.1. Identify power tools and their appropriate usage.	90.00%	60.00%	60.00%
1.3.2. Identify equipment and their appropriate usage.	100.00%	90.00%	92.00%
1.3.3. Demonstrate the proper techniques when using power tools and equipment.	100.00%	70.00%	68.00%

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1.3.5. Identify proper cleaning, storage and maintenance of power tools and equipment.	100.00%	90.00%	96.00%
<b>CONTENT STANDARD 2.0: APPLY FUNDAMENTAL PRINT READING, MEASURING, AND CADD</b>	74.21%	68.95%	72.00%
<b>Performance Standard 2.1: Demonstrate Print Reading Practices</b>	67.78%	68.89%	68.89%
2.1.1. Interpret basic elements of a technical drawing (i.e., title block information, dimensions).	43.33%	46.67%	50.67%
2.1.2. Identify industry standard symbols (i.e., hydraulic, pneumatic, electrical, welding, mechanical).	80.00%	90.00%	84.00%
2.1.3. Prepare a materials list from a technical drawing.	100.00%	100.00%	96.00%
2.1.4. Describe various types of drawings (i.e., part, assembly, pictorial, orthographic, isometric, and	10.00%	30.00%	12.00%
2.1.5. Understand dimensioning and tolerance, sectional drawings, fasteners, tables, charts, and assembly drawings.	96.67%	86.67%	92.00%
<b>Performance Standard 2.2: Demonstrate Measuring and Scaling Techniques</b>	78.75%	66.25%	71.50%
2.2.1. Identify industry standard units of measure.	65.00%	40.00%	54.00%
2.2.3. Determine appropriate engineering and metric scales.	75.00%	65.00%	72.00%
2.2.4. Measure and calculate speed, distance, object size, area, and volume.	90.00%	100.00%	88.00%
2.2.5. Determine and apply the equivalence between fractions and decimals.	100.00%	90.00%	96.00%
2.2.6. Demonstrate proper use of precision measuring tools (i.e., micrometer, dial indicator, dial caliper) and inspecting parts to print.	80.00%	65.00%	68.00%
<b>Performance Standard 2.3 CADD, CAM</b>	85.00%	80.00%	88.00%
2.3.1. Develop three dimensional models (i.e., wireframe, surface, solid, or parametric).	90.00%	90.00%	92.00%
2.3.2. Interpret and create design and working drawings.	80.00%	70.00%	84.00%
<b>CONTENT STANDARD 3.0: APPLY FUNDAMENTAL POWER SYSTEM PRINCIPLES</b>	51.82%	49.09%	50.18%
<b>Performance Standard 3.1: Identify and Utilize Basic Mechanical Systems</b>	90.00%	70.00%	72.00%
3.1.1. Understand examples of the six simple machines, their attributes and components.	80.00%	70.00%	52.00%
3.1.3. Explain concepts of mechanical advantage.	100.00%	70.00%	92.00%
<b>Performance Standard 3.2: Identify and Utilize Basic Fluid Systems</b>	36.67%	33.33%	50.67%
3.2.2. Identify and define the components of fluid systems.	30.00%	40.00%	44.00%
3.2.5. Explain the difference between gauge pressure and absolute pressure.	50.00%	40.00%	60.00%
3.2.7. Discuss mechanical advantage using Pascal's law.	30.00%	20.00%	48.00%
<b>Performance Standard 3.3: Identify and Utilize Basic Electrical Systems</b>	46.67%	50.00%	42.67%

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3.3.1. Define AC and DC electrical systems and terminology.	50.00%	50.00%	36.00%
3.3.3. Describe the principles of generation, transmission, distribution, and storage of electricity.	20.00%	60.00%	16.00%
3.3.5. Compute values of current, resistance, and voltage using Ohm's Law.	70.00%	70.00%	52.00%
3.3.6. Identify series, parallel and series-parallel (combination) circuits.	90.00%	80.00%	72.00%
3.3.7. Introduce single-phase and three-phase AC power.	0.00%	0.00%	24.00%
3.3.10. Explain electrical motor systems and motor controls by application.	50.00%	40.00%	56.00%
<b>CONTENT STANDARD 4.0: IDENTIFY AND APPLY MANUFACTURING PROCESSES</b>	72.50%	64.38%	66.50%
<b>Performance Standard 4.1: Identify Material Properties and Science</b>	80.00%	56.67%	68.00%
4.1.1. Identify the major material families used in manufacturing.	70.00%	50.00%	56.00%
4.1.2. Differentiate between the various types of material properties and their application.	70.00%	50.00%	60.00%
4.1.4. Explain how production is affected by the availability, quality and quantity of resources.	100.00%	70.00%	88.00%
<b>Performance Standard 4.2: Identify Manufacturing Processes</b>	70.00%	65.00%	72.00%
4.2.1. Identify and describe the five major manufacturing processes (i.e., forming, separating, joining,	60.00%	45.00%	54.00%
4.2.2. Discuss the impact of manufacturing processes on the environment.	80.00%	85.00%	90.00%
<b>Performance Standard 4.3: Apply Manufacturing Processes</b>	83.33%	73.33%	69.33%
4.3.1. Demonstrate cutting methods of metals and plastics.	95.00%	95.00%	80.00%
4.3.2. Demonstrate drilling methods of metals and plastics.	65.00%	55.00%	60.00%
4.3.3. Demonstrate grinding methods of metals.	100.00%	70.00%	52.00%
4.3.4. Demonstrate finishing methods of metals and plastics.	80.00%	70.00%	84.00%
<b>Performance Standard 4.4: Identify Fasteners</b>	46.67%	53.33%	52.00%
4.4.1. Identify various fastening methods (e.g., rivets, welds, adhesive, screws, seams, etc.).	30.00%	70.00%	48.00%
4.4.2. Categorize fastening methods by appropriate applications.	55.00%	45.00%	54.00%
<b>CONTENT STANDARD 5.0: APPLY FUNDAMENTAL ELECTRONIC AND INSTRUMENTATION PRINCIPLES</b>	51.67%	63.33%	39.33%
<b>Performance Standard 5.1: Demonstrate Control Technology and Automation Principles</b>	51.67%	63.33%	39.33%
5.1.1. Research the history and fundamentals of automation and control systems.	40.00%	35.00%	16.00%
5.1.2. Identify applications of control logic.	60.00%	80.00%	48.00%
5.1.3. Distinguish programmable controllers and PLC components and their functions.	60.00%	75.00%	54.00%
5.1.4. Interpret programming diagrams.	50.00%	80.00%	48.00%
<b>CONTENT STANDARD 6.0: MACHINING</b>	76.25%	67.92%	66.33%
<b>Performance Standard 6.1: Manual Machining</b>	80.63%	72.50%	71.00%
6.1.1. Hand-sharpen cutting tools.	80.00%	40.00%	80.00%
6.1.2. Perform maintenance on machines and tools.	80.00%	90.00%	72.00%
6.1.3. Deburr workpieces.	80.00%	80.00%	80.00%

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6.1.4. Setup and operate power saws.	100.00%	90.00%	84.00%
6.1.5. Setup and operate grinders.	63.33%	63.33%	42.67%
6.1.6. Set up and operate lathes including tool and parts setups.	72.50%	70.00%	76.00%
6.1.7. Set up and operate milling machines including tool and parts setups.	92.50%	80.00%	77.00%
6.1.8. Use appropriate inspection gages.	100.00%	70.00%	80.00%
<b>Performance Standard 6.2: CNC Machining</b>	67.50%	58.75%	57.00%
6.2.1. Demonstrate an understanding of the control interface.	100.00%	100.00%	96.00%
6.2.5. Demonstrate the ability to verify and dry run the program.	80.00%	70.00%	60.00%
6.2.6. Demonstrate the ability run the NC program.	100.00%	90.00%	76.00%
6.2.7. Demonstrate an understanding of NC programming.	65.00%	45.00%	52.00%
6.2.8. Demonstrate an understanding of coordinate systems.	45.00%	35.00%	40.00%
6.2.10. Demonstrate the ability to edit an NC program.	40.00%	50.00%	40.00%
<b>CONTENT STANDARD 7.0: ADDITIVE (3D) PRINTING</b>	90.00%	30.00%	56.00%
<b>Performance Standard 7.1: Operation</b>	90.00%	30.00%	56.00%
7.1.1. Setup and operate a 3D printer.	90.00%	30.00%	56.00%
<b>CONTENT STANDARD 8.0 ROBOTICS AND MATERIALS HANDLING SYSTEMS</b>	93.33%	96.67%	85.33%
<b>Performance standard 8.1 Process Automation</b>	93.33%	96.67%	85.33%
8.1.1. Demonstrate the knowledge of robotics and material handling equipment.	100.00%	100.00%	100.00%
8.1.2. Discuss conveyors, robotic arms, material handlers, pick-and-place technology.	90.00%	95.00%	78.00%