



# 2022-2023

## Technical Skills Assessment

### Precision Machining

### Results by Standard

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

|   |                  |                  |                  |
|---|------------------|------------------|------------------|
| <b>Assessment:</b> Precision Machining  | <b>% Correct</b> | <b>% Correct</b> | <b>% Correct</b> |
| <b>Number tested:</b> 28  | <b>20-21</b>     | <b>21-22</b>     | <b>22-23</b>     |
| <b>CONTENT STANDARD 1.0: PERFORM FUNDAMENTAL MACHINING SKILLS</b>                                       | 72.49%           | 68.37%           | 53.49%           |
| <b>Performance Standard 1.1: Comply with safe and efficient work practices</b>                          | 81.48%           | 64.29%           | 63.33%           |
| 1.1.4 Operate lab equipment according to safety guidelines  | 88.89%           | 64.29%           | 66.67%           |
| 1.1.13 Identify and wear appropriate clothing for lab/shop activities.                                  | 77.78%           | 50.00%           | 73.33%           |
| 1.1.15 Locate and interpret material safety data sheets (MSDS).   | 77.78%           | 78.57%           | 50.00%           |
| <b>Performance Standard 1.3: Perform job related mathematical calculations</b>                          | 80.00%           | 72.86%           | 56.67%           |
| 1.3.1 Accurately perform job related decimal and fraction calculations.                                 | 77.78%           | 100.00%          | 70.00%           |
| 1.3.2 Solve job-related problems using basic geometry.  | 88.89%           | 78.57%           | 60.00%           |
| 1.3.3 Accurately measure a work piece and compare measurements with blueprint specifications.           | 88.89%           | 78.57%           | 73.33%           |
| 1.3.4 Calculate the amount of material to be removed to obtain correct limits for secondary operations. | 77.78%           | 57.14%           | 46.67%           |
| 1.3.6 Convert measurements from English to metric and from metric to English units.                     | 66.67%           | 50.00%           | 33.33%           |
| <b>Performance Standard 1.4: Read, interpret and sketch blueprints</b>                                  | 80.00%           | 77.14%           | 61.33%           |
| 1.4.1 Interpret line types  | 55.56%           | 57.14%           | 23.33%           |
| 1.4.2 Read and interpret title blocks   | 88.89%           | 50.00%           | 63.33%           |
| 1.4.4 Read and interpret nomenclature   | 77.78%           | 92.86%           | 63.33%           |
| 1.4.5 Make shop sketches  | 88.89%           | 100.00%          | 86.67%           |
| 1.4.6 Read and interpret blueprints, including geometric dimensioning and tolerancing                   | 88.89%           | 85.71%           | 70.00%           |
| <b>Performance Standard 1.5: Demonstrate proficiency in machine planning</b>                            | 66.67%           | 71.43%           | 43.33%           |
| 1.5.1 Identify proper order of operations.  | 88.89%           | 78.57%           | 60.00%           |
| 1.5.4 Select proper tooling.  | 44.44%           | 64.29%           | 26.67%           |
| <b>Performance Standard 1.6: Perform measuring operations</b>   | 57.41%           | 58.33%           | 42.78%           |
| 1.6.1 Read and measure with steel rules and calipers.   | 0.00%            | 7.14%            | 13.33%           |
| 1.6.2 Read and measure with micrometers.  | 94.44%           | 75.00%           | 55.00%           |
| 1.6.3 Read and measure with Vernier tools.  | 55.56%           | 71.43%           | 50.00%           |

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| <b>Number tested:</b> 28   | <b>20-21</b>     | <b>21-22</b>     | <b>22-23</b>     |
| 1.6.4 Read and measure with dial indicators.   | 88.89%           | 92.86%           | 73.33%           |
| 1.6.5 Measure using a surface plate.   | 11.11%           | 28.57%           | 10.00%           |
| <b>CONTENT STANDARD 2.0: PERFORM BENCH WORK SKILLS</b>                                   | 66.67%           | 76.98%           | 77.04%           |
| <b>Performance Standard 2.1: Identify proper hand tools, usage, and application</b>      | 88.89%           | 100.00%          | 93.33%           |
| 2.1.1 Use proper hammer types.   | 88.89%           | 100.00%          | 93.33%           |
| <b>Performance Standard 2.7: Deburr workpieces</b>                                       | 50.00%           | 73.21%           | 65.83%           |
| 2.7.1 Select proper deburring tool.  | 22.22%           | 78.57%           | 70.00%           |
| 2.7.3 Demonstrate how to sharpen machinist scrapers.                                     | 66.67%           | 71.43%           | 60.00%           |
| 2.7.4 Deburr work pieces to required tolerances.   | 55.56%           | 71.43%           | 66.67%           |
| <b>Performance Standard 2.8: Use appropriate inspection gages</b>                        | 77.78%           | 75.00%           | 84.17%           |
| <b>CONTENT STANDARD 3.0: SETUP AND OPERATE POWER SAWS</b>                                | 55.56%           | 64.29%           | 33.33%           |
| <b>Performance Standard 3.1: Comply with safe and efficient work practices</b>           | 55.56%           | 64.29%           | 33.33%           |
| 3.1.2 Identify hazardous components of saws.   | 55.56%           | 64.29%           | 33.33%           |
| <b>CONTENT STANDARD 4.0: SETUP AND OPERATE PEDESTAL GRINDERS</b>                         | 88.89%           | 92.86%           | 80.00%           |
| <b>Performance Standard 4.1: Comply with safe and efficient work practices</b>           | 88.89%           | 92.86%           | 80.00%           |
| 4.1.1 Demonstrate the operation of pedestal grinders safety devices.                     | 88.89%           | 92.86%           | 80.00%           |
| <b>CONTENT STANDARD 5.0: HAND-SHARPEN CUTTING TOOLS</b>                                  | 77.78%           | 78.57%           | 73.33%           |
| <b>Performance Standard 5.1: Comply with safe and efficient work practices</b>           | 77.78%           | 78.57%           | 73.33%           |
| 5.1.1 Demonstrate knowledge of safety by completing a written safety test.               | 77.78%           | 78.57%           | 73.33%           |
| <b>CONTENT STANDARD 6.0: SETUP AND OPERATE LATHES</b>                                    | 79.11%           | 73.71%           | 70.13%           |
| <b>Performance Standard 6.1: Comply with safe and efficient work practices</b>           | 100.00%          | 100.00%          | 80.00%           |
| 6.1.5 Explain the proper housekeeping and tool hazards                                   | 100.00%          | 100.00%          | 80.00%           |
| <b>Performance Standard 6.4: Secure tools, tool holders, and fixtures or attachments</b> | 88.89%           | 90.48%           | 95.56%           |
| 6.4.1 Describe the proper selection of tool holding devices.                             | 100.00%          | 92.86%           | 96.67%           |
| 6.4.2 Describe the use of tool holders, fixtures and attachments.                        | 88.89%           | 85.71%           | 100.00%          |
| 6.4.3 Describe the mounting of tool bits.  | 77.78%           | 92.86%           | 90.00%           |
| <b>Performance Standard 6.5: Select and set feeds and speeds</b>                         | 86.11%           | 58.93%           | 66.67%           |
| 6.5.1 Locate, speed and feed chart on each machine.                                      | 85.19%           | 57.14%           | 67.78%           |
| 6.5.2 List spindle speed formula and calculate appropriate RPM.                          | 88.89%           | 64.29%           | 63.33%           |
| <b>Performance Standard 6.6: Setup lathes and face work pieces held in chucks</b>        | 97.22%           | 80.36%           | 75.00%           |
| 6.6.2 Calculate cutting speeds and feeds for facing operations.                          | 100.00%          | 35.71%           | 33.33%           |
| 6.6.3 Describe the procedures for facing.  | 96.30%           | 95.24%           | 88.89%           |
| <b>Performance Standard 6.7: Rough-cut and finish-cut with lathes</b>                    | 80.56%           | 87.50%           | 75.83%           |

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| <b>Number tested:</b> 28   | <b>20-21</b>     | <b>21-22</b>     | <b>22-23</b>     |
| 6.7.1 Calculate the correct speeds and feeds for the appropriate operation.  | 72.22%           | 82.14%           | 63.33%           |
| 6.7.3 Define and make trial cuts.  | 88.89%           | 85.71%           | 83.33%           |
| 6.7.4 Using appropriate measuring tools, measure work piece.   | 88.89%           | 100.00%          | 93.33%           |
| <b>Performance Standard 6.14: Counter bore holes with lathes</b>   | 44.44%           | 57.14%           | 43.33%           |
| 6.14.4 Counter bore a hole in a work piece.  | 44.44%           | 57.14%           | 43.33%           |
| <b>Performance Standard 6.15: Bores holes with lathes</b>  | 83.33%           | 92.86%           | 80.00%           |
| 6.15.2 Select the correct tool and tool holder for boring holes.   | 83.33%           | 92.86%           | 80.00%           |
| <b>Performance Standard 6.17: Cut external threads with lathes</b>   | 62.96%           | 52.38%           | 50.00%           |
| 6.17.1 Describe the procedures for cutting external threads.   | 83.33%           | 67.86%           | 58.33%           |
| 6.17.8 Determine compound off-set angle (right or left hand threads).  | 22.22%           | 21.43%           | 33.33%           |
| <b>Performance Standard 6.19: Cut internal threads with lathes</b>   | 51.85%           | 54.76%           | 54.44%           |
| 6.19.1 Describe the procedures for cutting internal threads.   | 66.67%           | 64.29%           | 53.33%           |
| 6.19.2 Explain the use of appropriate inspection gages.  | 55.56%           | 78.57%           | 73.33%           |
| 6.19.8 Determine compound off-set angle (right or left hand threads).  | 33.33%           | 21.43%           | 36.67%           |
| <b>CONTENT STANDARD 7.0: SETUP AND OPERATE MILLING MACHINES</b>  | 76.90%           | 78.20%           | 58.16%           |
| <b>Performance Standard 7.1: Comply with safe and efficient work practices</b>   | 44.44%           | 35.71%           | 16.67%           |
| 7.1.4 Operate lab equipment according to safety guidelines.  | 44.44%           | 35.71%           | 16.67%           |
| <b>Performance Standard 7.2: Identify the parts of the horizontal and vertical milling machine and know their function</b> | 81.48%           | 88.10%           | 64.44%           |
| 7.2.1 Describe the function of major parts.  | 81.48%           | 88.10%           | 64.44%           |
| <b>Performance Standard 7.4: True up the head and align milling machine fixtures</b>                                       | 72.22%           | 75.00%           | 50.00%           |
| 7.4.1 Explain the safety precautions/procedures in alignment of heads.   | 66.67%           | 78.57%           | 56.67%           |
| 7.4.5 Align a head of a milling machine.   | 77.78%           | 71.43%           | 43.33%           |
| <b>Performance Standard 7.5: Select and set feeds and speeds for milling work</b>  | 84.44%           | 87.14%           | 60.00%           |
| 7.5.1 List the correct cutting speed and feed for various materials.   | 83.33%           | 85.71%           | 60.00%           |
| 7.5.2 Set correct feeds and speeds on a milling machine for various materials.   | 85.19%           | 88.10%           | 60.00%           |
| <b>Performance Standard 7.6: Square up work pieces with a table vise</b>   | 70.37%           | 73.81%           | 46.67%           |
| 7.6.2 Describe the procedures for setting-up and machining a work piece parallel and square.                               | 70.37%           | 73.81%           | 46.67%           |
| <b>Performance Standard 7.7: Perform end milling</b>   | 72.22%           | 80.36%           | 65.83%           |
| 7.7.2 Describe the procedures for setting up and end milling a flat surface.   | 66.67%           | 76.19%           | 58.89%           |
| 7.7.3 Identify the correct cutting fluids for milling.   | 88.89%           | 92.86%           | 86.67%           |
| <b>Performance Standard 7.8: Perform fly-cutting operations</b>  | 85.19%           | 76.19%           | 46.67%           |
| 7.8.2 Explain the purpose of fly-cutters.  | 77.78%           | 85.71%           | 36.67%           |

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| 7.8.3 Calculate speeds, feeds, and determine depth of cut for fly-cutting surfaces.            | 88.89%           | 78.57%           | 50.00%           |
| 7.8.4 Describe the procedures for fly-cutting surfaces.  | 88.89%           | 64.29%           | 53.33%           |
| <b>Performance Standard 7.9: Drill holes with a milling machine</b>                            | 80.56%           | 69.64%           | 61.67%           |
| 7.9.1 Describe the procedures for using milling machine dials for accurate table positioning.  | 100.00%          | 100.00%          | 93.33%           |
| 7.9.4 Calculate the correct speed and feed.  | 66.67%           | 42.86%           | 41.67%           |
| 7.9.5 Drill holes in a work piece to specified tolerances using a milling machine.             | 88.89%           | 92.86%           | 70.00%           |
| <b>Performance Standard 7.10: Perform reaming operations</b>                                   | 85.19%           | 80.95%           | 73.33%           |
| 7.10.1 Explain the uses of centerdrills, drills, and reamers.                                  | 100.00%          | 100.00%          | 83.33%           |
| 7.10.2 Calculate proper speeds and feeds for centerdrilling, drilling, and reaming operations. | 88.89%           | 100.00%          | 76.67%           |
| 7.10.3 Describe the procedures for centerdrilling, drilling, and reaming on a milling machine. | 66.67%           | 42.86%           | 60.00%           |
| <b>Performance Standard 7.12: Bore holes with milling machines</b>                             | 70.37%           | 90.48%           | 58.89%           |
| 7.12.1 Explain the procedures for accurately adjusting a boring head.                          | 61.11%           | 85.71%           | 45.00%           |
| 7.12.2 Calculate speeds and feeds for boring operations.                                       | 88.89%           | 100.00%          | 86.67%           |
| <b>Performance Standard 7.18: Use an edge finder and wiggler</b>                               | 88.89%           | 82.14%           | 68.33%           |
| 7.18.1 Explain the correct care and use of an edge finder or wiggler.                          | 100.00%          | 82.14%           | 73.33%           |
| 7.18.2 Describe the procedures for touching off with an edge finder and a wiggler.             | 77.78%           | 92.86%           | 66.67%           |
| 7.18.3 Locate the center of a work piece after locating it with a wiggler or edge finder.      | 77.78%           | 71.43%           | 60.00%           |
| <b>Performance Standard 7.19: Position a table</b>   | 55.56%           | 64.29%           | 46.67%           |
| 7.19.3 Describe the procedures for keeping backlash out of lead screws.                        | 50.00%           | 60.71%           | 43.33%           |
| 7.19.5 Describe the procedures for drilling equally spaced holes.                              | 66.67%           | 71.43%           | 53.33%           |
| <b>CONTENT STANDARD 8.0: SETUP AND OPERATE DRILL PRESSES</b>                                   | 63.89%           | 71.43%           | 59.17%           |
| <b>Performance Standard 8.1: Comply with safe and efficient work practices</b>                 | 55.56%           | 78.57%           | 73.33%           |
| 8.1.1 Demonstrate knowledge of safety by completing a written safety test.                     | 55.56%           | 78.57%           | 73.33%           |
| <b>Performance Standard 8.3: Center drill, drill and ream a hole in a work piece</b>           | 66.67%           | 69.05%           | 54.44%           |
| 8.3.1 Describe the procedures for center drilling and drilling holes.                          | 61.11%           | 64.29%           | 51.67%           |
| 8.3.2 Describe the procedures for reaming holes.   | 77.78%           | 78.57%           | 60.00%           |