



## Job Ready Assessment Blueprint

# Precision Machining



Test Code: 4052 / Version: 01

**“Measuring What Matters”**

## Specific Competencies and Skills Tested in this Assessment:

### Organization and Shop Practices

- Demonstrate safe work habits and operating procedures
- Clean and maintain personal work area and equipment
- Select and appropriately use cutting fluids
- Identify and appropriately use personal protective equipment (PPE)
- Identify environmental and safety considerations established by the EPA, OSHA, and listed in MSDS publications



### Measurement/Inspection

- Identify, select, and calibrate precision and semi-precision measuring tools
- Measure workpiece to verify compliance with print specifications
- Display knowledge of quality control standards and process improvement

### Metallurgical Processes and Heat Treating

- Identify the properties and characteristics of common metals
- Identify the steel identification system (ANSI)
- Identify properties that affect machinability
- Identify heat treating processes and objectives

### Blueprint Interpretation and Process Planning

- Interpret blueprints with geometric dimensioning and tolerancing (G D & T) symbols
- Develop a production plan based on blueprint specifications

### Layout and Benchwork

- Identify and use hand tools
- Identify and safely use power hand tools
- Grind and shape tools using a pedestal/bench grinder
- Perform semi-precision layout

**Specific Competencies and Skills continued:****Band Saw Machines**

- Identify parts and preventive maintenance of a band saw
- Explain safe principles of operation
- Set up and perform band saw machine operations

**Lathes**

- Identify parts and preventive maintenance of a lathe
- Explain safe principles of operation
- Select and maintain appropriate tools
- Calculate appropriate cutting speed, feed rate, and depth of cut
- Grind and form lathe tools
- Demonstrate knowledge of various workholding methods (independent, universal, collet, faceplate, between centers, steady and follower rests)
- Set up and perform lathe machine operations (turning, boring, threading, taper turning, knurling, grooving and cut-off, drilling and tapping, filing, polishing)
- Explain and perform threading procedures
- Identify appropriate uses for carbide inserts

**Milling Machines**

- Identify parts and preventive maintenance of a mill
- Explain safe principles of operation
- Select and maintain appropriate tools
- Calculate appropriate cutting speed, feed rate, and depth of cut
- Demonstrate knowledge of various workholding methods (mill vise, table set-ups, angle plates, rotary table/index, v-blocks)
- Set up and operate milling machines (head alignment, indicate the vise, select tool holder, establishing a part zero, set DRO)

**Surface Grinder**

- Identify parts and preventive maintenance of a surface grinder
- Select appropriate grinding wheel
- Explain safe principles of operation
- Calculate appropriate cutting speed, feed rate, and depth of cut

***Specific Competencies and Skills continued:*****Computer Numerical Control (CNC) Programming, Preparation, Operations**

- Demonstrate knowledge of the axis and coordinate systems
- Read and write basic machine code
- Manually program, setup, and operate a CNC machine

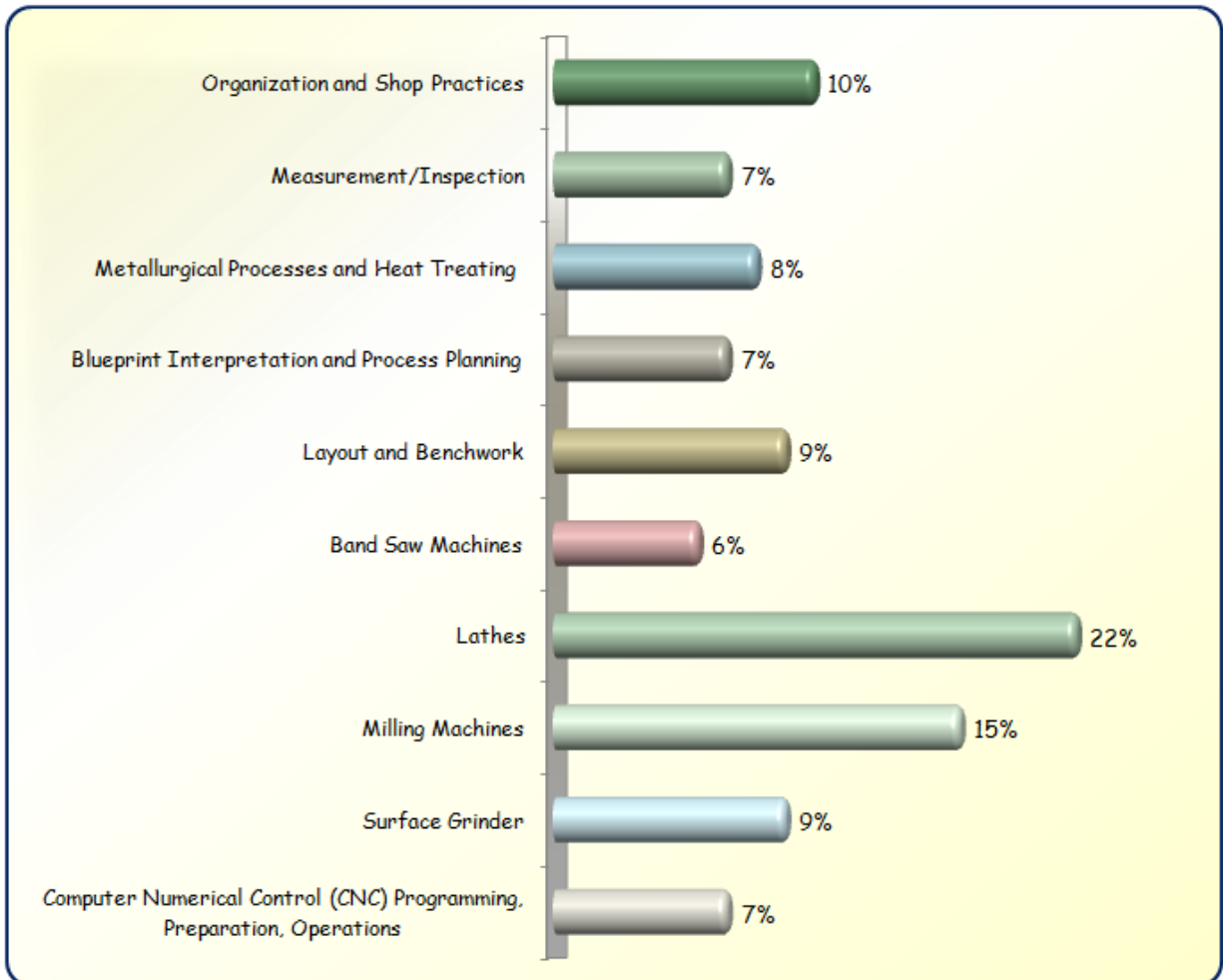


## Written Assessment:

Administration Time: 3 hours

Number of Questions: 149

### Areas Covered:



## Sample Questions:

The purpose of OSHA is to

- A. enforce employee benefits
- B. monitor minimum wages
- C. publish machining standards
- D. regulate safety in the workplace

The process of stacking gage blocks together for accurate measurements is called

- A. lapping
- B. honing
- C. polishing
- D. wringing

Accurate layout lines can be made with a/an

- A. awl
- B. punch
- C. scribe
- D. pencil

The flutes of a twist drill

- A. facilitate chip removal
- B. cut along the length of the hole
- C. size the hole
- D. burnish the hole surface

Use aluminum oxide wheels for

- A. carbide
- B. aluminum
- C. copper
- D. alloy steel



## Performance Assessment:

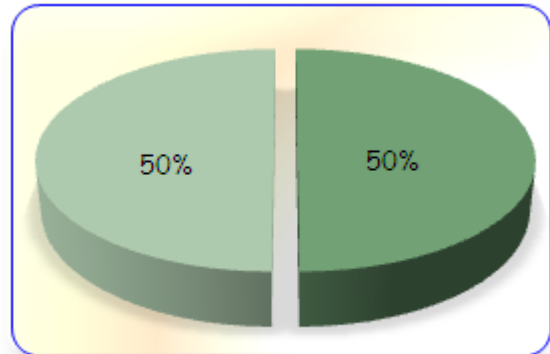
**Administration Time:** 3 hours

**Number of Jobs:** 2

### Areas Covered:

#### 50% Milling Operations

Safety, length, width square to length, width of groove, location of Hole A, length of entire groove, depth of groove, location of Hole B, depth of spot face on Hole B, diameter of Hole A, part ready for quality control and end user, clean up and care of tool/equipment, and time to complete job.



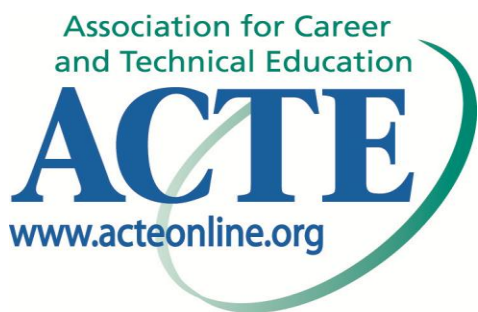
#### 50% Lathe Operations

Safety, length, diameter, chamfer angle, pitch diameter, diameter, part ready for quality control and end user, clean up and care of tools/equipment, and time to complete job.

**Sample Job:** Milling Operations

**Maximum Time:** 2 hours

**Participant Activity:** The participant will receive a piece of cold rolled steel, machine the part on the milling machine according to the specifications provided on a drawing, deburr the part and break all edges, notify the evaluator to inspect the work and to verify that it is in customer-ready condition, and clean up the machines and work area.



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!