

Industrial Equipment Maintenance: Grades 9, 10, 11, 12

Adopted 2004

Practicing Safety

A001. Explain the importance of safety. A001

A002. Demonstrate lifting and carrying techniques. A002

A003. Demonstrate ladder use techniques. A003

A004. Practice fire safety. A004

A005. Identify safe hand tool practices. A005

A006. Identify personal safety practices. A006

A007. Identify safe working practices related to the use of power tools. A007

A008. Demonstrate lockout/tagout procedures. A008

A009. Explain safe working practices around electrical hazards. A009

A010. Demonstrate safe housekeeping procedures. A010

A011. Comply with OSHA and EPA regulations for a safe work site. A011

A012. Identify emergency first aid procedures. A012

A013. Demonstrate safe machine shop practices. A013

A014. Demonstrate safe welding shop practices. A014

Performing Mathematical Calculations Related to Measurement

B001. Perform calculations using fractions. B001

B002. Convert between fractions and decimals. B002

B003. Compare numbers and calculate ratios. B003

B004. Use geometric functions. B004

B005. Perform algebraic equations. B005

B006. Apply trigonometric functions. B006

B007. Make metric measurements and conversions. B007

B008. Make linear measurements accurately to 1/16". B008

B009. Use a micrometer to measure accurately to .001". B009

B010. Use a dial caliper to measure accurately to .001". B010

B011. Use combination squares and protractors. B011

B012. Use a height gauge and surface plate to lay out and measure parts. B012

B013. Use inside micrometers and telescoping gauges. B013

B014. Use thread pitch, drill point, center, and radius gauges. B014

B015. Calculate speeds and feeds for machine tools. B015

**Demonstrating
Mechanical Skill with
Hand and Power Tools**

C001. Select appropriate hand tools. C001

C002. Cut stock accurately with a hand hacksaw. C002

C003. Use a file to de-burr, radius, and chamfer parts. C003

C004. Use punches and chisels properly. C004

C005. Cut internal and external threads with hand tools. C005

C006. Remove damaged screws with easy-outs. C006

C007. Use fixed and adjustable reamers. C007

C008. Thread pipe with hand tools. C008

C009. Select appropriate power tools. C009

C010. Use light-duty and heavy-duty drills. C010

C011. Use reciprocating saws, circular saws, and chop saws. C011

C012. Use hand grinders. C012

C013. Use power sheet metal shears. C013

C014. Use a bench grinder to sharpen punches, chisels, drill bits, and other cutting tools. C014

C015. Use a hydraulic press. C015

C016. Use a drill press. C016

C017. Use a band saw. C017

C018. Identify types of metals. C018

C019. Use power-driven pipe threaders. C019

Maintaining Systems

D001. Demonstrate knowledge of hydraulic system operation. D001

D002. Interpret diagrams and schematics for hydraulic systems. D002

D003. Install hydraulic system components. D003

D004. Apply preventive maintenance measures for hydraulic systems. D004

D005. Inspect and troubleshoot hydraulic systems. D005

D006. Demonstrate knowledge of pneumatic system operation. D006

D007. Interpret diagrams and schematics for pneumatic systems. D007

D008. Install pneumatic system components. D008

D009. Apply preventive maintenance measures for pneumatic systems. D009

D010. Inspect and troubleshoot pneumatic systems. D010

D011. Demonstrate knowledge of electrical system operation. D011

D012. Interpret diagrams and schematics for electrical systems. D012

D013. Install electrical system components. D013

D014. Apply preventive maintenance measures for electrical systems. D014

D015. Inspect and troubleshoot electrical systems. D015

D016. Demonstrate knowledge of mechanical system operation. D016

D017. Interpret diagrams and schematics for mechanical systems. D017

D018. Install mechanical system components. D018

D019. Apply preventive maintenance measures for mechanical systems. D019

D020. Inspect and troubleshoot mechanical systems. D020

Performing Milling Operations

- E001. Mill stock to size.** E001

- E002. Indicate a vise.** E002

- E003. Use a center finder.** E003

- E004. Drill and ream holes.** E004

- E005. Drill a bolt circle using a digital readout system.** E005

- E006. Use a rotary table.** E006

- E007. Use a dividing head.** E007

- E008. Use a boring head.** E008

- E009. Cut angles using a sine bar.** E009

Performing Turning Operations

- F001. Use carbide and HSS cutting tools.** F001

- F002. Use a three-jaw chuck.** F002

- F003. Use a four-jaw chuck.** F003

- F004. Use a collet chuck.** F004

- F005. Turn stock between centers.** F005

- F006. Use a follow rest.** F006

- F007. Use a steady rest.** F007

- F008. Cut a short taper using the compound rest.** F008

- F009. Cut a taper using the taper attachment.** F009

- F010. Use a parting tool.** F010

- F011. Use a boring bar.** F011

- F012. Cut external threads.** F012

- F013. Drill holes using straight and taper shank drills.** F013

Performing Welding Operations

- G001. Demonstrate knowledge of welding processes.** G001

- G002. Perform visual inspection of welds.** G002

- G003. Perform oxyfuel cutting operations.** G003

G004. Perform SMAW welding operations. G004

G005. Perform GMAW welding operations. G005

G006. Perform FCAW welding operations. G006

G007. Perform GTAW welding operations. G007

Working with Technical Drawings

H001. Interpret assembly drawings. H001

H002. Interpret building diagrams (including site plans). H002

H003. Develop sketches (including isometric and orthographic). H003

H004. Compute materials from drawings. H004

H005. Use a CAD program to create sketches. H005

Practicing Quality Control

I001. Apply TQM techniques. I001

I002. Demonstrate knowledge of ISO quality standards. I002

I003. Maintain inventory. I003

Exploring Careers

J001. Investigate careers in the industrial maintenance field. J001

J002. Participate in the co-curricular student organization activities J002