Appendix K

MANUFACTURING
YOUTH APPRENTICESHIP

PRODUCTION PATHWAY
ASSEMBLY AND PACKAGING (UNIT 4)

Unit 4: Production Pathway
Assembly and Packaging

Competency

1. Read technical drawings and work orders

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Review technical drawing
Gather reference materials as needed
Determine type of print and views used
Determine material specifications
Determine critical dimensions and tolerances
Analyze supplementary data
Determine product or job instructions and specifications
Interpret assembly and packaging symbols and procedures

Learning Objectives

Explain the need for technical drawings, also known as blueprints, schematics, part prints, or engineering drawings
Explain how technical drawings detail work piece design parameters, lay out and specifications
Explain how product design and production are related
Discuss different types of technical drawings
Identify terminology related to technical drawings
Describe how to interpret views, projections and elements from a technical drawing
Identify common terms, components, revisions, symbols, assembly sequence, dimensions, tolerances, scale, and list of materials from technical drawings or work orders

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

2. Interpret assembly and packaging symbols and procedures

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Interpret technical drawings accurately as needed for job task
Use appropriate terminology
Identify lines, views, symbols, and representations on the drawings
Interpret dimensions, tolerances, and scale on the drawings
Interpret threads, tapers, and shop notes on the drawings
Interpret the assembly and packaging plan from a technical drawing which includes tools, equipment, speeds, feeds, fixtures and holders as applicable

Learning Objectives

Define and explain the use of lines, views, symbols, dimensions, scale, and tolerances on technical drawings
Identify different lines by name, type, order of usage, and application such as object, hidden, center, section, dimension, extension, cutting plane, short break, long break, phantom
Demonstrate standard view placement practices
Compare pictorial format, orthographic projection, sectional views, and detail schedules
Discuss the standards for assembly and packaging document lines
Describe the standard usage of metric (SI) linear units in assembly drafting
Identify and interpret assembly drawings as to type, part name, part number, callouts, components, and part size dimensions
Determine the relationship of one part to another from assembly drawings
Determine procedure number cross-references to technical drawings

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

3. Identify set up for assembly

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Locate and review applicable technical drawings, work orders, and/or procedures for assembly processing

Plan sequencing, tools, and equipment needed for assembly

Identify set up needed

Consult with worksite professional to verify assembly schedule, deadlines, and timeframes

Learning Objectives

Describe how an assembly plan is developed from a technical drawing for process, equipment, tools, and holders

Explain how product design and the assembly are related

Identify terminology related to assembly and packaging

List characteristics of major types of assembly systems

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

4. Select tools and materials

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Select tools and assembly equipment to be used
Check assembly pieces needed against work order
Verify assembly pieces and materials meet specifications
Gather all resources needed at the workstation
Notify worksite professional of any discrepancies

Learning Objectives

List the various tools and equipment used in assembly and packaging at your worksite
Outline applications of each tool and equipment
Describe and demonstrate the safety requirements and safeguards for each tool and equipment
Explain the importance of pieces and materials meeting specifications prior to assembly

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

5. Perform safety checks

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Review assembly procedure to be used

Review safety requirements of assembly procedure

Verify safety equipment and any Personal Protective Equipment (PPE) needed for assembly process

Inspect tools and work area for safety considerations

Examine assembly equipment labeling and safeguarding

Learning Objectives

List the types of labeling used on tools and equipment at your facility to indicate whether a tool or piece of equipment is functional and safe to use

List the situations which require you to obtain help to resolve problems with equipment or production

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

6. Perform assembly set up

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Assemble and adjust tools and assembly equipment as required
Verify assembly equipment is available for use and in working order
Verify assembly equipment is current for preventative maintenance and/or calibration
Set assembly equipment parameters as required for the procedure
Stage pieces and materials for assembly

Learning Objectives

List the types of labeling used on tools and equipment at your facility to indicate whether a tool or piece of equipment is functional and safe to use
Explain the purpose and importance of preventative maintenance and calibration
List the situations which require you to obtain help to resolve problems with equipment or production

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

7. Verify assembly set up

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Verify set up meets assembly requirements and product specifications
Examine first assembled final product for visual and/or dimensional specification
Make adjustments to ensure final assembly meets specification if needed
Verify repeatability of set up if applicable
Document assembly set up procedure for repeatability if applicable
Document start up/set up procedure if required

Learning Objectives

Define repeatability
Describe the importance of repeatability in manufacturing

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

8. Perform assembly

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Operate assembly equipment safely in the manner required for the job task
Operate assembly equipment according to machine requirements
Wear the required Personal Protective Equipment (PPE) at all times as required for the operation of the equipment
Monitor equipment for safe operation while operating
Inspect final assembled product
Make adjustments to ensure assembled product meets specification if needed
Document assembly procedure

Learning Objectives

Describe the assembly procedure
Describe advantages and limitations of automated assembly
List the safety rules associated with automated production and assembly systems
List the situations which require you to obtain help to resolve problems with equipment or production

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

9. Perform quality checks

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Test assembled product for function and/or compliance
Label assembled products for compliance or non-compliance
Document quality control checks

Learning Objectives

Describe the uses of assembly and packaging data
List the quality checks performed as part of the assembly and packaging process
Explain why products are tested for quality and function
Explain why labeling and documentation are part of the quality check

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency
10. Build packaging

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Verify testing of assembled product(s) is complete
Identify package needed
Assemble package
Inspect package
Stage finished package

Learning Objectives

Identify the federal agencies that regulate packaging
Identify the basic aspects of packaging regulated by federal agencies
Explain why it is important to inspect the package after construction
Explain how product design and the packaging are related
List the situations which require you to obtain help to resolve problems with equipment or production

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

11. Package product

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Verify proper packaging procedure
Retrieve packaging
Use protective packaging materials as required
Use packaging methods that keep returns and claims for damaged and improperly packaged goods to a minimum
Place final compliant product in packaging
Seal package
Inspect sealed packaging for all relevant information against the work order
Handle package as required to prevent damage
Labeling meets regulatory and safety regulations
Package meets package and shipping specifications

Learning Objectives

Explain how customer shipping instructions determine packing requirements
Explain how packing materials determine packing requirements
Compare packing materials to determine the safest and most cost-effective method of shipping
List the situations which require you to obtain help to resolve problems with equipment or production

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

12. Process packaging documents

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Verify packaging documentation such as manuals, packing slips, warranties, inspection labels, start up instructions, are included and match the final packaged product as required

Apply all required documentation such as shipping tags as required

Handle package as required to prevent damage

Communicate package availability to proper parties in a timely manner

Documentation is legible

Documentation is complete

Documentation is in appropriate format

Documentation is stored or forwarded as required

Package is correctly stored or staged

Learning Objectives

Describe the importance of documenting the packaging process

State the purpose of an inspection label

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency
13. Clean up

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Select appropriate cleaning tools and equipment
Clean assembly and packaging tools/equipment as required
Clean work area as required
Store tools in proper location
Store materials in safe manner
Identify unsafe conditions and reports them promptly
Take corrective action to correct unsafe conditions
Ensure that workstation is clean and clear of safety hazards
Ensure workstation is organized for efficiency
Dispose of waste appropriately as required

Learning Objectives

Describe the cleaning procedures and materials used for the specific processes you perform

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency
14. Monitor equipment for correct operation

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Review equipment quality measures for trends and problems as required
Compare current equipment performance to optimal equipment operations on a regular basis
Report any noted deviations from expected performance
Ensure that equipment is properly labeled and pulled from production use if inoperative
Assist worksite professional to investigate abnormal equipment conditions in a timely manner
Assist worksite professional to follow up on repaired equipment to ensure that that corrective action solved the problem
Document all monitoring activities

Learning Objectives

Explain the meaning of common alarms on equipment at your facility
Explain how to read and review repair history records
Describe how trends for malfunctioning equipment might appear in production records
List the tools and equipment at your facility that must be monitored and maintained
Define Total Productive Maintenance (TPM)
Describe common electrical systems reliability issues including power supply connections, operations, series and parallel circuit function, circuit breaker function, electric motor control, and power overload
Describe common pneumatic system reliability issues including pressure gage readings, conductors, connectors, seals, gaskets, packing, quick-connect fittings, pneumatic cylinder and motor operations, air muffler operations, actuator power output, and pressure regulator operations
Describe common hydraulic system reliability issues including seals, gaskets, packing, and hydraulic fluids
Describe common automated machine reliability issues including computerized control processes, logic control circuits, solenoid-operated fluid power valves, electromechanical limit switches, time delay devices, manual controls, and interlock circuits

Comments:

Unit 4: Production Pathway
Assembly and Packaging

Competency

15. Document equipment use and/or operational problems

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Verify all internal and external communication with appropriate parties in a timely manner
Communicate maintenance and repair needs clearly
Use the correct reporting formats for communication
Document use, maintenance, and repair activities accurately
Report back and document any maintenance and repair issues in a timely manner
Maintenance communication is timely and accurate
Maintenance communication is documented

Learning Objectives

Explain the uses of equipment data
Discuss how to schedule repair and maintenance functions with respect to production requirements and production levels
Explain how communication for repair and maintenance issues demonstrates a knowledge of customer and business needs
List the parties that need to be involved of repair and maintenance issues
Describe the importance of documenting communications

Comments: