

Furniture Manufacturer Apprenticeship Standard

Furniture CNC Specialist Modules of Assessment

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Introduction

It is recognised that a Furniture Maker is likely to work in a variety of different roles and this standard allows for the apprentice to demonstrate a full range of skills across a variety of job roles within the occupation. This document covers the requirements for Furniture CNC Specialist.

All apprentices must complete the core requirements (see Assessment Modules – Core Requirements).

The employer, apprentice and training provider should undertake a programme that will meet the Standard Criteria to ensure all areas of the outcomes are covered in the apprentice job role.

Training providers should be evaluated and approved by the Assessment Organisation using appropriate methods.

Requirements

A Furniture CNC Specialist produces components for furniture using CNC machines. This includes setting up, operating and maintaining CNC machines and saws to cut, plane, shape and sand all types of wood and man-made wood components. They have an interest in computers and machines. They need to be able to work using their own initiative and motivate themselves. Furniture CNC Specialists work in environments where an ability to work to targets in terms of output and quality standards is essential. These can be wide ranging from small workshops to large scale factories. This programme is designed to give an excellent grounding for anyone who wants a career working with CNC machines.

In order to ensure sufficient flexibility to meet the needs of the industry whilst maintaining the rigour of every single apprenticeship within it, Furniture CNC Specialists will be able to undertake all the mandatory requirements and three of the optional requirements.

Mandatory

YOU WILL KNOW HOW TO AND BE ABLE TO

Essential	Measure and Mark Out	Measure and mark out materials to specification within the acceptable tolerances following standard operating procedures.
	Tooling	Select, prepare and maintain CNC/NC tooling.
	Operate CNC/NC Machinery and Equipment	Operate CNC/NC machinery and equipment to meet company requirements. Prepare tools and equipment including tooling technology and calibration of measuring equipment.
	CNC/NC Processing	Understand the principles of CNC/NC processing. This includes the capabilities of machinery used, how the machinery operates, principles of machinery and the manufacturing processes used in your organisation.

	Mechatronics System Principles and Fault Finding	Understand mechatronics systems principles and fault finding. This includes diagnosing simple faults, understanding total production maintenance, engineered systems, and the basic principles of pneumatic, hydraulic, mechanical and electrical actuation systems.
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Optional

YOU WILL KNOW HOW TO AND BE ABLE TO

Preparation	Methods of Measurement	Inspect and use measuring equipment, keep tools and equipment clear of debris and dirt.
	Jigs and Templates	Use and maintain jigs and templates for furniture production. <i>Jigs are used to ensure repeatability and accuracy in the production of furniture. These can be hand held or mounted on workbenches.</i>
	Sanding	Sand materials for preparation prior to assembly, post-assembly and de-nibbing. Understand grit sizes and the process of sanding. This includes the use of wide belt sander, overhead narrow belt sander, disc sander, bobbin sander, linisher and profile sander.
	Edge Banding	Carry out the edge-banding process following standard operating procedures. This includes colour matching, timber and PVC lippings, calibration and finishing techniques.
	Planing	Prepare, set up and operate planes. This includes surface planer and thicknesser (can be a combined machine) and four sided planer and moulder (for planed all round).
	Joints	Prepare, set up and operate CNC/NC machinery to produce jointed wood and wood-based products. This includes chisel morticer, chain morticer, slot morticer, dovetailer, vertical spindle moulder, stair router, single-end tenoner, double-end tenoner, round-end tenoner, dowler and router.
	Assembly	Assemble components of furniture following standard operating procedures. Understand the sequence of assembly and why this is important.

Assessment

On Programme

The suggested training and assessment for the apprenticeship is based on the 'Furniture Manufacturer Assessment Modules,' which detail the training modules that should be completed for the core requirements and each occupational area.

On-going reviews will be completed by the provider and employer during the apprenticeship but will not contribute to the end point assessment.

End Point Assessment

The independent assessment organisation is responsible for carrying out the end point assessment. When the apprentice, employer and provider have determined that the

apprentice is ready to complete the apprenticeship they will hold a final review to go through the portfolio of work. The apprentice will need to have completed the Level 1 Functional Skills in English and Maths and taken the test for the Level 2. This will act as a gateway to the end point assessment.

Portfolio of Evidence – Guidance

Evidence should show that the apprentice can complete all of the learning outcomes for each core module and options taken.

Types of Evidence:

Evidence of performance should be demonstrated by activities and outcomes, and should be generated in the workplace only, unless indicated under potential sources of evidence (see below). Evidence of knowledge can be demonstrated through performance or by responding to questions.

Quantity of Evidence:

Evidence should show that the apprentice can meet the requirements of the modules in a way that demonstrates that the standards can be achieved consistently over an appropriate period of time.

Potential Sources and Types of Evidence:

The main source of evidence for each module will be observation of the learner's performance and knowledge demonstrated during the completion of the module. There must also be evidence of using questioning and examination of work products. The following can be used as supplementary physical or documentary evidence:

- Responses to oral or written questioning
- Professional discussion
- Personal statements/reflective accounts
- Assessment records
- Case studies
- Evidence of feedback given
- Products of learner's work
- Expert witness testimony

Please Note that photocopied or downloaded documents are not normally acceptable evidence unless accompanied by a record of a professional discussion or assessor statement confirming learner knowledge of the subject.

Certification

Certification is claimed at the end of the apprenticeship when all components are complete.

Appeals

In the event of an appeal against the grade awarded, the Assessment Organisation will carry out an independent review of the evidence to confirm or modify the grade.

Module 1 – Measure and Mark Out

What is required

Measure and mark out materials to specification within the acceptable tolerances following standard operating procedures.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. check and calibrate marking, measuring tools and ancillary equipment following standard operating procedures
7. use marking and measuring tools and ancillary equipment following standard operating procedures and manufacturers' instructions
8. mark out from setting out details and cutting lists following standard operating procedures
9. describe relevant health and safety responsibilities
10. describe the meaning of terms used in specifications
11. describe how to check equipment is set up and is in good working order
12. describe how to check materials and the common faults that can occur
13. describe how to read cutting lists
14. describe how to mark out components from cutting lists
15. describe calibration and why this is important
16. describe how to use marking, measuring tools and ancillary equipment

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, Tools and Equipment	Hand tools Measuring devices Markers

	Staff Tri-squares Marking gauges Lasers
Materials	Timber Fabrics Metal Glass Manmade composites Foam Manufactured board
Calibrate	Measuring devices (tools and equipment) Tolerances
Faults	Material Jigs and templates Equipment

Assessment:

Observed Assessment.

Module 2 – Tooling

What is required

Select, prepare and maintain CNC/NC tooling.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. select appropriate tool for material to be machined to specification
6. check the tools used are to the required sharpness following standard operating procedures
7. prepare tools for use following standard operating procedures
8. change tools as required following standard operating procedures and manufacturers' instructions
9. maintain tools and tool holders following standard operating procedures
10. describe relevant health and safety responsibilities
11. describe the meaning of terms used in specifications
12. describe how to check equipment is set up and is in good working order
13. describe the different tools available and their uses
14. describe the tolerances allowed
15. describe how to check that tools are to the required sharpness
16. describe how to prepare tools
17. describe how to change tools
18. describe how to maintain tools and tool holders

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, tools and equipment	Cutters Blades Drill bits Saws

	Router Blocks Chisels Collets Tool holders Cleaners Sharpeners
Faults/Damage	Bluntness Chips Burns Smell Noise Resin Tool damage Material damage

Assessment:

Observed Assessment.

Module 3 – Operate CNC/NC Machinery and Equipment

What is required

Operate CNC/NC machinery and equipment to meet company requirements. Be able to prepare tools and equipment including tooling technology and calibration of measuring equipment.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is calibrated, set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. load programme to meet specification following manufacturer's instructions and standard operating procedures
7. prepare and set up machinery following manufacturers' instructions and standard operating procedures
8. conduct a simulation/test run to prove programme and rectify any problems following manufacturers' instructions and standard operating procedures
9. operate and monitor the machinery and quality of the finished product following standard operating procedures and manufacturers' instructions
10. maintain machinery following standard operating procedures and manufacturers' instructions within the limits of your responsibility
11. pass onto following stage following standard operating procedures
12. describe relevant health and safety responsibilities
13. describe the meaning of terms used in specifications
14. describe how to check equipment is set up and is in good working order
15. describe how to check materials and the common faults that can occur
16. describe how to load programmes
17. describe how to prepare and set up machines
18. describe how to conduct a simulation/test run to prove programmes
19. describe how to operate and monitor the machinery and quality of the finished products
20. describe how to maintain machinery and the limits of your responsibility
21. describe how to rectify any problems

Range:

Health and Safety	PPE Safe System of Work Risk Assessment
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	Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, Tools and Equipment	CNC Cutters Blades Drill bits Saws Router Blocks Chisels Collets Tool holders Cleaners Sharpeners
Materials	Timber Sheet materials Manufactured boards Fabrics Foams Veneers
Faults	Incorrect programme Tooling Materials Electrical or mechanical machine faults Operator Positioning Bluntness Chips Burns Smell Noise Resin Tool damage Material damage

Assessment:

Observed Assessment.

Module 4 – CNC/NC Processing

What is required

Understand the principles of CNC/NC processing. This includes the capabilities of machinery used, how the machinery operates, principles of machinery and the manufacturing processes used in your organisation.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. describe relevant health and safety responsibilities
3. describe the capabilities of the machines used in your organisations
4. describe how the machine operates and the different services required
5. describe the basic principles of CNC/NC machinery
6. describe the different types of CNC/NC machinery available
7. describe the manufacturing process used in your organisation

Range:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Services	Electricity Air Water Network
Principles	Axis Reference points Calibration
Types of machinery	Point to point Matrix Laser Water jet
Process	Drawings/CAD Programmes Network Products

Assessment:

Portfolio of evidence.

Module 5 – Mechatronics System Principles and Fault Finding

What is required

Understand mechatronics systems principles and fault finding. This includes diagnosing simple faults, understanding total production maintenance, engineered systems, and the basic principles of pneumatic, hydraulic, mechanical and electrical actuation systems.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. diagnose simple faults on control and actuation systems
3. describe relevant health and safety responsibilities
4. describe the importance of basic 'Total Production Maintenance' and autonomous maintenance
5. describe the basic engineered system of the machines used in your organisation
6. explain the operation and application of sensors
7. explain typical connections and tuning arrangements for sensors
8. explain the action and importance of signal conditioning systems
9. explain the importance of terms applied to sensors used in an industrial system
10. describe the basic principles of pneumatic, hydraulic, mechanical and electrical actuation systems
11. describe the basic principles of embedded control
12. describe basic fault finding principles on pneumatic, hydraulic, mechanical and electrical actuation systems

Range:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
TPM/AM	8 pillars of TPM Schedules OEE
Engineering systems	Control systems
Sensors	Mechanical Proximity Capacitive Inductive
Embedded control	Flow charts PLC Field bus systems
Fault finding principles	Error Code Identification Reporting procedures Personal responsibilities Bluntness

	<ul style="list-style-type: none">ChipsBurnsSmellNoiseResinTool damageMaterial damage
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Assessment:

Portfolio of evidence.

Module 6 – Methods of Measurement

What is required

Inspect and use measuring equipment, keep tools and equipment clear of debris and dirt.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. check measuring equipment is stored safely and maintained
7. clean measuring equipment of debris, dirt, and other materials that affect its accuracy following standard operating procedures
8. check measuring equipment regularly following standard operating procedures
9. use measuring equipment following standard operating procedures
10. describe relevant health and safety responsibilities
11. describe the meaning of terms used in specifications
12. describe how to check equipment is set up and is in good working order
13. describe how to check materials and the common faults that can occur
14. describe how to store measuring equipment safely
15. describe how to maintain measuring equipment
16. describe how to clean measuring equipment
17. describe how to check measuring equipment and state the intervals required
18. describe how to use measuring equipment
19. describe calibration methods and why this is important

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence COSHH
Specifications and Requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, Tools and Equipment	Measuring equipment Cleaning equipment

	Calibration tools
Materials	Cleaners
Faults	Measurements Dirt and debris

Assessment:

Observed Assessment.

Module 7 - Jigs and Templates

What is required

Use and maintain jigs and templates for furniture production. Jigs are used to ensure repeatability and accuracy in the production of furniture. These can be hand held or mounted on workbenches.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is calibrated, set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. use jigs and templates to specification following standard operating procedures
7. handle jigs and templates in ways that protect them from damage following standard operating procedures
8. store completed jigs and templates under suitable conditions to keep them in good order following standard operating procedures
9. routinely examine jigs and templates for signs of damage following standard operating procedures
10. identify damage that affects use of jigs or templates following standard operating procedures
11. clean jigs and templates using suitable methods and equipment following standard operating procedures
12. remove and report jigs and templates which are damaged beyond use following standard operating procedures
13. describe relevant health and safety responsibilities
14. describe the meaning of terms used in specifications
15. describe how to check equipment is set up and is in good working order
16. describe how to check materials and the common faults that can occur
17. describe how to protect jigs and templates from damage
18. explain why it is important to examine jigs and templates on a routine basis
19. describe damage that can occur to jigs and templates used
20. describe tolerance levels when assessing if jigs or templates are beyond use

Range:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
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Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, Tools and Equipment	Hand tools Power tools Measuring equipment Cleaning products
Materials	Jigs Templates
Faults	Size Shape Wear and tear

Assessment:

Observed Assessment.

Module 8 – Sanding

What is required

Sand materials for preparation prior to assembly, post-assembly and de-nibbing.
Understand grit sizes and the process of sanding.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. sand wooden components using appropriate grade sizes and blocks following standard operating procedures
7. clean wooden components between sanding following standard operating procedures
8. scrape tight corners following standard operating procedures
9. raise fibres of the grain following standard operating procedures
10. describe relevant health and safety responsibilities
11. describe the meaning of terms used in specifications
12. describe how to check equipment is set up and is in good working order
13. describe how to check materials and the common faults that can occur
14. describe when machine and hand sanding is appropriate
15. describe how to recognise different grades of abrasives and their uses
16. state the order different abrasives grades need to be used
17. describe faults/defects that can occur and how to recognise and how these can be rectified during the production process
18. explain why it is important to sand with the grain
19. describe how to prevent the appearance of a raised grain
20. describe how to sand different components
21. describe what de-nibbing is and how this is done
22. describe the different pads available and their uses
23. describe fillers used within the preparation process
24. describe different machinery and equipment to use and why

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
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	COSHH
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Materials	Timber Fabrics Metal Glass Manmade composites Foam Manufactured board
Faults	Grade Materials

Assessment:

Observed Assessment.

Module 9 - Edge Banding

What is required

Carry out edge-banding process following standard operating procedures. Edge banding is the process of applying a trim or edge to the piece of furniture to make it neat and aesthetically pleasing.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults
6. prepare adhesives and components for application following standard operating procedures
7. position edge finishes to specification following standard operating procedures
8. apply edge finishes to products to specification following standard operating procedures
9. trim edge finishes to specification following standard operating procedures
10. check and finish components to specification following standard operating procedures
11. process to next stage
12. describe relevant health and safety responsibilities
13. describe the meaning of terms used in specifications
14. describe how to check equipment is set up and is in good working order
15. describe how to check materials and the common faults that can occur
16. describe adhesives and how to prepare these
17. describe curing times and process
18. describe different edge finishes available, their uses and how to apply these
19. describe the trimming process
20. describe the quality checks that need to be carried out and why

Range:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info

	Work tickets
Machinery, Tools and Equipment	Edge banders Measuring Cutting equipment Cramps Jigs
Materials	Adhesives Edge Materials
Faults	Machinery, tools and equipment Materials Components
Edgebanders	Single and/or double sided Iron CNC Laser
Edge Treatment Finishes	Solid lippings Profiled foil Laminates Veneers Edging tape

Assessment:

Observed Assessment.

Module 10 - Planing

What is required

Prepare, set up and operate planes. This includes surface planer and thicknesser (can be a combined machine) and four sided planer and moulder (for planed all round).

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. prepare and set up the machine following manufacturers' instructions and standard operating procedures
7. set up appropriate tooling to meet requirements following manufacturers' instructions and standard operating procedures
8. operate machinery and monitor the machinery and quality of the finished product following standard operating procedures and manufacturers' instructions
9. use and maintain hand ancillary equipment
10. maintain machinery following standard operating procedures and manufacturers' instructions within the limits of your responsibility
11. describe relevant health and safety responsibilities
12. describe the meaning of terms used in specifications
13. describe how to check equipment is set up and is in good working order
14. describe how to check materials and the common faults that can occur
15. state tolerances allowed
16. describe how to prepare and set up machinery
17. describe how to set up appropriate tooling
18. describe how to operate and monitor the machinery and quality of the finished product
19. describe how to use and maintain hand ancillary equipment
20. describe how to maintain machinery and the limits of your responsibility

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists

	Job sheets Batch info Work tickets
Machinery, Tools and Equipment	Surface planer and thicknesser Four sided planer and moulder Cutter blocks Knives Blades
Materials	Timber
Faults	Materials Machinery Tools Equipment as before, noise, etc

Assessment:

Observed Assessment.

Module 11 - Joints

What is required

Joint components and understand the principles of joints used in making furniture.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. identify joints required and type of joint to be made following standard operating procedures
7. mark out components following standard operating procedures
8. set machinery, jigs and equipment following standard operating procedures and manufacturers' instructions
9. cut joints to within required tolerances following standard operating procedures
10. check joints fit to specification following standard operating procedures
11. describe relevant health and safety responsibilities
12. describe the meaning of terms used in specifications
13. describe how to check equipment is set up and is in good working order
14. describe how to check materials and the common faults that can occur
15. describe different types of joints and their uses
16. describe how to mark out components and acceptable tolerances
17. describe how to set up machinery, jigs and templates
18. describe how to cut joints and tolerances allowed
19. describe how to check joints fit for accuracy and why this is important

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets
Machinery, Tools and Equipment	Wood working machinery CNC Machinery

	Hand tools Electric and air powered tools Hand crafting tools Measuring devices
Materials	Timber Fabrics Metal Glass Manmade composites Foam Manufactured board
Faults	Materials Fit Cut
Joints	Scarf, rub joints, knock-down, dove-tail, mitred dove-tail, mortise and tenon, mitred tenon, bridle, lap, mitre, tongue and groove, loose tongue, housing, dowel, biscuit and butt joints

Assessment:

Observed Assessment.

Module 12 - Assembly

What is required

Assemble components of furniture. Understand the sequence of assembly and why this is important.

Learning Outcomes:

The learner can:

1. comply with health and safety requirements and procedures at all times
2. obtain specifications and requirements of the items to be produced following standard operating procedures
3. obtain equipment and materials required to carry out the job following standard operating procedures
4. check equipment is set up correctly and in good working order following standard operating procedures and any manufacturer's instructions
5. check all materials required are to specification and free from faults following standard operating procedures
6. prepare to assemble, mark components to specification following standard operating procedures
7. assemble routine components in position following standard operating procedures
8. secure components to specification following standard operating procedures
9. finish assembly to specification following standard operating procedures
10. check finished assembly meets specification following standard operating procedures
11. proceed to next stage
12. describe relevant health and safety responsibilities
13. describe the meaning of terms used in specifications
14. describe how to check equipment is set up and is in good working order
15. describe how to check materials and the common faults that can occur
16. describe assembly methods and techniques
17. describe quality control procedures and recognition of assembly defects
18. describe handling equipment and procedures
19. describe preparation methods and techniques
20. describe tool and equipment care and control procedures

Range/Scope:

Health and Safety	PPE Safe System of Work Risk Assessment Training documents / evidence
Specifications and requirements	Specification sheet Work to lists Job sheets Batch info Work tickets

Machinery, Tools and Equipment	Power tools Hand tools Measuring equipment Cramps Jigs and templates
Materials	Fixings Adhesives Components
Faults	Machinery, tools and equipment Materials
Marking	Face sides Sequence
Secure components	Gluing Fixing Cramping

Assessment:

Observed Assessment.