

Model Answers

Domain	Furniture Operations			
Unit	16235 v4	Demonstrate knowledge of manufactured boards used in furniture operations	Level 2	Credits 4

Assessment Information

Entry Information

There are no pre-requisite requirements for this unit.

Required Evidence

This Assessment Guide, that includes the following completed assessment tasks:

- » Questions
- » Observation Checklist

Appeals

The candidate must understand the appeals process before carrying out this assessment.

Information about Competenz's assessment appeals process can be found on the Assessors and Moderators page of Competenz's website www.competenz.org.nz.

Assessment Requirements

This Assessment Guide is designed to help you provide evidence of your skills and knowledge required by this unit standard.

Before you begin

Read through the assessment requirements yourself. Talk with your Assessor if there is anything you don't understand.

Meet with your Assessor to plan your assessment. Your Assessor will:

- » talk you through this Guide, and discuss when and how you will be assessed.
- » check you are ready to begin this assessment.

What you need to do

1. Complete the following assessment tasks:

Questions	Answer questions about manufactured boards used in furniture operations.
Observation Checklist	Be observed identifying manufactured boards. This will involve: <ul style="list-style-type: none">» Identifying manufactured board samples» Identifying manufactured boards used in furniture

Note: Your Assessor may choose someone to observe your work. This person must have expertise in manufactured boards used in furniture operations and could be someone you report to, your trainer, or a supervisor or manager who works with you regularly.

2. You may wish to provide additional supporting evidence that proves you have the knowledge and skills required by this unit. Additional evidence may include, for example, workplace documentation you have used and/or completed, training records, photos, screenshots, printouts, videos, voice recordings.
3. When you have completed all assessment tasks, complete the 'Candidate evidence check' at the end of this Guide.
4. When you are sure you have completed and/or attached everything, contact your Assessor or Account Manager to arrange next steps.

Conditions

- » Your evidence must clearly show you have knowledge of manufactured boards used in furniture operations.
- » Complete all assessment tasks yourself. Use your own words when answering questions.
- » It is expected that you will have had learning / experience of manufactured boards used in furniture operations on more than one occasion, before you are formally assessed.
- » It is likely that you will have already been observed manufactured boards used in furniture operations on more than one occasion, before you are formally assessed.
- » All tasks you carry out for this assessment must be completed following workplace procedures, and comply with organisational and legislative (legal) requirements.
- » This unit standard may be assessed against on-job or off-job.

References

The assessment tasks must be completed in accordance with the following reference texts:

- » Jackson, A. and Day, D., (2005) *Collins Complete Woodworker's Manual*, London, England: HarperCollins, which is available at: <http://www.amazon.com>

Any queries, contact: Competenz, PO Box 9005, Newmarket, Auckland 1149. Ph. 0800 526 1800

Unit Standard Evidence Map

Unit 16235 v4	Demonstrate knowledge of manufactured boards used in furniture operations	Level 2	Credits 4
Outcomes and Evidence Requirements		Evidence	No.
<p>Outcome 1: Identify and explain the construction of manufactured boards used in furniture operations.</p> <p>Range: three of – laminated plastics, particle board, medium density fibre board (MDF), plywood, hardboard, pre-finished board.</p>			
1.1	Manufactured board samples are identified and their composition explained in accordance with the reference text.	Questions Observation Checklist	1 1,2,3
1.2	The manufacturing process for manufactured board samples identified in evidence requirement 1.1 is explained in accordance with the reference text.	Questions	2
1.3	Manufactured boards are identified in three items of assembled furniture available at the work or training site in accordance with the reference text.	Observation Checklist	4
<p>Outcome 2: Explain the advantages, disadvantages, and suitable end uses of manufactured boards used in furniture operations.</p> <p>Range: three of – laminated plastics, particle board, MDF, plywood, hardboard, pre-finished board.</p>			
2.1	Three advantages, and three disadvantages, of manufactured boards used in furniture operations are explained in accordance with the reference text.	Questions	3
2.2	Two suitable end uses of manufactured boards are explained in accordance with the reference text.	Questions	4
<p>Outcome 3: Describe transportation, handling, and storage requirements of manufactured boards.</p>			
3.1	Transportation of manufactured boards is described in terms of requirements to avoid moisture, edge, and warping damage.	Questions	5
3.2	Unpacking of manufactured boards upon arrival is explained in terms of requirements to minimise damage. Range evidence of two requirements is required.	Questions	6
3.3	Injuries that may occur when lifting and moving manufactured boards are identified and explained in terms of minimising the potential for these injuries to occur. Range evidence of two potential injuries is required.	Questions	7
3.4	Storage of manufactured boards is explained in terms of requirements to ensure they are not distorted in any way. Range evidence of five storage requirements is required.	Questions	8

Questions

Answer the following questions about manufactured boards used in furniture operations.

Use your own words. You can answer the questions in writing, or give your answers verbally to your Assessor who will write down what you say. You may need to arrange this in advance with your Assessor.

Draw pictures or diagrams to support your answers if you wish.

Your Assessor may ask you additional questions to check your knowledge and understanding.

Judgement statements

- The candidate's written and/or verbal responses support their competency.
- All answers are in accordance with the reference text.

Your name	
Workplace	
Answers written by: (Tick one)	<input type="checkbox"/> Candidate <input type="checkbox"/> Assessor <input type="checkbox"/> Other (please write):

	<input checked="" type="checkbox"/>												
<p>1. For at least three (3) of the following manufactured boards, explain what they can be made of. <input checked="" type="checkbox"/></p> <p>Assessor</p> <p>This question supports E.R. 1.1.</p> <p>Judgement statement</p> <ul style="list-style-type: none"> <input type="checkbox"/> The candidate correctly explains what three of the manufactured boards listed can be made of. <input type="checkbox"/> The candidate's answer is in accordance with the reference text. <p>Example answers</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="background-color: #cccccc;">Board</th> <th style="background-color: #cccccc;">Composition</th> </tr> </thead> <tbody> <tr> <td>Laminated plastics</td> <td>Formica is made out of layers of paper impregnated with resin with a decorative layer on the top</td> </tr> <tr> <td>Particle board</td> <td>Irregular shaped particles of wood (chips) and resin</td> </tr> <tr> <td>Medium density fibre board (MDF)</td> <td>Made from chips that are refined into individual fibres mixed with resin and waxes.</td> </tr> <tr> <td>Plywood</td> <td>Thin sheets of wood veneer and glue</td> </tr> <tr> <td>Hardboard</td> <td>Made from fine chips compressed using high pressure and temperature with natural resins</td> </tr> </tbody> </table>	Board	Composition	Laminated plastics	Formica is made out of layers of paper impregnated with resin with a decorative layer on the top	Particle board	Irregular shaped particles of wood (chips) and resin	Medium density fibre board (MDF)	Made from chips that are refined into individual fibres mixed with resin and waxes.	Plywood	Thin sheets of wood veneer and glue	Hardboard	Made from fine chips compressed using high pressure and temperature with natural resins	
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Pre-finished board	Melamine is made from thin plastic sheet applied to the substrate							
2.	For each type of board explained in question 1, explain at least four steps in their manufacturing process.	☑						
<p>Assessor</p> <p>This question supports E.R. 1.2.</p> <p>Judgement statement</p> <p><input type="checkbox"/> The candidate correctly explains at least four steps in the manufacturing process for each type explained in question 1.</p> <p><input type="checkbox"/> The candidate's answer is in accordance with the reference text.</p> <p>Example answers</p>								
<table border="1"> <thead> <tr> <th>Board</th> <th>Manufacturing process</th> </tr> </thead> <tbody> <tr> <td>Laminated plastics</td> <td> <p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Bottom kraft paper layers are impregnated with phenolic resins • A sheet is printed with colours and designs - impregnated with melamine formaldehyde resin. • A clear sheet of alpha cellulose is impregnated with melamine formaldehyde resin. • Sheets are then dried • Sheets are then cut and laid up to desired thickness with the clear cellulose layer on top, underneath of that is the decorative layer, underneath of those are the layers of kraft paper • Layered sheets are then pressed thermosetting them into one single, rigid sheet • Dry sheet is cut into desired size and shape • May also be bonded to a wood panel or metal. </td> </tr> <tr> <td>Particle board</td> <td> <p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs sawn into short lengths and debarked • Material is fed into flakers • Flakes are dried • Flakes mixed with resin </td> </tr> </tbody> </table>			Board	Manufacturing process	Laminated plastics	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Bottom kraft paper layers are impregnated with phenolic resins • A sheet is printed with colours and designs - impregnated with melamine formaldehyde resin. • A clear sheet of alpha cellulose is impregnated with melamine formaldehyde resin. • Sheets are then dried • Sheets are then cut and laid up to desired thickness with the clear cellulose layer on top, underneath of that is the decorative layer, underneath of those are the layers of kraft paper • Layered sheets are then pressed thermosetting them into one single, rigid sheet • Dry sheet is cut into desired size and shape • May also be bonded to a wood panel or metal. 	Particle board	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs sawn into short lengths and debarked • Material is fed into flakers • Flakes are dried • Flakes mixed with resin
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Particle board	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs sawn into short lengths and debarked • Material is fed into flakers • Flakes are dried • Flakes mixed with resin 							

		<ul style="list-style-type: none"> • Flake formed into matts • Matts are hot pressed into boards • Boards are sanded and trimmed • Product graded and packaged 	
	Medium density fibre board (MDF)	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs are debarked • Feed into chipper • Chips are washed • Chips are refined • Resin and wax added • Material dried • Formed into matt • Matts are hot pressed into boards • Boards sanded and trimmed • Boards graded and packaged 	
	Plywood	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs debarked • Veneer peeled • Veneer clipped • Veneer dried • Glue added/spread • Veneers laid up • Boards are pressed • Trimmed/sanded/packageged 	
	Hardboard	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Logs/wood is debarked • Turned into chips • Chips are cooked under heat and pressure • Chips are refined into fibres • Formation of felting of the fibre to form a matt • Matt pressed under heat to form boards • Boards are humidified • Trimmed to size 	

Pre-finished board	<p>Any four of the following and must be in manufacturing sequence.</p> <ul style="list-style-type: none"> • Substrate is selected • Substrate is prepared for attachment of overlay • Glue/resin added to substrate (in case of melamine the overlay is impregnated with the resin) • Overlay is positioned on to substrate • Pressed under heat and pressure • Boards cut to size 	
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3. For three (3) of the following manufactured boards, name three (3) advantages and three (3) disadvantages.

Assessor

This question supports E.R. 2.1.

Judgement statement

- The candidate correctly names at least three advantages and three disadvantages for three of the manufactured boards listed.
- The candidate's answer is in accordance with the reference text.

Example answers

Board	Advantage	Disadvantage
Laminated plastics	<p>Variety of surface finishes</p> <p>Hard wearing surface</p> <p>Good machinability</p> <p>High level of UV and colour stability</p> <p>Weather resistant</p> <p>Long lasting</p> <p>Doesn't require painting</p> <p>Low maintenance</p>	<p>Hard on tools and equipment</p> <p>No UV protection</p> <p>Hot and cold can create expansion problems</p> <p>Prone to stress and delamination</p>
Particle board	<p>Relatively inexpensive</p> <p>Relatively light in weight</p> <p>Availability</p> <p>Variety</p>	<p>Due to the porous structure, the edges require special treatment</p> <p>Corners tend to flake</p> <p>Cannot support heavy loads</p>

		<p>Prone to damage from moisture and humidity</p> <p>Low life, low durability</p>
Medium density fibre board (MDF)	<p>Easily moulded</p> <p>Available in various thicknesses</p> <p>Stable due to lack of grain direction</p>	<p>Edges/corners easily damaged</p> <p>Easily affected by moisture</p> <p>Cannot handle heavy weight</p> <p>Produces large amount of dust when being cut</p>
Plywood	<p>There is little warping or shrinkage</p> <p>Strong in both directions</p> <p>Can be bent to form curved components</p>	<p>Edges require some form of treatment</p> <p>Difficult to work by hand due to the alternating grain pattern</p> <p>Easily discoloured</p> <p>Easily absorbs water causing it to bubble or delaminate</p>
Hardboard	<p>The sheets are light and extremely strong and flexible</p> <p>Simple even curves can be formed easily</p> <p>Variety of boards depending on usage</p>	<p>More absorbent than solid timber</p> <p>Dulls tools quickly due to its abrasive nature</p> <p>Colour is unattractive</p>
Pre-finished board	<p>Various colours available</p> <p>Various grains available</p> <p>Available in various thicknesses</p>	<p>Edges of substrate needs to be edge-banded or finely sanded</p> <p>Weak</p> <p>Water and moisture make it swell</p> <p>Rough surface if not finished with a veneer</p>

4. Explain two (2) common end uses for any three of the following manufactured boards.

Assessor

This question supports E.R. 2.2.

Judgement statement

- The candidate correctly explains two common end uses for any three of the manufactured boards listed.
- The candidate's answer is in accordance with the reference text.

Example answers

Board	Common End Use
Laminated plastics	Bench tops Desk tops Counter tops
Particle board	Substrate for laminated plastic Substrate for veneer boards
Medium density fibre board (MDF)	Carcase construction e.g. shelving, ends, tops As a substrate for veneering laminated plastic, vinyls and melamine
Plywood	Carcase backs Drawer bottoms Bending
Hardboard	Drawer bottoms Carcase backs
Pre-finished board	Furniture carcase material Drawer fronts and door panels

5. Explain how the following types of damage can be avoided when transporting manufactured boards.

Assessor

This question supports E.R. 3.1.

Judgement statement

- The candidate correctly explains how the following types of damage can be avoided when transporting manufactured boards.

Example answers

Damage type	Explanation of prevention
Moisture damage	Boards should be adequately protected by a waterproof covering during transportation
Edge damage	Edge protection should be provided by using protective corners or casings to avoid damage by ropes, traps or other banding
Bending/warping	Boards should be fully supported by well-spaced bearers to avoid sagging or other distortion or placed on a flat stable surface

6. Name two (2) actions which should be done to avoid damage when manufactured boards are delivered to your worksite.

Provide an explanation for each action.

Assessor

This question supports E.R. 3.2.

Judgement statement

- The candidate correctly names two actions which should be done to avoid damage when manufactured boards are delivered.
- The candidate correctly explains each action.

Example answers

Action	Explanation
Keep edge and face protection	Check edge and face protection has been provided and leave this protection in place until boards are required for use
Remove banding or strapping	If packing includes banding or strapping this should be cut as soon as possible to prevent any permanent deformation of the boards.
Store correctly	Boards should be adequately supported to prevent sagging and damage.

7. Name two (2) common injuries that can occur when lifting and moving boards.
For each injury, explain how it can be minimised.

Assessor

This question supports E.R. 3.3.

Judgement statement

- The candidate correctly names two common injuries that can occur when lifting and moving boards.
- The candidate correctly explains how each injury can be minimised.

Example answers

Common injury	How injury can be minimised
Back injury	Always use correct lifting techniques Use appropriate lifting equipment for heavy lifts e.g. panel trolley
Foot injury	Wear appropriate protective footwear
Hand injury	Wear gloves

8. Briefly explain five ways boards can be stored so they do not become distorted.

Assessor

This question supports E.R. 3.4.

Judgement statements

- The candidate correctly explains five ways boards can be stored so they do not become distorted

Example answers

Sheets stored horizontally or in vertical racks

Stored on a flat, dry, even and stable surface

When using bearers, they must be evenly spaced and of equal thickness

Ends and sides of sheets should be flush

Storage area should be well ventilated

Scrap sheets should be placed on top of rack

Store away from heat or direct sunlight

Where thin boards are stacked (6mm or less) they should be supported by a thicker board (18mm or greater)

You have reached the end of the questions.

Observation Checklist

Carefully read through this Observation Checklist so you know exactly what is expected.

You, the candidate, must fill in Part A.

Part B will be completed by your Assessor or someone who has been approved by your Assessor.

You must be observed identifying manufactured board samples. This will involve:

- » Identifying manufactured board samples provided by your supervisor or assessor.
- » Attach labelled photographs of board samples identified.

Your Observer may ask you additional questions to check your knowledge and understanding.

Note to the Observer

- » Complete Part B of this checklist.
- » Watch the candidate carry out each task.
- » Note down any extra questions you ask of the candidate, and their responses.
- » Attach photographs of boards identified.

Assessor

This Observation Checklist supports E.R. 1.1 and 1.3.

Judgement statements

- The completed Observation Checklist supports the candidate's successful performance in identifying manufactured boards used in furniture operations.
- The candidate attaches photographs of board samples identified.
- The candidate has carried out all tasks in accordance with reference text.

Part A: Candidate to complete this section

Your name	Candidate name provided		
Workplace	Workplace identified		
	Observation 1	Observation 2	Observation 3
Manufactured board sample identified (Tick which applies)	<input type="checkbox"/> Laminated plastics <input type="checkbox"/> Particle board <input type="checkbox"/> MDF <input type="checkbox"/> Plywood <input type="checkbox"/> Hardboard <input type="checkbox"/> Pre-finished board Assessor – One box must be ticked	<input type="checkbox"/> Laminated plastics <input type="checkbox"/> Particle board <input type="checkbox"/> MDF <input type="checkbox"/> Plywood <input type="checkbox"/> Hardboard <input type="checkbox"/> Pre-finished board Assessor – One box must be ticked	<input type="checkbox"/> Laminated plastics <input type="checkbox"/> Particle board <input type="checkbox"/> MDF <input type="checkbox"/> Plywood <input type="checkbox"/> Hardboard <input type="checkbox"/> Pre-finished board Assessor – One box must be ticked

Part B: Observer to complete this section

For each statement below, tick if you agree.

The following tasks must be observed on **three** separate occasions.

When identifying and explaining the construction of manufactured boards used in furniture operations, the candidate:

	Obs 1	Obs 2	Obs 3
	Date:	Date:	Date:
1. Correctly identified the type of manufactured board. Assessor – a different manufactured board is to be used for each observation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2. Attached a labelled photograph of manufactured board identified.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. Correctly explained what each board identified is made of. Observation 1 Explanation: Observation 2 Explanation: Observation 3 Explanation:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

<p>4. Correctly identified the manufactured boards used in an assembled furniture item.</p> <p>Observation 1</p> <p>Furniture item: _____</p> <p>Manufactured board used: _____</p> <p>_____</p> <p>Observation 2</p> <p>Furniture item: _____</p> <p>Manufactured board used: _____</p> <p>_____</p> <p>Observation 3</p> <p>Furniture item: _____</p> <p>Manufactured board used: _____</p> <p>_____</p> <p>Assessor – a different furniture item is to be used for each observation</p>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Please comment on the candidate's ability to demonstrate knowledge about manufactured boards used in furniture operations.</p>			
<p>Observation 1</p> <p>Any comments support the candidate's successful performance in meeting the above standards.</p> <p>Observation 2</p> <p>As above</p> <p>Observation 3</p> <p>As above</p>			
<p>I confirm that I have directly observed the candidate carry out all the above tasks to the standard required.</p>			
<p>Observation 1</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>Observation 2</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>Observation 3</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	

Observer name and title	Observer name and title recorded	(If different observer) Observer name and title recorded, as required	(If different observer) Observer name and title recorded, as required
Observer phone / email	Contact details recorded	(If different observer) Contact details recorded	(If different observer) Contact details recorded
Signature	Observer signed	Observer signed	Observer signed
Date	Date recorded	Date recorded	Date recorded

Candidate evidence check

Required evidence

Use this checklist to make sure you finished the assessment tasks in full.

Clearly name and label all attachments.

I have completed and/or attached:

- the Questions in this guide
- one** Observation Checklist completed and signed by an observer
- photographs of manufactured board samples identified

Assessor

The required evidence for each assessment has been completed and/or attached.

Additional supporting evidence

If you have any other evidence which helps prove your skills and knowledge in this unit (such as completed documents, photos, videos or voice recordings), attach it and record it below.

Clearly name and label all attachments.

I have attached the following as additional supporting evidence:

Assessor

There is no requirement to attach additional supporting evidence.

Any additional supporting evidence is relevant and further supports the candidate's competency in this unit.

Assessor final judgement

After reviewing the candidate's evidence for Unit Standard 16235 v4, it is clear that the candidate can competently:

- Identify and explain the construction of manufactured boards used in furniture operations.
- Explain the advantages, disadvantages and suitable end uses of manufactured boards used in furniture operations.
- Describe transportation, handling, and storage requirements of manufactured boards.

Assessor feedback to the candidate

Please provide specific feedback to the candidate about their performance in meeting the requirements of this unit standard.

Assessor

Assessor name recorded

Date

Date recorded