Title	Demonstrate knowledge of the principles of laminating in wood product manufacturing		
Level	2	Credits	5

Purpose	People credited with this unit standard are able to demonstrate knowledge of laminating; the lamination process and lamination end uses; and quality control in laminating; and identify glues, and their safe handling and storage requirements.

Classification	Solid Wood Manufacturing > Wood Product Manufacturing Skills

Available grade	Achieved

Guidance Information

1   References
AS/NZS 1328.1:1998 *Glued laminated structural timber – Performance requirements and minimum production requirements*.
Other specifications are designed for specific purposes, for example, Japanese Agricultural Standards (JAS), American Standard Test Methods (ASTM).

2   Definitions
Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider wood manufacturing industry as examples of best practice.
Laminated product is the laminated member (the final product).
A *laminate* is a material (product) constructed by placing wood layer upon layer in the laminated member (wood may be a finger-jointed blank or solid timber).
Workplace procedures refer to documented policies and procedures set by the organisation carrying out the work, and to documented or other directions provided to staff, and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site specific procedures, site safety procedures, equipment operating procedures, quality assurance procedures, product quality specifications, references, approved codes of practice, housekeeping standards, environmental considerations, on-site briefings, supervisor's instructions, and procedures to comply with legislative and local body requirements relevant to the wood manufacturing sector.

3   Assessment information
a   Process, minimum and maximum shook length, and structural and non-structural finger lengths are to be identified for an on-site finger jointer or a finger jointer at a local operation.
b   All activities and evidence must meet workplace procedures and accepted industry practice.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of laminating.

Performance criteria

1.1 Advantages of laminated structural products compared with solid timber products are described.

 Range four advantages required.

1.2 Advantages of laminated appearance (non-structural) products compared with solid timber products are identified.

 Range four advantages required.

1.3 Disadvantages of laminating are described in terms of cost and potential down-grade.

1.4 Lamination requirements are identified in terms of moisture content (MC), site grade, straight and square edges and faces, consistent thickness and high-quality surface finish.

1.5 Importance of moisture content in the laminating process is described in terms of stability and bond.

1.6 Commercial product end-uses are identified for structural and non-structural laminated products.

 Range two examples are required of each product type.

Outcome 2

Demonstrate knowledge of the lamination process and lamination end uses.

Performance criteria

2.1 Steps in lamination are identified in order of process.

 Range six to eight steps required.

2.2 Laminating types are identified in accordance with joint type and end-use.

 Range joint types – face joint, edge joint;
 end use – structural, non-structural.

2.3 Requirements for a reliable bond are described.

2.4 Curing methods are described.

Range cure methods – radio frequency, heat assisted, cold cure.

Outcome 3

Identify glues, and their safe handling and storage requirements.

Performance criteria

3.1 Glues are identified by exposure category and end-use of product.

Range glues may include but are not limited to – poly vinyl acetate (PVAc) single pot, PVAc with cross linker, melamine urea formaldehyde resins (MUF), resorcinol resins, aqueous polymer isocyanate (API), aqueous polymer emulsion (APE), polyurethanes (PUR);
end use – structural, non-structural;
exposure category – interior, exterior protected, exterior exposed.

3.2 Handling and storage of glues, first aid, and environmental requirements are identified from the Safety Data Sheets (SDS) and product specification sheets.

Outcome 4

Demonstrate knowledge of quality control in laminating.

Performance criteria

4.1 Quality checks are identified.

Range evidence is required of five.

4.2 Delamination is identified from samples, and potential causes are explained.

Range causes may include but are not limited to – high moisture content, low moisture content, lack of glue, incorrect surface preparation, incorrect pressure, low curing temperature, excessive open assembly time, insufficient press time, insufficient post-cure time.

4.3 Product defects other than delamination are identified from samples.

Range defects may include – stepping, incorrect finger-joint placements, incorrect lay-up;
evidence is required of three product defects.

4.4 Key bond strength test is described.

4.5 Key bond durability test is described.

Planned review date	31 December 2024

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	10 February 1999	31 December 2020
Revision	2	14 March 2000	31 December 2020
Revision	3	15 December 2000	31 December 2020
Review	4	18 December 2006	N/A
Review	5	27 August 2020	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.