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| <b>Title</b> | <b>Explain preparation of materials for composite wood panel manufacture</b> |                |           |
| <b>Level</b> | <b>4</b>   | <b>Credits</b> | <b>10</b> |

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| <b>Purpose</b> | People credited with this unit standard are able to explain: the impacts of raw materials; wood furnish preparation; refiner operations; adhesive use; principles of heat; fibre drying; and furnish preparation and related environmental issues in relation to composite wood panel manufacture. |
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| <b>Classification</b> | Wood Fibre Manufacturing > Composite Wood Panel Manufacturing |
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| <b>Available grade</b> | Achieved |
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### Explanatory notes

- 1 All evidence must be demonstrated and assessed in accordance with the reference text: *Technical and Problem Solving Aspects of Wood Panels Production – Composites*, published by Competenz and available from Competenz at <http://www.competenz.org.nz>, or Competenz, PO Box 9005, Newmarket, Auckland 1149.
- 2 The following apply to the performance of all outcomes of this unit standard:
  - a All work practices must meet recognised codes of practice and documented worksite health and safety and environmental procedures (where these exceed code) for personal, product and worksite health and safety, and must meet the obligations required under current legislation, including the Health and Safety in Employment Act 1992, the Resource Management Act 1991, and their subsequent amendments.
  - b All work practices must meet documented worksite quality management requirements. This includes the recording (by electronic or non-electronic means) of activities, events, and decisions.
  - c All communications must be made in accordance with worksite procedures for content, recipient, timing and method.

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### Outcomes and evidence requirements

#### Outcome 1

Explain the impacts of raw materials on composite wood panel manufacture.

**Evidence requirements**

- 1.1 Wood density and its relevance to composite wood panel production with reference to hardwoods and softwoods is explained.
- 1.2 Log characteristics that influence the quality of log debarking are explained.
- 1.3 The impact of bark on composite wood panel furnish is explained.
- 1.4 Uses of fines screened from raw materials used for composite wood panel furnish are explained.

**Outcome 2**

Explain wood furnish preparation for composite wood panel manufacture.

**Evidence requirements**

- 2.1 Characteristics of chip and flake that impact on the quality of composite wood panels is explained and the impact on panel quality is described.
- 2.2 The purpose of chip washing systems is explained and their impact on furnish temperature is described.
- 2.3 Chip and flake screening methods and problems associated with their operation are explained.
- 2.4 Types of furnish transport systems are explained and furnish is matched to the transport system.
- 2.5 The operation of cyclones, and advantages and disadvantages of their use for transportation of furnish, are explained.
- 2.6 Problems associated with furnish storage systems are explained and potential causes of these problems are described.

Range evidence of two problems is required.

**Outcome 3**

Explain refiner operations for composite wood panel manufacture.

**Evidence requirements**

- 3.1 The operation of a refiner in the preparation of the furnish for composite wood panel manufacture is explained.
- 3.2 Function of rotor and stator plates are described.
- 3.3 Impacts of refining intensity on composite wood panel manufacturing are explained.

- 3.4 Impacts of refining on composite wood panel furnish are explained.
- 3.5 Impacts of furnish fibre length on composite wood panel formation and final panel quality are explained.
- 3.6 Factors that influence the furnish colour are explained.
- 3.7 Shive formation and their impact on composite wood panel product quality are described.

#### Outcome 4

Explain adhesive use for composite wood panel manufacture.

#### Evidence requirements

- 4.1 Potential hazards associated with resins are described.
- Range storage, handling, spillage.
- 4.2 Resin and glue are defined and differences in their use in composite wood panel manufacture is explained.
- 4.3 Thermoset and thermoplastic resins are defined and their use in composite wood panel manufacture is described.
- 4.4 The use of melamine in making resins and the stages that are necessary in the use of melamine resins are described.
- 4.5 Preparation and quality checks required for resins and glues are described.
- 4.6 Terms associated with resin use in composite wood panel manufacture are defined.
- Range terms may include but are not limited to – viscosity, solids content, rate of cure, storage life, working life, polymerisation, surface tension, specific gravity, usage, spread, tack point, tack loss point, residual tack, dry out point, catalyst, hydrolysis, glue to wood ratio, water to wood ratio; evidence of ten is required.
- 4.7 Blow line blending is defined and two advantages of this method are described.
- 4.8 Factors that affect resin distribution and efficiency in blending are described.
- 4.9 The use of other chemicals added to panel furnish to give added panel characteristics is explained.
- Range chemicals may include but are not limited to – wax, hardener, fungicides, mouldicide, insecticides; evidence of five is required.

**Outcome 5**

Explain the principles of heat used in composite wood panel manufacture.

**Evidence requirements**

- 5.1 Heat and temperature are defined and the difference between them is described.
- 5.2 Changes that occur with the application of heat in terms of latent heat, expansion, and changes of state are described.
- 5.3 Types of heat transfer including conduction, convection, and radiation using composite wood panel examples are described.
- 5.4 The properties of each state of matter in terms of shape, volume, and compression are defined.
- 5.5 The relationship of volume, temperature, and pressure in terms of Charles' and Boyle's laws is described.

**Outcome 6**

Explain fibre drying for composite wood panel manufacture.

**Evidence requirements**

- 6.1 The purpose of drying furnish for composite wood panel manufacture is explained.
- 6.2 Types of dryers used for furnish drying and describes their operation are explained.  
  
Range            types – pneumatic, cross flow, flash tube;  
                      operation – cost factors, safety, drying time.
- 6.3 Impacts of moisture variation of the furnish on panel production and quality are explained.
- 6.4 The term 'selectivity' is defined as it is used in furnish dryer design and its impact on furnish dryer operation is described.
- 6.5 Furnish dryer fire prevention techniques are explained.
- 6.6 Panel quality properties that are linked to furnish dryer operations are explained and their causes are described.
- 6.7 Causes of high dryer temperatures are explained.

**Outcome 7**

Explain furnish preparation and related environmental issues in composite wood panel manufacture.

**Evidence requirements**

- 7.1 Types of air emission and their sources in furnish manufacture are identified.
- 7.2 Sources of waste water and their contaminates in furnish manufacture are identified.
- 7.3 Activities undertaken to ensure resource consent requirements are met at a specific site are identified.
- 7.4 Drivers of composite wood panel production are identified and their influence on operation at a specific site are described.

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| <b>Planned review date</b> | 31 December 2015 |
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**Status information and last date for assessment for superseded versions**

| Process               | Version | Date             | Last Date for Assessment |
|-----------------------|---------|------------------|--------------------------|
| Registration          | 1       | 29 March 2005    | 31 December 2012         |
| Rollover and Revision | 2       | 23 February 2007 | 31 December 2012         |
| Review                | 3       | 15 April 2011    | N/A                      |

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| <b>Consent and Moderation Requirements (CMR) reference</b> | 0173 |
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**Please note**

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMRs). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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**Comments on this unit standard**

Please contact the Competenz at [info@competenz.org.nz](mailto:info@competenz.org.nz) if you wish to suggest changes to the content of this unit standard.