

<b>Title</b>	<b>Demonstrate knowledge of wood science for commercial forestry</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>4</b>

<b>Purpose</b>	People credited with this unit standard are to: demonstrate knowledge of the physical and chemical properties of wood as a raw material; demonstrate knowledge of the mechanical properties of wood and how they are determined; and describe the relationship between wood properties and wood utilisation.
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<b>Classification</b>	Forestry > Forestry Knowledge
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<b>Available grade</b>	Achieved
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## Guidance Information

### 1 References

- Colley, M. *Forestry handbook / New Zealand Institute of Forestry Inc.* (4<sup>th</sup> ed) (2005). Christchurch: New Zealand Institute of Forestry Inc.
- Cown, D.J. (and others). *New Zealand Pine and Douglas Fir: Suitability for Processing* (2<sup>nd</sup> ed) (1999). FRI Bulletin 216. Rotorua, New Zealand: New Zealand Forest Research Institute.
- Kininmonth, J.A. and Whitehouse, L.J. *Properties and Uses of New Zealand Radiata Pine. Volume 1, Wood Properties* (1991), Rotorua, New Zealand: Ministry of Forestry, New Zealand Forest Research Institute.
- McLaren, J.P. *Radiata Pine Growers Manual* (1993). FRI Bulletin 184. Rotorua, New Zealand: New Zealand Forest Research Institute.
- Walker, J.C.F. *Primary Wood Processing: Principles and Practice* (2nd edition) (2006). London: Chapman and Hall.

### 2 Assessment information

All information provided as evidence must be in accordance with the reference texts.

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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of the physical and chemical properties of wood as a raw material.

### Performance criteria

1.1 The physical properties of wood are defined.

Range	density, moisture content, extractives, anatomy, growth features, heartwood and sapwood, softwood and hardwood.
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- 1.2 The way that cell structure influences the physical properties and end-use of wood is explained.
- 1.3 Three factors that influence wood density are described.
- 1.4 The physical properties of core wood and outer wood are compared.
- Range any two of – density, strength, moisture content, shrinkage, fibre length.
- 1.5 The physical properties of late wood and early wood are compared.
- Range any two of – density, strength, moisture content, shrinkage, fibre length.
- 1.6 Sources of growth variation within a forest block are identified.
- 1.7 Moisture content (MC), how it is determined, and the implications for wood end-use is explained.
- 1.8 The effect of silvicultural practices on the physical properties of wood is described.
- Range pruning, thinning, rotation length.
- 1.9 The main chemical components of heartwood and sapwood and where they occur are identified and explained.
- Range cellulose, hemicellulose, other wood polysaccharides, lignin, wood extractives.

## Outcome 2

Demonstrate knowledge of the mechanical properties of wood and how they are determined.

### Performance criteria

- 2.1 The methods of determining the mechanical properties of wood are described and the determination of wood density is explained.
- 2.2 Reasons for the variability in wood properties are described.
- 2.3 The impacts of knots and pith on wood strength are explained.

## Outcome 3

Describe the relationship between wood properties and wood utilisation.

**Performance criteria**

3.1 The effect of tree growth characteristics on wood utilisation is described.

Range density, compression wood, tension wood, heartwood, sapwood, knots, pith, spiral grain, resin pockets.

3.2 The effect of silvicultural practices on wood utilisation is described.

<b>Planned review date</b>	31 December 2024
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	28 January 1995	31 December 2020
Review	2	27 May 1998	31 December 2020
Review	3	27 May 2002	31 December 2020
Review	4	16 October 2009	31 December 2017
Review	5	10 December 2015	N/A
Review	6	25 June 2020	N/A

<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>.

**Comments on this unit standard**

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