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| Title | Operate timber drying kiln | | |
| Level | 3 | Credits | 25 |

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| Purpose | People credited with this unit standard are able to: demonstrate knowledge of kiln drying operations; demonstrate knowledge of dry and wet bulb temperature reading; manage hazards associated with kiln drying wood products; complete manufacturers' condition monitoring requirements for timber kiln components; load and operate a wood drying kiln; monitor the performance of kiln and charge; and complete post kiln operations activities. |
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| Classification | Solid Wood Manufacturing > Timber Drying and Treatment |
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| Available grade | Achieved |
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Guidance Information

- Legislation and references

Health and Safety at Work Act 2015.

Resource Management Act 1991.

Best Practice Guideline for the Safe Use of Timber Preservatives & Anti-sapstain Chemicals – V1 (Wellington, 2005). This is referred to below as the 'Guideline', and is available through the New Zealand Timber Preservation Council, Wellington or online at <http://www.nztpc.co.nz>.

Approved Code of Practice for Training Operators and Instructors of Powered Industrial Lift Trucks (Wellington: WorkSafe, 1995), available at <https://worksafe.govt.nz/topic-and-industry/machinery/forklifts/forklift-training/>.

AS/NZS 1080.1:2012 *Timber – Methods of test – Method 1: Moisture content*.
- Definitions

Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider wood manufacturing industry as examples of best practice.

Corrective action may include actions such as communication to management, communication to on-site technical support person, communication to off-site technical support person, cleaning, communication with maintenance staff, recalibration, or changes made to the operating system in accordance with worksite documentation.

Optimise refers to the most efficient use of product and plant, taking into account raw material input, customer demands, and machine capability.

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 industry sector.

- 3 Range
Evidence is required of one of the following – low temperature (below 60°C), conventional temperature (60°-80°), accelerated conventional temperature (ACT) (81°-100°C), high temperature (over 100°C);
evidence is required of 12 charge sheets of varying products, and/or time for outcome 5, 6, and 7
- 4 Assessment information
All activities and evidence must meet workplace procedures and accepted industry practice.
- 5 Recommended unit standards for entry: Unit 143, *Fillet and build a packet of timber for further processing*; Unit 155, *Demonstrate knowledge of properties of wood*; and Unit 162, *Demonstrate knowledge of the principles of wood drying*.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of kiln drying operations.

Performance criteria

- 1.1 Role, scope, and responsibilities of the kiln operator are described.
- 1.2 Operating parameters, processing capability, and capacity of kilns used in the workplace are defined.
- 1.3 Energy systems and construction materials of kilns in use in New Zealand are described.

Range systems may include but are not limited to – wood waste, coal, natural gas, electricity, fuel oil, gas, thermal steam;
materials – concrete block, brick, stainless steel, aluminium, steel.
- 1.4 Energy sources of kilns used in the workplace are identified.

- 1.5 Operating components of the kiln are identified, and their function and operation are explained.

Range may include but is not limited to – control panel, control valves, spray, vent, heat control, relief valves, wet and dual dry bulbs (thermometers), air circulation controls, water supply, overflow drains, door seal mechanisms, fans, ventilation and humidity controls, baffles, heating coils, spray lines, recording charts and mechanisms, pilot lights, computer monitoring, overload switches, re-set controls, kiln recording charts.

- 1.6 Principles and purpose of drying are explained in terms of drying phases, cycles, and sequences.

- 1.7 Factors for consideration when scheduling charges to optimise production throughputs are explained.

Range factors may include but are not limited to – priority of orders, end product specification requirements, drying time, steam and energy availability, stock rotation, maximise chamber fill in the kiln (maximise charge bill, maximise length, same length package).

Outcome 2

Demonstrate knowledge of dry and wet bulb temperature reading.

Performance criteria

- 2.1 The function of dry and wet bulb and the effect of temperature depression (difference between the two readings) on drying is explained.
- 2.2 Dry and wet bulb temperatures, drying time, and start time are read and interpreted from kiln charts.

Outcome 3

Manage hazards associated with kiln drying wood products.

Performance criteria

- 3.1 Safe work practices associated with kiln drying wood products are applied.

Range practices may include but are not limited to – isolation procedures, lock-outs, emergency stops, machine guarding, wearing appropriate safety equipment, entry in kiln vault during drying operation, stacking, loading/unloading operations, steam handling procedures.

- 3.2 Emergency procedures when there is a fire in a kiln are described.

Outcome 4

Complete manufacturers' condition monitoring requirements for timber kiln components.

Performance criteria

4.1 Visual inspection of timber kiln components and reports are completed.

Range may include but is not limited to – fastener and weld checks; panel sealing and corrosion checks; greasing point and motor shaft seal checks; checks of wiring glands through roof and walls; inspection of fans for cracks and corrosion, fan tip clearance, and fan hub connection to motor or shaft line; checks of heat exchanger tube condition in heating and steam bath coils; check door seal condition and door fit; checks of door lifter condition; checks of kiln trolley wheel and bed condition; condition and operation of internal baffles; mechanical damage to the kiln; heat pump oil leaks or seal damage; condition of pressure pipe work including joints; condition of wet bulb water supply and reservoir, water sprays, and connections.

4.2 Checks of timber kiln components are performed.

Range includes but is not limited to – checks for fan motor noise and vibration in the kiln; vent operation and linkage condition; steam bath level control valve operation; operation of safety and warning lights.

Outcome 5

Load and operate a wood drying kiln.

Performance criteria

5.1 Input material is checked, timber packets are selected, and are loaded to optimise the air flows in the kiln.

Range timber packet selection criteria – uniformity of size, age, condition, species.

5.2 Kiln is operated to maximise kiln drying time and minimise turnaround time.

5.3 Drying and final steam conditioning schedules are applied.

Range species, timber thickness, customer and release requirements.

5.4 Kiln charge data is entered into the kiln management system.

5.5 Residue and waste are managed.

Outcome 6

Monitor the performance of kiln and charge.

Performance criteria

- 6.1 Output data is monitored and used to determine the end point of drying.
- 6.2 Any human and equipment faults that affect timber drying are recognised, and corrective action is taken.
- 6.3 Kiln drying schedule specifications are adjusted to match product grade, species, and end use.
- 6.4 Characteristics of dry product are checked against specifications and directed for further action.
- Range may include but is not limited to - moisture content, process defects, moisture gradient, stress.
- 6.5 Cooling down period is observed before top weights are removed.
- 6.6 Kiln data is analysed, areas for improvement identified, and corrective action taken to optimise productivity.

Outcome 7

Complete post kiln operations activities.

Performance criteria

- 7.1 Documentation is completed.
- 7.2 Cleaning schedule is explained and carried out.

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| Planned review date | 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 | 27 January 1994 | 31 December 2014 |
| Review | 2 | 24 October 1996 | 31 December 2014 |
| Review | 3 | 10 February 1999 | 31 December 2014 |
| Review | 4 | 18 December 2006 | 31 December 2014 |
| Review | 5 | 18 April 2013 | N/A |
| Review | 6 | 28 May 2020 | N/A |

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| Consent and Moderation Requirements (CMR) reference | 0013 |
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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 if you wish to suggest changes to the content of this unit standard.