Title	**Manage a timber drying kiln plant**		
Level	**4**	**Credits**	**35**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the principles of timber drying processes; demonstrate knowledge of the operation of timber drying kiln plant; demonstrate and apply knowledge of timber drying specifications; identify, explain, and apply safety and security requirements for the kiln drying plant; assess kiln drying suitability of wood, and select charge schedules and builds; monitor kiln charge, plant, and people performance; assess and confirm timber drying performance and identify complying product; complete documentation and records and analyse records to improve productivity; apply maintenance requirements for kilns and explain procedures for drying new or significantly different materials or products.

Classification	Solid Wood Manufacturing > Timber Drying and Treatment

Available grade	Achieved

Guidance Information

1 Legislation and references
Health and Safety at Work Act 2015.
Resource Management Act 1991.
Best Practice Guideline for the Safe Use of Timber Preservatives and Antisapstain Chemicals (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 https://worksafe.govt.nz/topic-and-industry/machinery/forklifts/forklift-training/.
AS/NZS 1080.1:2012 *Timber – Methods of test – Method 1: Moisture content*.
AS/NZS 4787:2001 (Reconfirmed R2016) Timber-Assessment of drying quality.

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.
Charge refers to a piece, single packet or multiple packets of timber.
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 wood manufacturing sector.

3 Assessment information
All activities and evidence must be in accordance with workplace procedures and accepted industry practice.

4 Recommended unit standard for entry: Unit 738, *Operate timber drying kiln*.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the principles of timber drying processes.

Performance criteria

1.1 The principles and purpose of the timber drying process and their effect on wood end use are explained in terms of drying types, schedule or process.

1.2 Advantages and limitations of the timber drying process are described.

1.3 Timber drying methods used in the candidate's workplace are identified and their drying principles are explained.

1.4 Species that are approved for the type of drying are identified.

1.5 Types of biological attack are differentiated in terms of their visual appearance and their degrading effect on wood.

Range incipient decay, surface mould, sapstain fungi, decay fungi.

1.6 The effect of surface mould and sapstain fungi on drying are explained.

1.7 Moisture content and moisture gradient on the end-use effectiveness of timber are explained.

Outcome 2

Demonstrate knowledge of the operation of timber drying kiln plant.

Performance criteria

2.1 The role, scope, and responsibilities of the timber drying kiln plant operator are described.

2.2 Operating parameters, capability, and capacity of the timber drying kiln plant are defined.

Range may include but is not limited to – plant design and layout, maximum charge volumes (sawn timber), packet build and length, drying methods and schedules, throughput capacity, product storage capacities.

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

Range may include but is not limited to – priority order timetabling, species and product suitability and availability by grade/size requirement and charge lots, type of drying, specification requirements, anticipated charge duration, charge batching and succession, fuel or boiler restraints.

2.4 Operating components of the timber drying kiln plant are identified, and their function and sequence of operation are explained.

Range may include but is not limited to – plant design and layout, kiln chamber and door opening mechanisms, condensate disposal and control, pipework layout and operation understood, valves, pipe work, vents or other device linkages, filters, water flow meters, control panels, automatic and manual control, systems, pilot lights, sequence controllers, isolating and reset, controls, warning devices, check gauges, product handling systems.

2.5 Timber drying kiln plant control and product testing equipment is identified, serviceability checked, and their use explained.

Range equipment may include but is not limited to – moisture meter hand-held, in kiln moisture system, temperature detection calibration, fan vibration equipment if applicable, over temperature devices, low water level sensors.

Outcome 3

Demonstrate and apply knowledge of timber drying specifications.

Performance criteria

3.1 Release criteria and specifications used at the kiln drying plant are identified and the process is explained.

3.2 Documentation and charge sheet record requirements are identified and their use explained.

Range may include but not limited to – charge sheets, moisture content results, kiln charge graph, time related graph of kiln process, in line moisture meter, in kiln moisture meter system graph.

Outcome 4

Identify, explain, and apply safety and security requirements for the kiln drying plant.

Performance criteria

4.1 Hazardous areas on the timber drying site, their safety and security measures are identified, and risks explained.

Range may include but is not limited to – warning signs and symbols, authorised access areas, fuel storage areas, hot pipe areas, working at heights, remote control mechanisms, vapour suspension in confined spaces and confined spaces in general, loading and unloading mechanisms.

4.2 Risk factors associated with chemicals used in the drying process and the safeguards required are explained in accordance with safety data sheets (SDS).

Range formulations may include but are not limited to – boiler chemicals or water treatment chemicals if applicable;
evidence of one chemical is required.

4.3 Safe operating and housekeeping requirements are explained.

Range includes but is not limited to – safe operating practices, codes of conduct and personal hygiene, appropriate personal protective clothing and equipment, chemical and product handling, SDS, emergency procedures.

Outcome 5

Assess kiln drying suitability of wood, and select charge schedules and builds.

Performance criteria

5.1 Pre-drying suitability of the product is assessed and confirmed, and non-conforming product is removed.

Range product factors may include but is not limited to – approved species, product characteristics, surface condition, moisture content, density and grade, dimensional thickness, biological degradation, filleting quality assessment, charge build quality assessment.

5.2 Charge schedules and charge builds are selected for kiln product.

Range may include but is not limited to – product source, species, size variations and quantities, sapwood and exposed heartwood ratios, moisture content, wood density, surface condition, historical charge data;
evidence is required of a practical demonstration plus reference to five recent charge sheet records showing application and management.

Outcome 6

Monitor kiln charge, plant, and people performance.

Performance criteria

6.1 Operational steps for kiln drying wood are demonstrated.

Range evidence is required of five charges – dried, moisture content specifications, drying time and temperature other quality checks completed as per site requirements.

6.2 Pre-start-up preparations appropriate to the process are demonstrated.

Range may include but is not limited to – collection of charge data, batch or run identification, packet specifications and volume, control panel settings, sequence controls, charge sheet entries, product pre-treatment condition, loading.

6.3 Charge and plant performance are monitored, and corrective action is taken.

Range may include but is not limited to – over temp, power failure, process control failure, cycle duration, temperature drop across loads, vibration analysis, moisture content analysis, temperature analysis, valve position.

6.4 Equipment faults and malfunctions in the process cycle are identified and corrective action is taken.

Range may include but is not limited to – electrical, hydraulic, mechanical, process control.

6.5 End point of the drying process is determined and controlled to maximise quality and throughput.

6.6 Environmental measures are observed for the treated product.

Range may include but is not limited to – use of approved storage devices for contaminated condensate, condensate management, spillage clean up and disposal.

6.7 Performance of employees in the kiln operation is monitored and expectations communicated as per site requirements.

Range may include but is not limited to – staff training needs analysis, staff training arrangements, training records, site interviews or performance reviews, site procedures sign-off such as standard operating procedures or health and safety-based systems.

Outcome 7

Assess and confirm timber drying performance and identify complying product.

Performance criteria

7.1 Drying compliance is determined from charge sheet results and product testing.

Range may include but is not limited to – charge sheet compliance parameters, correct product sampling prescription applied, valid test samples collected and prepared, correct interpretation of moisture results, other quality results (stress testing, distortion, moisture gradient) are correctly completed and interpreted as per site requirements.

7.2 Compliance with appropriate kiln drying standards is undertaken in accordance with NZS 1080.1:2012 and AS/NZS 4787:2001 if applicable.

7.3 Non-conforming product is isolated and re-drying, re-use, or disposal options are applied.

Range may include but is not limited to – non-confirming product identification, re-drying, charge sheet, references, non-conformance investigation.

Outcome 8

Complete documentation and records and analyse records to improve productivity.

Performance criteria

8.1 Charge or run sheets are sequentially completed, and charge performance comments entered and distributed.

Range evidence is required of 12 recently completed charge sheets.

8.2 Records are completed and held.

Range may include but is not limited to – charge summary, analytical records.

8.3 Drying documentation charge sheets and reconciliations are analysed, and corrective action taken to improve productivity.

Outcome 9

Apply maintenance requirements for kilns and explain procedures for drying new or significantly different materials or products.

Performance criteria

9.1 Routine and preventative maintenance and cleaning requirements are applied.

Range may include but is not limited to – isolation procedures, confined space entry, power surge protection, plant maintenance logbooks, plant and equipment calibration, product storage sheds, storage tanks/devices, belt drives, ball and roller bearings, gland packing, filters, valves, gauges, plant operating equipment.

9.2 Product and material inventory levels are maintained to meet production and contingency requirements.

Range may include but is not limited to – fillets, bearers, fuel, forklifts and fuel, test equipment, plant maintenance materials, protective clothing and first aid kits, strapping, concrete weights.

9.3 Procedures for drying new or significantly different materials or products are referenced and explained.

Range may include but is not limited to – type of product (solid wood, engineered, laminated) species, process, process variations, product grade size and condition.

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	22 October 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.