Title	**Manage a timber treatment operation**		
Level	**4**	**Credits**	**35**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the principles of treatment processes relevant to the workplace; demonstrate knowledge of the operation of treatment plants; demonstrate and apply knowledge of treatment specifications; identify, explain and apply safety and security requirements for the treatment plant; assess treatment suitability of wood and estimate solution absorption; prepare and check the wood preservative solution; operate the wood treatment plant and monitor charge and plant performance; assess and confirm wood treatment performance and identify complying product; complete documentation, and record and analyse to improve productivity; apply maintenance requirements for treatment plants.

Classification	Solid Wood Manufacturing > Timber Drying and Treatment

Available grade	Achieved

Guidance Information

1 Reference
Competence in this unit standard requires knowledge of the following:
NZS 3640: 2003 *Chemical Preservation of Round and Sawn Timber.*

2 Definitions
Accepted industry practice – 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.
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 workplace procedures.
Preventative maintenance refers to the care and servicing of equipment and machinery. This may include periodic checks and inspections, testing, measurements, adjustments, or parts replacement as required in accordance with worksite policies and procedures for the purpose of preventing faults or failures and to maintain production requirements.
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
Treatment processes relevant to this unit standard include diffusion, pressure, and vacuum treatments;
evidence is required for one.

4 Assessment information
All activities and evidence must meet workplace procedures and accepted industry practice.

5 Recommended unit standard for entry: Unit 28015, *Carry out basic operation and maintenance activities for a timber treatment plant*.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the principles of treatment processes relevant to the workplace.

Performance criteria

1.1 The principles and purpose of the treatment process and their effect on wood impregnation are explained in terms of treatment schedule or process.

1.2 Advantages and limitations of the treatment process are described.

1.3 Other treatment methods used in the candidate's workplace (if applicable) are identified and their treatment principles explained.

1.4 Species that are approved for the type of treatment 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 treatment uptake are explained.

1.7 The influence of moisture content and moisture gradient on treatment effectiveness is explained.

Outcome 2

Demonstrate knowledge of the operation of treatment plants.

Performance criteria

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

2.2 Operating parameters, capability, and capacity of the treatment plant at the workplace are defined.

Range may include but is not limited to – plant design and layout, preservative types, maximum/minimum charge volumes (sawn timber and round wood), packet build and length, treatment methods and schedules, throughput capacity, preservative 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 Hazard Class requirement and charge lots, type of treatment, specification requirements, anticipated charge duration, charge batching and succession, preservative stock levels (bulk and in solution), solution status (formulation balance).

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

Range may include but is not limited to – plant design and layout, treating cylinder and door safety mechanisms, storage tanks, agitation methods used, pumps, valves, pipe work, linkages, filters, sight tubes, flow meters, control panels, automatic and manual control systems, pilot lights, sequence controllers, isolating and reset controls, warning devices, check gauges, solution containment safeguards, product handling systems.

2.5 Plant control and product testing equipment is identified, serviceability checked, and their use explained.

Range may include but is not limited to – increment borer, moisture meter, refractometer, titration equipment, chemical reagent viability, pH test equipment, X-ray fluorescence, spot test solutions and chemical viability, vacuum and pressure gauges or certification, sensors, metric ruler, calibrated sight tubes.

Outcome 3

Demonstrate and apply knowledge of treatment specifications.

Performance criteria

3.1 Preservative types used at the plant are identified and their properties and uses are explained.

3.2 The preservative formulations used at the candidate's workplace are explained in terms of chemical components, ratios, and balance parameters.

3.3 Causes of solution imbalance are identified and explained, and corrective actions are carried out.

3.4 Treatment specification requirements are referenced and explained in accordance with the NZS 3640:2003.

Range may include but is not limited to – pre-treatment condition, species, preservatives, hazard class, process requirements (pressure, duration, vacuum), quality checks (retention and penetration), product branding or labelling, out-of-specification product, environmental considerations;
evidence is required of one preservative type and one process method.

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

Range may include but is not limited to – charge sheets, reconciliation statements, sampling summaries, charge summary, analytical records.

Outcome 4

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

Performance criteria

4.1 Hazardous areas on the treatment 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, chemical storage areas, vacuum exhaust vents, automatic remote control mechanisms, vapour suspension in confined spaces, loading and unloading mechanisms, chemical handling and mixing areas, storage and handling of treated products.

4.2 Risk factors associated with preservative formulations used and the safeguards required are explained in accordance with Safety Data Sheets (SDS).

Range formulations may include but are not limited to – copper chrome arsenic (CCA), Tanalith E, Boron compounds, ammoniacal copper quarternary (ACQ).

4.3 Safe operating and housekeeping requirements are explained.

Range may include but is not limited to – safe operating practices, codes of conduct and personal hygiene, appropriate personal protective clothing and equipment, chemical and product handling, Safety Data Sheets (SDS) for each preservative type, eye wash, emergency shower, first aid facilities, emergency procedures.

Outcome 5

Assess treatment suitability of wood and estimate solution absorption.

Performance criteria

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

Range may include but is not limited to –
product factors – approved species, product characteristics, surface condition, moisture content and moisture gradient, dimensional thickness, biological degradation, pre-cutting, machining;
production factors – strapping tightness, packet build and length, treatment identification (branding), product/unit identification, pre-treatment holding period for steamed product.

5.2 Solution absorption is estimated for 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.

Outcome 6

Prepare and check the wood preservative solution.

Performance criteria

6.1 Pre-test checks are undertaken on solution testing equipment and test chemicals.

Range may include but is not limited to – cleanliness, suitability, correction factors, preparation of chemical reagents and viability checks, refractometer condition, X-ray fluorescence.

6.2 Factors affecting the accuracy of solution concentration measurements are identified and corrective action is taken.

Range may include but is not limited to – operator technique, solution contaminants, aerated solution, inaccurate instruments, correction factors, equipment cleanliness and calibration, incorrect references, pH, efficacy of titration reagents.

6.3 Representative solution samples are taken at predetermined times and solution concentration is measured and calculated.

Range prior to, during, and on completion of treatment process; accuracy parameters; comparisons between operator and laboratory analysis determinations.

6.4 Solution concentration and/or volume is adjusted in working tanks to meet charge requirements.

Outcome 7

Operate the wood treatment plant and monitor charge and plant performance.

Performance criteria

7.1 Operational steps for treating wood are demonstrated.

Range evidence is required of two charges treated.

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

Range may include but is not limited to – solution concentration confirmation, working tank levels, solution agitation, control panel settings, sequence controls, sump levels, charge sheet entries, product pre-treatment condition, loading, door seal.

7.3 Charge and plant performance are monitored, and corrective action taken.

Range may include but is not limited to – pressure relief valve and gauges, vacuum intensity, cycle duration, cylinder leakage, solution concentrations, charge absorption, working tank levels, final rate of flow monitoring against charge requirements.

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

Range includes but is not limited to – electrical, hydraulic, mechanical, chemical leakage, process control.

7.5 End point of the treatment process is determined, and all working solutions are returned to storage and solution measurements are taken.

7.6 Environmental measures are observed for the treated product.

Range includes but is not limited to – use of approved drip areas, drip time allowance according to process type, CCA treated wood product holding times, spillage clean up and disposal.

Outcome 8

Assess and confirm wood treatment performance and identify complying product.

Performance criteria

8.1 Treatment 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 spot test results, accurate results determination and recording, charge samples batched, labelled and held for audit purposes as required.

8.2 Compliance branding or labelling is undertaken in accordance with NZS 3640: 2003.

8.3 Non-conforming product is isolated and re-treatment, re-branding, or disposal options are explained and applied.

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

8.4 Preservative solutions and/or product samples for laboratory analysis are collected, tested, labelled, and dispatched.

8.5 Laboratory analysis results for preservative solutions and treated products are correctly interpreted and matched against NZS 3640 specification requirements and operator check measurements, and corrective action is taken.

Range includes but is not limited to –
product – penetration, retention zone, retention zone loading;
solution – active ingredients, pH, preservative ratios and balance, solution concentration.

Outcome 9

Complete documentation, and record and analyse to improve productivity.

Performance criteria

9.1 Charge sheets are sequentially completed, and charge performance comments entered and distributed.

Range evidence is required of 12 recently completed charge sheets.

9.2 Reconciliations of completed work against charge sheets are completed and processed.

9.3 Records are completed.

Range includes but is not limited to – sampling summaries, charge summary, analytical records.

9.4 Treatment documents and reconciliations are analysed, and corrective action taken to improve productivity.

Outcome 10

Apply maintenance requirements for treatment plants.

Performance criteria

10.1 Routine and preventative maintenance and cleaning requirements are explained and applied.

Range may include but is not limited to – isolation procedures, confined space entry, power surge protection, plant maintenance log books, plant and equipment calibration, preservative storage and working tank, belt drives, ball and roller bearings, gland packing, hydraulic systems, pump seals, impellors, filters, valves, gauges, sight tubes, plant operating equipment, compressors, lubrication, waste/sludge handling, removal and authorised disposal, anti-corrosion measures, spike protection (power surges).

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

Range may include but is not limited to – preservative chemicals, chemical reagents, test equipment, solution containers, treated plugs, blank charge sheets, plant maintenance materials, protective clothing and first aid kits, strapping.

10.3 Procedures for extending plant approvals are referenced and explained.

Range includes but is not limited to – species, process, process variations, product condition, preservative type, dispensations, experimental treatments.

Replacement information	This unit standard replaced unit standard 152, unit standard 21759, and unit standard 21760.

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	18 April 2013	N/A
Review	2	28 May 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.