

Title	Manufacture burnt lime for kraft liquor production in a pulp or paper plant		
Level	4	Credits	5

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the manufacture of burnt lime; operate a lime kiln; and monitor and control the performance of a lime kiln.
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Classification	Wood Fibre Manufacturing > Pulp and Paper - Chemical Plants
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Available grade	Achieved
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Guidance Information

1 Legislation and references

Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the:

- Hazardous Substances and New Organisms Act 1996;
- Health and Safety at Work Act 2015;
- Resource Management Act 1991;
- Health and Safety at Work (Major Hazard Facilities) Regulations 2016.

2 Definitions

Operating parameters refer to the boundary conditions in which the operations are carried out in the manufacture of burnt lime.

Operating procedures refer to the process(es) that are worked through, e.g. standard operating procedure (SOP) in the manufacture of burnt lime.

Worksite documentation refers to organisation policies and procedures that are documented in memo, electronic, or manual format and available in the workplace, and are consistent with manufacturer's requirements. 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, sustainability, on-site briefings, supervisor's instructions, and procedures to comply with legislative and local body requirements relevant to the pulp and paper industry.

3 Assessment information

Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, worksite documentation and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the manufacture of burnt lime.

Performance criteria

- 1.1 Chemical reactions that occur during the manufacturing process and involve calcium carbonate, calcium oxide, carbon dioxide, fuel, and sulphur dioxide are described.
- 1.2 Principles of heat exchange and energy conservation in a lime kiln are described.
- Range components of heat exchange includes but are not limited to– fuel type and consumption, excess air, chains, air preheating, product dryness, refractory material, temperature balance.
- 1.3 Operating components and process controls of rotary lime kilns are described and their purpose is explained.
- Range operating components may include but are not limited to – raw material handling, non-condensable gas system, product handling, burner, refractory, drives, coolers, emission control, white liquor scrubbing system, gas system stripper.
- 1.4 Operating parameters and capability of the lime kiln are explained.
- 1.5 Measurement of the quality of burnt lime is explained.
- Range availability, residual carbonate.
- 1.6 Warming up, cooling down, and emergency shut-down procedures are identified, and the reasons for their existence are explained.
- 1.7 Hazards associated with rotary lime kilns are identified and actions to be taken to minimise, or eliminate the hazard are described.
- Range hazards may include but are not limited to – lime dust, hot lime, caustic burns, heat burns.
- 1.8 Environmental standards applying to the operation of lime kilns are described.
- Range environmental standards may include but are not limited to – particulate and total reduced sulphur emissions, gas incineration, white liquor scrubbing.
- 1.9 Roles and responsibilities of the lime kiln operator are described.

Outcome 2

Operate a lime kiln.

Performance criteria

- 2.1 Safe work practices associated with operating a lime kiln are identified and used.
- Range practices may include but are not limited to – isolation procedures, lock-outs or tag-outs, emergency stops, machine guarding, wearing of appropriate safety equipment.
- 2.2 Lime kiln is set up, started up, operated, and shut down.
- 2.3 Operating parameters are set and adjusted to enable production requirements to be achieved.
- Range operating parameters may include but are not limited to – fuel consumption, kiln temperature profile, feed rate, oxygen level; production requirements may include but are not limited to – burnt lime quality.
- 2.4 Essential care and housekeeping requirements for the lime kiln are carried out.

Outcome 3

Monitor and control the performance of a lime kiln.

Performance criteria

- 3.1 The lime kiln is monitored, and plant performance parameters are controlled in accordance with operating parameters.
- Range control parameters may include but are not limited to – feed rate, oxygen level, fuel consumption, kiln rotation rate, mud dryness, mud soda; plant performance parameters may include but are not limited to – kiln temperature profile.
- 3.2 Operating and equipment faults and malfunctions are identified, and relevant corrective actions are taken.
- Range equipment faults and malfunctions may include but are not limited to – electrical, mechanical, hydraulic, instrumentation, distributed control system.
- 3.3 Product and process testing is carried out.
- Range on-line testing, off-line testing.
- 3.4 Production, maintenance, and quality records are completed.

Planned review date	31 December 2028
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	22 February 1995	31 December 2024
Revision	2	27 January 1997	31 December 2024
Review	3	25 February 1999	31 December 2024
Review	4	18 December 2006	31 December 2024
Review	5	24 October 2014	31 December 2025
Review	6	30 November 2023	N/A

Consent and Moderation Requirements (CMR) reference	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 Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.