

<b>Title</b>	<b>Manufacture burnt lime for kraft liquor production in a pulp and paper plant</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	People credited with this unit standard are able to: explain fundamentals of the manufacture of burnt lime; operate and maintain a lime kiln efficiently; and monitor and control the efficient performance of a lime kiln.
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<b>Classification</b>	Wood Fibre Manufacturing > Pulp and Paper - Chemical Plants
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<b>Available grade</b>	Achieved
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<b>Entry information</b>	
<b>Critical health and safety prerequisites</b>	Unit 3637, <i>Describe principles of causticising and lime kiln operation in wood pulp manufacturing</i> ; or demonstrate equivalent knowledge and skills.

## Explanatory notes

- 1 Definition  
*Worksite documentation* refers to instructions to staff on policy and procedures (including the application of legislation to worksite situations) which are formally documented, and are available for reference at the worksite. Examples are standard operating procedures, specifications, manuals, and manufacturer's information.
- 2 The following apply to the performance of all outcomes of this unit standard:
  - a All work practices must meet recognised codes of practice and documented worksite health and safety and environmental procedures (where these exceed code) for personal, product, and worksite health and safety, and must meet the obligations required under current legislation, including the Health and Safety in Employment Act 1992, the Resource Management Act 1991, the Hazardous Substances and New Organisms Act 1996, and their subsequent amendments.
  - b All work practices must meet documented worksite operating procedures. This includes the recording (by electronic or non-electronic means) of activities, events, and decisions.
  - c All communications made in relation to this unit standard must be made in accordance with worksite procedures for content, recipient, timing, and method.
- 3 The reference text for this unit standard is Green R.P. & Hough, G (eds.), *Chemical Recovery in the Alkaline Pulping Processes* (TAPPI Press, Revised edition, 1992). It is available through <http://www.tappi.org/>.

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## Outcomes and evidence requirements

### Outcome 1

Explain fundamentals of the manufacture of burnt lime.

#### Evidence requirements

- 1.1 Chemical reactions that occur during the manufacturing process and involve calcium carbonate, calcium oxide (burnt lime), carbon dioxide, fuel, and sulphur dioxide are described in accordance with the reference text.
- 1.2 Principles of heat exchange and energy conservation in a lime kiln are described in accordance with the reference text.
- Range 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 identified, and their purpose is explained, in accordance with worksite documentation.
- Range may include but is 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 in accordance with worksite documentation.
- 1.5 Measurement of the quality of burnt lime is explained in accordance with worksite documentation.
- 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, in accordance with worksite documentation.
- 1.7 Hazards associated with rotary lime kilns are identified and actions to be taken to isolate, minimise, or eliminate the hazard are described in accordance with worksite documentation.
- 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 in accordance with worksite documentation and legislative requirements.
- Range may include but is 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 in accordance with worksite documentation.

## Outcome 2

Operate and maintain a lime kiln efficiently.

### Evidence requirements

- 2.1 Safe work practices associated with operating a lime kiln are identified and used in accordance with worksite documentation and legislative requirements.
- Range practices may include but are not limited to – isolation procedures, lock-outs, emergency stops, machine guarding, wearing of appropriate safety equipment.
- 2.2 Lime kiln is set up, started up, operated, and shut down efficiently in accordance with worksite documentation.
- 2.3 Setting and timely adjustment of operating parameters enables production requirements to be achieved in accordance with worksite documentation.
- Range operating parameters – fuel consumption, kiln temperature profile, feed rate, oxygen level;  
production requirements – burnt lime quality.
- 2.4 Preventative maintenance and cleaning schedules for the lime kiln are carried out in accordance with worksite documentation.

## Outcome 3

Monitor and control the efficient performance of a lime kiln.

### Evidence requirements

- 3.1 Monitoring and interpretation of feedback information and the timely adjustment of control parameters enable product quality, efficient plant performance, and process and legislative requirements to be maintained in accordance with worksite documentation.
- Range control parameters – feed rate, oxygen level, fuel consumption, kiln rotation rate, mud dryness, mud soda;  
plant performance – kiln temperature profile.
- 3.2 Operating and equipment faults and malfunctions are identified, and corrective action is taken, in accordance with worksite documentation.
- Range equipment faults and malfunctions – electrical, mechanical, hydraulic, instrumentation, distributed control system.
- 3.3 Output burnt lime meets the requirements specified in worksite documentation.

- 3.4 Production rate is regulated in accordance with worksite documentation and process requirements.
- 3.5 Product and process testing is carried out in accordance with worksite documentation.
- Range on-line testing, off-line testing.
- 3.6 Production, maintenance, and quality records are explained and completed in accordance with worksite documentation.

<b>Planned review date</b>	31 December 2019
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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	N/A
Revision	2	27 January 1997	N/A
Review	3	25 February 1999	N/A
Review	4	18 December 2006	N/A
Review	5	24 October 2014	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>.

#### Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

#### 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.