

<b>Title</b>	<b>Explain principles of the chemical recovery process in the production of kraft wood pulp</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	<p>People credited with this unit standard are able to explain: the purpose of the chemical recovery process in the kraft cycle, the black liquor evaporation process, the operating principles of a recovery boiler, and the recausticising process.</p> <p>This unit standard aims to provide knowledge of the principles and equipment used in the recovery of chemicals in the kraft process.</p>
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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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### Explanatory notes

- All evidence requirements must be demonstrated and assessed in accordance with the reference texts: *Pulp & Papermaking Technology, Unit 84, Kraft Pulping – Chemical Recovery*, and *Unit 85, Soda AQ Pulping – Chemical Recovery*, (Australia: Box Hill College of TAFE, 1998), available through Competenz PO Box 9005, Newmarket, Auckland 1149.
- Abbreviations used in this unit standard are:  
 BLOX – black liquor oxidation  
 SBLOX – strong black liquor oxidation  
 WBLOX – weak black liquor oxidation.

### Outcomes and evidence requirements

#### Outcome 1

Explain the purpose of the chemical recovery process in the kraft cycle.

#### Evidence requirements

- Reasons for chemical recovery are identified and explained.  
 Range chemical cost, economics, heat recovery, environmental.
- Elements of the kraft cycle are identified and their functions are explained.  
 Range digester, evaporators, BLOX, recovery boiler, causticiser.

1.3 Chemicals present in each stage are identified.

Range chemicals – sodium hydroxide, sodium sulphide, sodium carbonate, sodium sulphate, calcium oxide, calcium hydroxide, calcium carbonate.

## Outcome 2

Explain the black liquor evaporation process.

### Evidence requirements

2.1 The requirement to increase the black liquor solids is explained in terms of combustion and safety.

2.2 Multiple effect evaporators and their operation are explained in terms of heat exchange, heat recovery, vapour pressures, and solids contents.

2.3 Direct contact evaporator operation is explained in terms of solids, flue gas, and odour generation.

Range type – cascade.

2.4 Types of black liquor oxidation are explained in terms of use of air, sodium thiosulphate production, and odour control.

Range types – SBLOX, WBLOX.

## Outcome 3

Explain the operating principles of a recovery boiler.

### Evidence requirements

3.1 Functions of a recovery boiler are identified and explained in terms of combustion, chemical conversion, and steam generation.

3.2 Components of the recovery boiler are identified and their functions are explained in accordance with the reference text.

Range superheater, boiler, economiser, electrostatic precipitator, liquor heater, liquor guns, air ports.

3.3 Chemical changes resulting from combustion are identified for organic and inorganic compounds.

Range sodium carbonate, sodium sulphide, sodium hydroxide, sodium sulphate, lignin.

**Outcome 4**

Explain the recausticising process.

**Evidence requirements**

4.1 Components of the causticising plant are identified and their functions are explained.

Range dregs washer, slaker, causticising tanks, clarifier, filter.

4.2 Chemical reactions taking place at the slaking, causticising, and lime kiln are identified and explained.

Range one reaction at each process is required.

4.3 Lime kilns are described and their operation is explained in terms of drying, heating, and gas release.

<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	23 November 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.

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**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.