

Title	Control chemical recovery boiler systems for wood pulp manufacturing		
Level	5	Credits	20

Purpose	People credited with this unit standard are able to: explain chemical recovery boiler systems; operate and maintain a chemical recovery boiler system efficiently; and monitor and control the efficient performance of a chemical recovery boiler system.
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Classification	Wood Fibre Manufacturing > Pulp and Paper - Chemical Plants
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Available grade	Achieved
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Entry information	
Critical health and safety prerequisites	<p>Unit 3638, <i>Describe principles of black liquor combustion for wood pulp manufacturing</i>; or demonstrate equivalent knowledge and skills.</p> <p>Note also that legislation requires that operators of these boilers are required to hold a relevant boiler operating qualification.</p>

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 Evidence of the outcomes of this unit standard must be presented across the following contexts:
recovery boiler system – black liquor system, green liquor production, chemical make up and reclaim system.
- 3 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.

Outcomes and evidence requirements

Outcome 1

Explain chemical recovery boiler systems.

Evidence requirements

- 1.1 The chemical components and composition of black liquor are identified and explained in terms of their origins and organic to inorganic ratios.
- Range dissolved lignin, sodium carbonate, sodium sulphide, sodium hydroxide, dissolved oxygen, chlorides and potassium.
- 1.2 Operating components and process controls of the black liquor system are identified, and their purpose and operation are explained, in accordance with worksite documentation.
- Range may include but is not limited to – precipitators, cascade evaporator, black liquor heaters, salt cake mixing tanks, low odour unit, spill reclaim system, spill refractometers, control system, air systems.
- 1.3 Operating parameters and capability of the black liquor system are explained in accordance with worksite documentation.
- Range may include but is not limited to – black liquor solids, liquor flow, temperature and pressure, burning rate, effect of salt cake, oxygen levels, alkalinity, sulphide levels.
- 1.4 Operating components and process controls of the green liquor system are identified, and their purpose and operation are explained, in accordance with worksite documentation.
- Range may include but is not limited to – dissolving tank, shatter sprays, spouts, emergency water systems, density and level control, green liquor storage tanks, scrubber systems.
- 1.5 Operating parameters and capability of the green liquor system are explained in accordance with worksite documentation.
- Range may include but is not limited to – density, total titratable alkali (TTA), spout temperatures, agitation of liquor tanks, environmental requirements.

- 1.6 Safety features and emergency procedures of the black liquor system are identified and their purpose and operation are explained in accordance with worksite documentation.
- Range safety features – safety isolation procedures, plant access procedures, emergency stops, guards, boiler trip system, emergency shutdown procedure, steam smothering, soot blowing, low solids divert system.
- 1.7 Hazards associated with chemical recovery boiler operation 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 – crystallisation, solidification, heat, pressure, explosions.
- 1.8 Consequences of non-conformance with worksite operating procedures when operating a chemical recovery boiler system are described in accordance with worksite documentation.
- 1.9 Roles and responsibilities of the chemical recovery boiler operator are described in accordance with worksite documentation.

Outcome 2

Operate and maintain a chemical recovery boiler system efficiently.

Evidence requirements

- 2.1 Safe work practices associated with operating a chemical recovery boiler system are demonstrated in accordance with worksite documentation and legislative requirements.
- Range practices may include but are not limited to – plant entry procedures, isolation procedures, lock-outs, emergency stops, machine guarding, wearing appropriate safety equipment.
- 2.2 Chemical recovery boiler system is set up, started up, operated, and shut down efficiently in accordance with worksite documentation.
- 2.3 Setting and timely adjustment of operating parameters enable production requirements to be achieved in accordance with worksite documentation.
- Range operating parameters – black liquor density, temperature, air flows, pressures;
production requirements – environmental compliance, green liquor chemical strength, production rate, steam demand.
- 2.4 Spill reclaim system is operated in accordance with worksite documentation.
- 2.5 Preventative maintenance and cleaning requirements are carried out in accordance with worksite documentation.

Outcome 3

Monitor and control the efficient performance of a chemical recovery boiler system.

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 black liquor system control parameters may include but are not limited to – solids, sulphidity, temperature, pressure, air to blix plant, total residual sulphur chemical make up; green liquor control parameters – green liquor density, tank levels and TTA; process requirements – customer demand, storage levels, production priority, air distribution, opacities, burning rate, total residual sulphur.

3.2 Operating and equipment faults and malfunctions are identified, and corrective action is taken, in accordance with worksite documentation.

Range operating faults and malfunctions may include but are not limited to – leakages, blockages, boiler fouling, steam to water differential, contaminations; equipment faults and malfunctions – electrical, mechanical, hydraulic, pneumatic, instrumentation, distributed control system.

3.3 Output green liquor and steam meet the requirements of worksite documentation for quality limits.

Range green liquor requirements – liquor strength, density; steam requirements – pressure, temperature, silica and sodium content.

3.4 Production rate is regulated in accordance with worksite documentation and process requirements.

3.5 Production, maintenance, and quality records are explained and completed in accordance with worksite documentation.

3.6 Product and process testing is carried out in accordance with worksite documentation.

Range may include but is not limited to – green liquor test, black liquor solids test, smelt reduction test, water quality, steam quality.

Planned review date	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

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>.

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 if you wish to suggest changes to the content of this unit standard.