

Title	Condition liquor using black liquor evaporator for wood pulp manufacturing		
Level	4	Credits	15

Purpose	People credited with this unit standard are able to: demonstrate knowledge of fundamentals of liquor conditioning using black liquor evaporators; operate and maintain a black liquor evaporator; and monitor and control the performance of a black liquor evaporator.
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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

Liquor refers to weak black liquor used in the kraft pulping process.

Operating parameters refer to the boundary conditions in which the operations are carried out in liquor conditioning using black liquor evaporators.

Operating procedures refer to the process(es) that are worked through, e.g. standard operating procedure (SOP) in liquor conditioning using black liquor evaporators.

RCA refers to root cause analysis.

TCC refers to trouble cause correct.

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 fundamentals of liquor conditioning using black liquor evaporators.

Performance criteria

- 1.1 Purpose of liquor conditioning is explained.
- 1.2 Operating parameters and capability of the black liquor evaporators are explained.
- Range operating parameters includes but are not limited to – temperatures, flows, densities, pressures, vacuums, evaporator capacities.
- 1.3 Operating components and process controls of black liquor evaporators are described and their purpose is explained.
- Range evaporator bodies, flash tanks, pumps, condenser, clean condensate system, contaminated condensate system, steam and vapour waste gas removal systems, pressure and vacuum devices, instrumentation, hotwell, seal tank, soap removal system, distributed control system.
- 1.4 Hazards associated with black liquor evaporator operations are identified and actions to be taken to minimise, or eliminate the hazard are described.
- Range hazards may include but are not limited to – heat, steam, vacuum, pressure, leakage, spills, vessel entry, gas testing, non-condensable (waste) gas, foul condensate.
- 1.5 Environmental considerations applying to black liquor evaporators are described.
- Range environmental considerations may include but are not limited to – non-condensable (waste) gases to atmosphere, sewer monitoring for black liquor and contaminated condensate, soap spill.
- 1.6 The consequences of non-conformance with worksite operating procedures are described.
- Range high soap content, low or high solids, impact on effluent treatment.

1.7 Roles and responsibilities of the black liquor evaporator operator are described.

Outcome 2

Operate and maintain a black liquor evaporator.

Performance criteria

2.1 Safe work practices associated with the black liquor evaporator operation are demonstrated.

Range practices may include but are not limited to – isolation procedures, lock-outs or tag-outs, emergency stops, machine guarding, wearing appropriate safety equipment.

2.2 Black liquor evaporator 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 – temperature, solids, flows, pressures, vacuum, soap foam tank level;
production requirements – soap separation, chemical strength, production rate.

2.4 Essential care and housekeeping requirements are carried out.

Outcome 3

Monitor and control the performance of a black liquor evaporator.

Performance criteria

3.1 Performance of a black liquor evaporator is monitored and parameters are controlled in accordance with operating parameters.

Range control parameters may include but are not limited to – temperature, vacuum, pressures, solids, liquor flow, production rate, continuous digester rates, tank levels;
process requirements – customer demand, storage levels.

3.2 Operating and equipment faults and malfunctions are identified, and relevant corrective actions are taken.

Range operating faults and malfunctions may include but are not limited to – loss of vacuum, loss of steam supply, loss of water to the condenser, pump failure, soap blockages, air fluctuations, air supply failure, non-condensable gases, condensate, fouling evaporator, electrical faults.

3.3 Production rate in optimising evaporator and liquor output is monitored.

Range evaporator steam, condensate quality, liquor quality

3.4 Relevant problem-solving techniques to assist with troubleshooting are used.

Range problem-solving techniques may include but are not limited to –
RCA, TCCs, 5 why.

3.5 Production, maintenance notification, 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.