

Title	Clarify liquor for wood pulp manufacturing		
Level	3	Credits	5

Purpose	People credited with this unit standard are able to: demonstrate knowledge of liquor clarification; operate a liquor clarification system; and monitor and control the performance of liquor clarification.
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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 clarification refers to clarifying, mixing, and settling green and white liquor and dregs filtration used in the kraft pulping process.

Operating parameters refer to the boundary conditions in which the operations are carried out in liquor clarification.

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

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.

- 4 Recommended skills and knowledge:
Unit 3637, *Demonstrate knowledge of the principles of causticising in wood pulp manufacturing*; or demonstrate equivalent knowledge and skills.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of liquor clarification.

Performance criteria

- 1.1 Purpose and principles of liquor clarification in the causticising process are explained in terms of flocculation, sedimentation, and liquor rise rate.
- 1.2 Operating components and process controls of liquor clarification systems are described and their purpose is explained.
- Range operating components may include but are not limited to – rakes, dregs filter, underflows, pumps, inflows, drive units, dilution, agitators, blend tank, distributed control system.
- 1.3 Hazards associated with liquor clarification 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, leakage, spillage, dust, material handling.
- 1.4 Hazards associated with substances used in liquor clarification are identified, and the management of risks to materials, plant and people is explained.
- Range substances may include but are not limited to – white liquor, green liquor, weak wash, lime mud, flocculant.
- 1.5 Environmental impact on the effluent system caused by chemical loss to drains is explained.
- 1.6 Operating parameters and capability of liquor clarification are explained.
- Range operating parameters may include but are not limited to – underflow rates, pump capacities, inflow rates, rake torques, cake renewal, dregs filtration.
- 1.7 Consequences of non-compliance with worksite operating procedures for liquor clarification are described.
- 1.8 Roles and responsibilities of the liquor clarification system operator are explained.

Outcome 2

Operate a liquor clarification system.

Performance criteria

2.1 Safe work practices associated with operating liquor clarification 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 appropriate safety equipment.

2.2 Clarification system is set up, started up, operated, and shut down.

2.3 Essential care and housekeeping requirements are carried out.

Outcome 3

Monitor and control the performance of liquor clarification.

Performance criteria

3.1 Liquor clarification is monitored, and parameters are controlled in accordance with operating parameters.

Range process requirements may include but are not limited to – customer demand, storage levels.

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

Range operating faults and malfunctions may include but are not limited to – density of underflows, clarity of liquors, strength, torque, doctor blade condition, vacuum, vat level, shower flows; equipment faults and malfunctions may include but are not limited to – electrical, mechanical, instrumentation.

3.3 Output weak wash is checked for clarity.

3.4 Output white and green liquor is monitored for clarity and strength.

3.5 Underflows from clarifiers are checked for density.

Range white and green liquor clarifiers, mud washers, dregs filters.

3.6 Production, maintenance, and quality records are completed.

3.7 Production rate is regulated in accordance with process requirements.

Range process requirements may include but are not limited to – liquor flow rates, underflow rates, environmental constraints.

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.