

Title	Digest wood chips		
Level	5	Credits	30

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the digestion process; operate a digester and ancillary equipment; and monitor and control the performance of a digester and ancillary equipment.
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Classification	Wood Fibre Manufacturing > Pulp Making
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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

NCG refers to non-condensable gases.

Operating parameters refer to the boundary conditions in which the operations are carried out in wood chip digestion.

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

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 making 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 the digestion process.

Performance criteria

- 1.1 Equipment and process control systems used in the digestion process from chip bin to blow line are identified, and their purpose, construction, and safety features are explained.
- 1.2 Operating principles of continuous digestion are explained.
- Range operating principles may include but are not limited to – steam and filtrate flows, pressures, temperatures, cooking process, column movement, steam and condensate system, heat exchanger, liquor circuit, by-product extraction.
- 1.3 Procedures for shutting down and restarting the system are explained.
- 1.4 Operating parameters and capability for a digester are explained.
- Range operating parameters includes but are not limited to – liquor flow rates, operating pressures, screen pressures, chip feeder pressure and speed, scraper speed and torque.
- 1.5 Hazards associated with digester operations are identified and actions to be taken to minimise, or eliminate the hazards are explained.
- Range hazards may include but are not limited to – chemical solutions, pressure, steam and condensate lines, liquor lines, height, confined space, gases, moving components, hydraulic oil.
- 1.6 Environmental considerations applying to scrubbing systems, spill recovery systems and NCG recovery systems are explained.
- Range environmental considerations may include but are not limited to – non-condensable (waste) gases to atmosphere, sewer monitoring for black liquor and contaminated condensate.
- 1.7 Consequences of non-conformance with worksite operating procedures are explained.
- 1.8 Roles and responsibilities of the digestion process operator are explained.

Outcome 2

Operate a digester and ancillary equipment.

Range ancillary equipment may include but is not limited to – chip bin, pre-steaming vessel, low and high pressure feeders, liquor heat exchangers, flash tank, blow unit, blow tank, condensate system, steam system, liquor feed system, NCG recovery, liquor spill recovery, scrubber systems.

Performance criteria

2.1 Safe work practices associated with operating a digester and ancillary equipment are demonstrated.

Range practices may include but are not limited to – plant access procedures, isolation procedures, lock-outs or tag-outs, digester over-pressure protection system, emergency stops, machine guarding, wearing appropriate safety equipment.

2.2 Digesters and ancillary equipment are 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 – flows, pressures, differential pressures, interlocks, temperatures;
production requirements – kappa number, soda content, shive content, production rate.

2.4 Grade changes are completed.

2.5 Essential care and housekeeping requirements are carried out.

Outcome 3

Monitor and control the performance of a digester and ancillary equipment.

Performance criteria

3.1 Performance of a digester and ancillary equipment is monitored and parameters are controlled in accordance with operating parameters.

Range performance parameters – kappa number, soda content, shive content, production rate.

3.2 Adjustment of input rates is made to provide desired output rate and quality.

Range input rates may include but are not limited to – black liquor and white liquor flow rates, chips, feed rates, steam flow rates.

3.3 Adjustment of production rate in relation to contingencies is carried out.

Range shortfall in chemical, chip, and/or steam supply.

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

Range equipment faults and malfunctions – mechanical, electrical, hydraulic, pneumatic, instrumentation, distributed control system.

3.5 Relevant problem-solving techniques are used to assist with trouble shooting.

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

3.6 Residual chemicals, kappa number and consistency of output product are monitored to meet specified requirements.

3.7 Production, maintenance notifications, and quality records are explained and 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.