Title	**Empty and restart a continuous digester in pulp manufacturing**		
Level	**5**	**Credits**	**30**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of continuous digester procedures; empty a continuous digester and ancillary equipment to produce pulp; and fill cooking vessel and batch cook, to produce pulp.

Classification	Wood Fibre Manufacturing > Pulp Making

Available grade	Achieved

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
Operating parameters refer to the boundary conditions in which the operations are carried out to empty and restart a continuous digester.
Operating procedures refer to the process(es) that are worked through, e.g. standard operating procedure (SOP) to empty and restart a continuous digester.
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.

4 Recommended skills and knowledge
Unit 3555, *Digest wood chips*; or demonstrate equivalent knowledge and skills.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of continuous digester procedures.

Performance criteria

1.1 Procedures for starting up and shutting down the continuous digester are explained for empty-out conditions.

1.2 Continuous digester isolation procedures for plant maintenance are explained.

Range isolations may include but are not limited to – chip bin, pre-steaming vessel, low- and high-pressure feeders, liquor heat exchangers, flash tanks, condensers, blow unit, blow tank, condensate system, turpentine recovery system, steam system, liquor feed system.

1.3 Hazards associated with emptying out, isolation, and refilling the continuous digester are identified and actions to be taken to minimise, or eliminate the hazards are explained.

Range hazards may include but are not limited to – environmental, personal safety, explosions, blockages, blown gaskets.

1.4 Consequences of non-compliance with worksite operating procedures are explained.

Outcome 2

Empty a continuous digester and ancillary equipment to produce pulp.

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.

Performance criteria

2.1 Safe work practices associated with emptying the digester are demonstrated.

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

2.2 Upstream and downstream processing stages are checked and prepared for the empty-out process to commence.

2.3 Empty-out procedures are completed.

2.4 Environmental considerations are managed and met.

2.5 Washing of cooking vessel and ancillary equipment is completed to meet engineering requirements.

2.6 Isolation of the cooking vessel and ancillary equipment is completed and checked.

Outcome 3

Fill cooking vessel and batch cook, to produce pulp.

Performance criteria

3.1 De-isolation procedures are completed.

3.2 Digester vessel and ancillary plant are pressure tested.

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, turpentine recovery system.

3.3 Chip and liquor fills are completed, and batch cooking process is commenced.

3.4 Pressures, temperatures, and flows are monitored to determine the endpoint of the batch cook process.

3.5 Continuous cooking operations are established.

3.6 Equipment faults and malfunctions are identified, and corrective action is taken.

Range equipment faults and malfunctions may include but are not limited to – electrical, mechanical, hydraulic, pneumatic, instrumentation, distributed control system.

3.7 Production, maintenance, and quality records are completed.

Planned review date	31 December 2028

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	18 December 2006	31 December 2024
Review	2	24 October 2014	31 December 2025
Review	3	30 November 2023	N/A

Consent and Moderation Requirements (CMR) reference	0173

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.