

Title	Explain fundamentals of the recycling of fibre for paper making		
Level	4	Credits	10

Purpose	People credited with this unit standard are able to explain fundamentals of: recycling fibre products; waste paper pulping; waste paper furnish screening; waste paper furnish cleaning; recycled fibre dispersion plants; and de-inking.
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Classification	Wood Fibre Manufacturing > Pulp and Paper Technology
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Available grade	Achieved
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Explanatory notes

- 1 Definition
Stock refers to pulp furnish, which can include virgin fibre, secondary fibre, and broke.
- 2 All evidence requirements must be demonstrated and assessed in accordance with the reference text: Gary A Smook, *Handbook for Pulp and Paper Technologists (The Smook Book)*, (Vancouver: A. Wilde, 3rd ed, 2002). It is available from TAPPI at <http://www.tappi.org/>.

Outcomes and evidence requirements

Outcome 1

Explain fundamentals of recycling fibre products.

Evidence requirements

- 1.1 Grades of waste paper are identified.

Range grades – broke, converter's, used.
- 1.2 Characteristics and end use of each recycled fibre group are identified and explained in terms of fibre type and content, contaminants, fillers, and substitution.

Range contaminants – plastics, heavy contraries, light contraries, contraries requiring dispersion or de-inking.

- 1.3 Effluent solids are explained and possible disposal methods for each are identified.
- Range solids – polythene, ink, clarifier solids;
methods – land fill, fuel, soil conditioner.
- 1.4 Liquid effluent treatment methods are described.
- Range clarification, anaerobic, settlement, aeration.
- 1.5 Functions of the fiberiser and drum sorter are identified and explained in terms of accepts, heavy rejects, and light rejects.

Outcome 2

Explain fundamentals of waste paper pulping.

Evidence requirements

- 2.1 Components of a waste paper pulping system are identified and explained in terms of their purpose.
- Range low-consistency hydropulper, high-consistency hydropulper, ragger, flote-purge, junker, drubber, deflaker.
- 2.2 Components of a hydropulper are identified and explained in terms of their purpose.
- Range bowl, rotor, screen plate, conveyor, drive.

Outcome 3

Explain fundamentals of waste paper furnish screening.

Evidence requirements

- 3.1 Components of a waste paper furnish screening system are identified and explained in terms of their purpose.
- Range flat screen, pressure screen.
- 3.2 Screening is described in terms of positive and probability separation, and the operation of pressure screens is described.
- Range pressure screen operation must include – baskets, foils, pressure pulses.
- 3.3 Reasons for multi-stage screening are identified in terms of reject reduction and separation, and typical cascade system is explained.
- 3.4 Fractionation is explained terms of fibre type separation, fibre treatment, energy, waste grading, and fibre utilisation, and its benefits are identified.

3.5 Method of fibre separation is explained in terms of statistical function, and its effects are explained on reject-to-accept ratio and consistency.

3.6 Importance of stock consistency and its control is explained in terms of fractionation rate, reject consistency, flow rates, and capacity.

Outcome 4

Explain fundamentals of waste paper furnish cleaning.

Evidence requirements

4.1 Components of a waste paper furnish cleaning system are identified and their purpose is explained.

Range cyclones, centrifugal cleaners, thickeners.

4.2 Principles and operation of centrifugal cleaners are explained.

Range liquid cyclone, vortex, reject valves, pressure drop.

Outcome 5

Explain fundamentals of recycled fibre dispersion plants.

Evidence requirements

5.1 Purpose of dispersion is explained in terms of the dispersal and reduction in size and/or removal of contraries.

5.2 Components of a dispersion system are identified and their functions are explained.

Range thickener, heater, disperser, refiner, slusher.

Outcome 6

Explain fundamentals of de-inking.

Evidence requirements

6.1 Purpose of de-inking is explained in terms of removal or dispersal of ink and the end uses for the de-inked product are identified.

Range end uses – newsprint, writing and printing, boards, virgin pulp substitute.

6.2 Chemicals added to the pulper to assist de-inking are identified and their effects are explained.

Range chemicals – caustic soda, soaps, dispersants, stabilisers, chelating agents.

6.3 Flotation de-inking is described and its advantages are identified in terms of losses, water economy, and particle removal.

6.4 Air injection and foam removal methods are explained for flotation de-inking.

Range air injection – injector, compressor;
foam removal – overflow, suction.

6.5 De-inking by washing is described in terms of particle size removal and requirements for good removal.

Range requirements – fibre mass.

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	30 November 2000	N/A
Review	2	18 December 2006	N/A
Review	3	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.