

Title	Produce components by performing engineering machining operations in MaPS environment		
Level	3	Credits	7

Purpose	<p>This unit standard has been designed for secondary school learners in a manufacturing pathway skills (MaPS) programme.</p> <p>People credited with this unit standard are able to: prepare for machining operations; perform machining operations to produce components; and verify tolerances of machined product.</p>
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Classification	Mechanical Engineering > Manufacturing Pathways Skills
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Available grade	Achieved
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Guidance Information

- 1 Legislation and references relevant to this unit standard:

Health and Safety at Work Act 2015.

Safety in Technology Education: A Guidance Manual for New Zealand Schools 2017 and any subsequent versions of this document, available from Ministry of Education website (<https://education.govt.nz>).

R. Culley (2010) *Fitting and Machining*, Melbourne, Australia, RMIT Publishing, ISBN 9781921426780.
- 2 Definitions

Components – a part of a larger whole, especially a part of a machine or vehicle.

MaPS refers to Manufacturing pathways skills.

MaPS environment refers to any workplace or context where work or activities related to the Manufacturing and Engineering sector take place.

MaPS project refers to a project undertaken in a MaPS environment under general supervision, using a range of tools, equipment and materials, and involving standard processes.

Specifications – detail that defines an object being made; commonly communicated by annotated and dimensioned drawings; by written description, or by other communication media. External references may also be used to specify objects such as tables or industry standards.

Workshop procedures – procedures used by the school carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

Workshop recycling procedures – procedures used by the school workshop to recycle materials. Examples are – ferrous-nonferrous metal scrap bins, sorting of recyclable materials.

Machining operations – for the purpose of this unit standard refers to turning and milling operations.

3 Assessment information

Demonstrated knowledge must be within the context of mechanical engineering and aligned with accepted industry practice. All tasks must be completed in accordance with workshop procedures.

It is recommended that the skills in this unit standard be assessed using projects that integrate all the skills for turning and milling contained in the unit.

Outcomes and performance criteria

Outcome 1

Prepare for machining operations.

Range turning operations – parallel turning between centres, taper turning using the compound slide, boring, drilling, reaming, facing, simple V form external thread, grooving, parting off;
turning tolerances – diameter +/-0.1 mm, length +/-0.2 mm;
evidence is required of two different turning operations which may include using four-jaw chucks;
milling operations – end milling, slot milling, face milling, keyway cutting, boring;
milling tolerances – +/-0.2 mm;
evidence is required of two different milling operations.

Performance criteria

- 1.1 Drawings, instructions, and specifications are interpreted to establish job requirements.
- 1.2 Sequence of operations is planned to achieve job requirements in accordance with workshop procedures.
- 1.3 Machine condition and capability are checked.
- 1.4 Components are marked out as required in accordance with specifications.
- 1.5 Accessories and work-holding fixtures are installed to securely hold the work.
- 1.6 Tools are selected in accordance with job requirements.
- 1.7 Speeds and feeds are selected relevant to machine, material, tooling, and job requirements.

Outcome 2

Perform machining operations to produce components.

Performance criteria

- 2.1 Machine coolant type and flow are adjusted if required by machine operations.
- 2.2 Components are machined and finished to tolerances.
- 2.3 Machine is cleaned, and waste material disposed of in accordance with workshop recycling procedures.

Outcome 3

Verify tolerances of machined product.

Range turning tolerances – diameter +/-0.1 mm, length +/-0.2 mm;
milling tolerances – +/-0.2 mm.

Performance criteria

- 3.1 Measuring instruments are selected, appropriate to the tasks and items to be measured.
- 3.2 Measuring instruments calibration is verified and used.
- 3.3 Accuracy of measurements are verified against tolerances.

Planned review date	31 December 2024
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	23 April 2020	N/A

Consent and Moderation Requirements (CMR) reference	0013
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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 Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.