Title	**Demonstrate knowledge of toolmaking principles**		
Level	**3**	**Credits**	**2**

Purpose	This unit standard is for people training to work in mechanical engineering trades where precision tools are made. It covers the principles of making precision tools for modern metal and plastics production machinery. People credited with this unit standard are able to demonstrate knowledge of press toolmaking, toolmaking for plastics, pressure diecasting, jigs and fixtures, and limit gauges.

Classification	Mechanical Engineering > Engineering Machining and Toolmaking

Available grade	Achieved

Guidance Information

Reference
Culley, Ron, ed. *Fitting and Machining.* ISBN 0724138196. Melbourne: RMIT Publishing, 2009.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of press toolmaking.

Performance criteria

1.1 The operation of a typical press is described using reference to diagrams.

1.2 The major press operations are described using reference to the action of tools on the working material.

Range operations – blanking, piercing, bending, forming.

1.3 Three stages in the piercing action are described. The description uses reference to the appearance of the cut edge and the significance of the clearance between punch and die.

1.4 The components and action of a typical blanking die are described using reference to diagrams.

Outcome 2

Demonstrate knowledge of toolmaking for plastics.

Performance criteria

2.1 The properties of thermosetting and thermoplastic polymers are compared using reference to tool construction.

2.2 Plastics moulding processes are described using reference to machine diagrams.

Range injection moulding, blow moulding, compression moulding, extrusion;
evidence of two is required.

2.3 The components and actions of typical tools are described using reference to diagrams.

Range injection moulding, blow moulding, compression moulding, extrusion;
evidence of two is required.

2.4 Material shrinkage consideration is explained for the design of tooling for plastic moulding.

Outcome 3

Demonstrate knowledge of pressure diecasting.

Performance criteria

3.1 The operation of the pressure diecasting process is described using reference to diagrams.

3.2 The key differences in tooling for plastic injection moulding and pressure diecasting are identified.

3.3 Material shrinkage consideration is explained for the design of tooling for pressure diecasting.

Outcome 4

Demonstrate knowledge of jigs and fixtures.

Performance criteria

4.1 The difference between jigs and fixtures used in machining operations is explained.

4.2 The components and action of a typical jig or fixture are described using reference to diagrams.

Outcome 5

Demonstrate knowledge of limit gauges.

Performance criteria

5.1 The purpose of limit gauges is described, and the difference between go and no-go gauges explained for part and manufacturing assembly.

5.2 The relationship between work tolerance and gauge tolerance is explained for part and manufacturing assembly.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 June 2006	31 December 2022
Rollover and Revision	2	17 November 2011	31 December 2022
Review	3	14 December 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013

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.