Title	**Design pattern and/or tooling for industry**		
Level	**5**	**Credits**	**15**

Purpose	People credited with this unit standard are able to: prepare design requirements for pattern and/or tooling; design pattern and/or tooling; and complete documentation for pattern and/or tooling.

Classification	Mechanical Engineering > Engineering Patternmaking

Available grade	Achieved

Entry information	
Recommended skills and knowledge	Unit 29635, *Make patterns and/or tooling for use in industry*; or demonstrate equivalent knowledge and skills.

Explanatory notes

1 References
Health and Safety at Work Act 2015.
Resource Management Act 1991.
Hazardous Substances and New Organisms Act 1996.
WorkSafe New Zealand. *Health and Safety Guidelines on the Management of Hazards in the Metal Casting Industry*. Available at: http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/metal-casting-industry-health-and-safety-guidelines-for-the-management-of-hazards-in/metal-casting-hs-guidelines.pdf.
WorkSafe New Zealand. *Code of Practice for Health and Safety in the Manufacture of Composites Based on Synthetic Resins* (*Fibreglass*). Available at: https://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/composites-based-on-synthetic-resins-fibreglass-code-of-practice-for-health-and-safety-in-the-manufacture-of/compositescode.pdf.

2 Definition
Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.
Workplace procedures refer to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – 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.

3 Range
Evidence must be demonstrated in one industry accepted test piece involving hand and machine operations.

4 Assessment Information
- a All activities must comply with relevant legislative and/or regulatory requirements, which include, but are not limited to those listed in the references.
- b All activities must comply with applicable workplace procedures and must be consistent with accepted industry practice.
- c Essential underpinning skills and knowledge for this unit standard include: computer aided draughting (CAD), foundry technology, manufacturing processes, and metallurgical principles and skills.

Outcomes and evidence requirements

Outcome 1

Prepare design requirements for pattern and/or tooling.

Evidence requirements

1.1 Product specifications and optional requirements are confirmed with the customer.

1.2 Proposed machining and manufacturing processes are established with the customer.

Range includes quantity and/or production runs.

1.3 Complementary service requirements are clarified with the customer.

1.4 Potential design and/or structural and safety hazards are ascertained in accordance with industry safety policies.

Outcome 2

Design pattern and/or tooling.

Evidence requirements

2.1 Layout produced covers design requirements in accordance with specifications.

2.2 Machining and manufacturing requirements are incorporated into design in accordance with workplace procedures.

2.3 Complementary service requirements are incorporated into design in accordance with workplace procedures.

2.4 Working drawings of pattern and/or tooling design are produced in accordance with workplace procedures.

Range may be from hand sketch to CAD and data processing.

2.5 Preventative actions are incorporated into design, in accordance with relevant legislation for potential hazards.

2.6 Product produced from pattern or tooling conforms to product specification.

Outcome 3

Complete documentation for pattern and/or tooling.

Evidence requirements

3.1 Critical tooling dimensions are established and recorded in accordance with job requirements.

3.2 Process requirement calculations are established and recorded in accordance with job requirements.

3.3 Design calculations are established and recorded in accordance with job requirements.

3.4 Design information and documentation are provided to customer in accordance with workplace procedures.

Planned review date	31 December 2021

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 October 1994	31 December 2012
Revision	2	14 April 1997	31 December 2012
Revision	3	5 January 1999	31 December 2012
Review	4	19 October 1999	31 December 2012
Review	5	19 May 2006	31 December 2016
Rollover and Revision	6	17 November 2011	31 December 2016
Review	7	18 August 2016	N/A

Consent and Moderation Requirements (CMR) reference	0013

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.