Title	**Create three-dimensional engineering models using CAD software under supervision**		
Level	**3**	**Credits**	**5**

Purpose	People credited with this unit standard are able to, under supervision: prepare three-dimensional environment; create and modify three-dimensional engineering model; produce output from three-dimensional engineering model; and confirm output compliance.

Classification	Mechanical Engineering > Engineering Drawing and Design

Available grade	Achieved

Entry information	
Recommended skills and knowledge	Unit 2433, *Produce engineering component drawings using CAD software,* or demonstrate equivalent skills and knowledge.

Explanatory notes

1 Reference
SAA/SNZ HB1:1995 Joint handbook – *Technical drawing for students*. Available from Standards New Zealand.

2 Definitions
CAD – computer aided design.
DXF – drawing exchange format.
Entities – single items created on screen which may include but are not limited to – lines, arcs, circles, text, hatch, dimensions
IGES – initial graphics exchange specification.
Primitive shapes – the basic elements of graphics output which includes – spheres, cones, cylinders, boxes.
STEP – standard for the exchange of product data.
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.
Job specifications refers to instructions relevant to the safe completion of the specific task, such as technical specifications, assembly instructions, drawings, parts lists, standards, codes of practice, test and commissioning procedures, and verbal instructions.
Supervision refers to working under the direction of a suitably qualified tradesman or manager who oversees the learner and is responsible for ensuring that the quality of work meets the required standard.

Three dimensional (3D) CAD software refers to software developed to draw and manipulate objects that have height, width and depth.
Workplace procedures refers 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 Assessment information
Assessment against this unit standard requires the production of at least three, three-dimensional models using any proprietary 3D CAD software that permits the creation and manipulation of entities and primitive shapes.

Outcomes and evidence requirements

Outcome 1

Prepare three-dimensional environment under supervision to meet component modelling requirements.

Evidence requirements

1.1 Co-ordinate system is set up.

1.2 Orientation is established.

1.3 Views are established.

Outcome 2

Create and modify three-dimensional engineering models under supervision to meet component modelling requirements.

Evidence requirements

2.1 Entities are created in three-dimensional space.

2.2 Primitive shapes are created in three-dimensional space.

2.3 Entities are manipulated in three-dimensional space.

Range examples of manipulating images – changing view, shape, dimensions, colour, texture.

2.4 Existing three-dimensional model is modified.

Range examples of modification – changing shape, dimensions, tolerances, finish.

2.5 Surfaces are created in three-dimensional space.

Range may include but is not limited to – plane, revolved, swept, extruded, shelled.

Outcome 3

Produce output from three-dimensional engineering model under supervision.

Evidence requirements

3.1 File is saved for retrieval in accordance with workplace procedures or accepted industry practice.

3.2 Hard copy of three-dimensional model is produced to meet component construction requirements in accordance with workplace procedures or accepted industry practice.

Range two-dimensional drawings and pictorial views, including working dimensions.

3.3 Physical properties are extracted from the model to determine component properties.

Range includes but is not limited to – volume, mass, centre of gravity.

3.4 Drawing files are saved in different formats in accordance with workplace procedures or accepted industry practice.

Range may include but is not limited to – IGES, DXF, STEP.

Outcome 4

Confirm output compliance under supervision.

Evidence requirements

4.1 Output is checked to ensure compliance with job specifications.

4.2 Any non-conformance to job specifications is corrected in accordance with workplace procedures or accepted industry practice.

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	31 October 1994	31 December 2011
Revision	2	14 April 1997	31 December 2011
Revision	3	5 January 1999	31 December 2011
Revision	4	23 May 2001	31 December 2011
Review	5	26 July 2004	31 December 2011
Rollover and Revision	6	20 March 2009	31 December 2016
Review	7	17 November 2011	31 December 2021
Review	8	15 September 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.