

## National Diploma in Engineering (Level 6) with strands in Mechanical Engineering, Production Engineering, and Mechanical Services, and with an optional strand in Practical Endorsement

<b>Level</b>	<b>6</b>
<b>Credits</b>	<b>244</b>

This qualification has been **reviewed**. The last date to meet the requirements is 31 December 2015.

### Purpose

Holders of this qualification are people who possess a sound knowledge of mechanical engineering fundamentals, as well as being able to demonstrate a range of technical and practical skills in specialist areas. The compulsory and core elective components of this qualification focus on the principles of mechanical engineering and their application, by recognizing the skills needed to solve engineering problems, using appropriate analytical techniques, methods of investigation and engineering technologies.

The individual strands in this qualification provide a distinct career path into specialist areas for learners. This could include, but is not limited to, detailed design, advanced testing, maintenance, project management, production or operations management, or assisting professional engineers.

The diploma must be completed with one of the following strands:

- Mechanical Engineering – this strand focuses on careers in mechanical engineering
- Production Engineering – this strand focuses on careers within manufacturing engineering
- Mechanical Services – this strand focuses on careers within refrigeration, heating, ventilating, and air conditioning engineering.

There is also the option of obtaining a strand in Practical Endorsement, which recognises the practical application of skills relevant to the mechanical engineering industry.

This qualification may follow a number of National Certificates, such as:

- National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 5) [Ref: 0718]
- National Certificate in Engineering Machining and Toolmaking (Level 5) [Ref: 0719]
- National Certificate in Refrigeration and Air Conditioning (Level 5) [Ref: 0720]
- National Certificate in Heating, Ventilating, and Air Conditioning (Mechanical Services) Level 5 [Ref: 0897]
- National Certificate in Engineering – Fabrication (Level 5) with strands in Heavy Fabrication, Light Fabrication, and Welding [Ref: 0681].

This diploma provides a base from which further industry-linked qualifications can be added, and provides a route to higher qualifications in engineering, including degrees.

This qualification has been developed to meet international benchmarks for engineering technicians.

## Replacement Information

This qualification has been replaced by the New Zealand Diploma in Engineering Practice (with strands in Civil Engineering, Electrical Engineering and Mechanical Engineering) [Ref: 1714] and the New Zealand Diploma in Engineering [Ref: 112950].

This qualification replaced the New Zealand Certificate in Engineering (NZCE): Mechanical; Power and Plant; Heating, Ventilating and Air Conditioning.

## Special Notes

### Entry Provisions

Entry to the qualification is open. However, it is recommended that people have already demonstrated their capacity to achieve at this advanced level by meeting at least one of the following preferred entry provisions:

- A minimum total of 32 credits, of which:
  - 8 credits are from standards in the English domain at level 1 or above,
  - 12 credits are from standards in the Mathematics subfield at level 2 or above, and
  - 12 credits are from standards in the Physics domain at level 2 or above.
- A minimum total of 44 credits, of which:
  - 8 credits are from standards in the English domain at level 1 or above,
  - 12 credits are from standards in the Mathematics subfield at level 2 or above, and
  - 24 credits are from standards at level 2 or above from any of the following subfields: Computing, Mechanical Engineering, English;  
or domains: Accounting Generic, Design - Graphic Communication, Electronics Technology, Technology - General Education, Biology, Chemistry, Physics, Science – Core, Economics, Geography, History.
- Award of a National Certificate in the Mechanical Engineering subfield at level 4 or above and at least 12 credits from standards in the Mathematics subfield at level 2 or above.
- Award of a mechanical engineering Trade Certificate and either sixth form certificate mathematics or at least 12 credits from the Mathematics subfield at level 2 or above.

### Recognition of Prior Learning

Arrangements for the recognition of prior learning (RPL) and/or recognition of current competence (RCC) for those with relevant Degree papers, NZCE papers, Trade and Advanced Trade Certificates are available from Competenz and accredited providers.

## Credit Range

	Core Compulsory	Core Elective
Level 2 credits	19	-
Level 3 credits	15	-
Level 4 credits	56	-
Level 5 credits	64	-
Level 6 or above credits	15	30
Minimum totals	169	30

	Mechanical Engineering Strand	Production Engineering Strand
Level 5 credits	15	15
Level 6 or above credits	30	30
Minimum totals	45	45

	Mechanical Services Strand	Practical Endorsement Optional Strand
Level 3 credits	-	0-11
Level 4 credits	-	0-8
Level 5 credits	-	0-32
Level 6 or above credits	45	30-60
Minimum totals	45	60

## Requirements for Award of Qualification

### Award of NZQF National Qualifications

Credit gained for a standard may be used only once to meet the requirements of this qualification.

Unit standards and achievement standards that are equivalent in outcome are mutually exclusive for the purpose of award. The table of mutually exclusive standards is provided on the New Zealand Qualifications Authority (NZQA) website: <http://www.nzqa.govt.nz/qualifications-standards/standards/standards-exclusion-list/>.

Reviewed standards that continue to recognise the same overall outcome are registered as new versions and retain their identification number (ID). Any version of a standard with the same ID may be used to meet qualification requirements that list the ID and/or that specify the past or current classification of the standard.

## Summary of Requirements

- Core Compulsory standards
- Core Elective – A minimum of 30 credits as specified

One of the following strands is required

- Mechanical Engineering Strand
- Production Engineering Strand
- Mechanical Services Strand

The following strands are optional

- Practical Endorsement Optional Strand

## Detailed Requirements

### Core Compulsory

The following standards are required

Engineering and Technology > Engineering > Generic Engineering

ID	Title	Level	Credit
12634	Identify and apply ethical responsibilities relating to professional engineering practice	5	4

Engineering and Technology > Mechanical Engineering > Applied Principles of Mechanical Engineering

ID	Title	Level	Credit
11385	Demonstrate and apply knowledge of fluid mechanics in mechanical engineering	6	15
14866	Demonstrate workshop skills for mechanical engineering	2	12
21772	Apply sketching techniques and produce drawings for mechanical engineering	4	11
21773	Demonstrate and apply knowledge of mechanical statics for mechanical engineering	4	15
21774	Demonstrate and apply knowledge of mechanical dynamics for mechanical engineering	4	15
21775	Demonstrate knowledge of mathematical principles for mechanical engineering	3	15
21776	Apply knowledge of calculus and data analysis for mechanical engineering	4	15
21781	Explain and apply laws of thermodynamics in mechanical engineering	5	15
21785	Demonstrate knowledge of and test materials for mechanical engineering applications	5	15
21787	Demonstrate and apply electrical and electronic knowledge to mechanical engineering	5	15
21788	Demonstrate and apply knowledge of manufacturing processes and equipment for mechanical engineering	5	15

## Engineering and Technology &gt; Mechanical Engineering &gt; Engineering Core Skills

ID	Title	Level	Credit
21911	Demonstrate knowledge of safety on engineering worksites	2	1
21912	Apply safe working practices on an engineering worksite	2	2

## Engineering and Technology &gt; Mechanical Engineering &gt; Engineering Drawing and Design

ID	Title	Level	Credit
2430	Draw and interpret engineering sketches under supervision	2	4

**Core Elective**

A minimum of 30 credits at Level 6 or above

## Engineering and Technology &gt; Engineering &gt; Generic Engineering

ID	Title	Level	Credit
11413	Produce a design from a supplied design concept	6	15

Field	Subfield	Domain
Engineering and Technology	Mechanical Engineering	Applied Principles of Mechanical Engineering

**Mechanical Engineering Strand**

The following standards are required

## Engineering and Technology &gt; Mechanical Engineering &gt; Applied Principles of Mechanical Engineering

ID	Title	Level	Credit
21277	Demonstrate and apply knowledge of the mechanics of machines in mechanical engineering	6	15
21783	Demonstrate and apply knowledge of strength of materials in mechanical engineering	5	15
21784	Demonstrate and apply advanced knowledge of strength of materials in mechanical engineering	6	15

**Production Engineering Strand**

The following standards are required

## Engineering and Technology &gt; Mechanical Engineering &gt; Applied Principles of Mechanical Engineering

ID	Title	Level	Credit
21777	Apply knowledge of quality and reliability for mechanical engineering production	6	15

ID	Title	Level	Credit
21778	Demonstrate and apply knowledge of mechanical engineering operations management	6	15
21779	Demonstrate and apply knowledge of mechanical engineering planning	5	15

### Mechanical Services Strand

A minimum of 45 credits

Engineering and Technology > Mechanical Engineering > Applied Principles of Mechanical Engineering

ID	Title	Level	Credit
24530	Demonstrate and apply knowledge of water-based system design for HVAC applications	6	15
24531	Demonstrate and apply knowledge of piped services system design	6	15
24532	Demonstrate and apply knowledge of air handling system design for HVAC applications	6	15
24533	Demonstrate and apply knowledge of HVAC control and building management system design	6	15
24534	Demonstrate and apply knowledge of commercial and light industrial RAC system design	6	15
24535	Demonstrate and apply knowledge of industrial refrigeration system design	6	15

### Practical Endorsement Optional Strand

A minimum of 60 credits

- Of which a minimum of 30 credits at Level 6 or above

Business > Accounting > Accounting - Generic

ID	Title	Level	Credit
7380	Recognise and examine management control concepts	3	3

Business > Business Operations and Development > People Development and Coordination

ID	Title	Level	Credit
25463	Manage a plan to achieve organisational objectives	5	10

Business > Business Operations and Development > Quality Management

ID	Title	Level	Credit
8081	Collect data for a specified purpose	3	8

## Business &gt; Management &gt; Management - Systems and Resources

ID	Title	Level	Credit
7459	Develop, manage, and evaluate improvements to products, services, and systems	6	10
7461	Plan procurement of material, plant and equipment supplies	6	10
8505	Set, control, and justify budgets	6	5

## Engineering and Technology &gt; Engineering &gt; Generic Engineering

ID	Title	Level	Credit
11405	Prepare estimates of engineering project costings	5	4

## Engineering and Technology &gt; Mechanical Engineering &gt; Engineering Core Skills

ID	Title	Level	Credit
21771	Manage a mechanical engineering project	6	20

## Engineering and Technology &gt; Mechanical Engineering &gt; Engineering - Measurement

ID	Title	Level	Credit
4439	Select, use, and care for complex engineering measuring equipment for precision jobs	4	4
4441	Calibrate engineering measuring devices and equipment	4	4
4442	Demonstrate knowledge of, and use, coordinate measuring machine (CMM) technology	5	6
4443	Demonstrate knowledge of, and apply, international measurement uncertainty principles in engineering	5	2

## Engineering and Technology &gt; Mechanical Engineering &gt; Maintenance and Diagnostics in Mechanical Engineering

ID	Title	Level	Credit
11399	Develop, implement, and review maintenance plans for mechanical engineering systems	6	20
11400	Manage testing and measuring procedures within mechanical engineering contexts	6	5
11401	Carry out tests and measurements using approved procedures within mechanical engineering contexts	5	10
21780	Develop and implement design in a mechanical engineering workplace	6	20
21786	Select and specify materials for mechanical engineering applications	6	20

## Credit Transfer Arrangements

Candidates for this qualification may claim exemptions from listed standards as specified below. The application form for exemptions is attached to this document (Appendix 1).

### Exemptions for engineering papers

Candidates with passes in relevant engineering papers from a New Zealand University or Polytechnic Degree may claim exemptions from the following standards.

Credit for			Exempt from
Ref	No	Title	Standard ID
	94972	Achieved a pass in Engineering Intermediate Mathematics	21775, 21776
	94973	Achieved a pass in Engineering Mechanics Stage 1	21773

Competenz will consider and approve relevant engineering papers and verify results before applications are sent to NZQA for processing.

### Exemptions for Trade or Advanced Trade Certificates

Holders of Trade or Advanced Trade Certificates may claim exemptions from the following standards.

Exempting Qualification	Exempt from
Trade Certificate/Advanced Trade Certificate in any one of the following: <ul style="list-style-type: none"> <li>• Boilermaking</li> <li>• Fitting and Turning</li> <li>• Fitting &amp; Welding A</li> <li>• Fitting &amp; Welding B</li> <li>• Heating, Ventilating &amp; Air Conditioning</li> <li>• Refrigeration</li> <li>• Sheetmetal Engineering</li> <li>• Toolmaking</li> <li>• Patternmaking</li> </ul>	2430, 21911, 21912, 14866

## Transition Arrangements

### Version 4

Version 4 was issued to indicate that this qualification is expiring.

This qualification has been replaced by the New Zealand Diploma in Engineering Practice (with strands in Civil Engineering, Electrical Engineering and Mechanical Engineering) [Ref: 1714] and the New Zealand Diploma in Engineering [Ref: 112950].

For detailed information see [Review Summaries](#) on the NZQA website.



Enrolments in the replacement qualification, the New Zealand Diploma in Engineering [Ref: 112950], commenced in February 2011. Transition arrangements were included when that qualification was listed on the NZQF. No new enrolments have been accepted into programmes leading to the award of the expiring qualification since February 2012. Only one provider, Western Institute of Technology at Taranaki, still has students enrolled in the expiring qualification and it is expected that they will complete the qualification in 2013. Competenz has previously notified all providers that the qualification will expire in December 2015.

Candidates enrolled in the programmes leading to award of this qualification with the Practical Endorsement Optional Strand are advised that assessment against standard 8505 is no longer available as it expired in December 2012. However, there are sufficient credits available from the other listed standards to meet the strand requirements. Assessment against expiring standards 7380, 21771, and 25463 must be completed before they expire in December 2014.

This qualification contains standards that replace earlier standards. For the purposes of this qualification people who have gained credit for expiring standards are exempt from the requirement to gain credit for the replacement standards.

Credit for	Exempt from
2824	21911, 21912
7452	25463
11387	21781, 21782
11388, 11389	21773, 21774
11390	21783, 21784
11391	21277
11394	21785
11395, 11396	21787
11397	21788
11414	2430, 21772

It is not intended that anyone is disadvantaged by this review, and the above arrangements have been designed for a smooth transition. However, anyone who feels they have been disadvantaged may appeal to Competenz – see contact details below.

### Previous versions of the qualification

Version 3 was issued following a review by key stakeholders. These stakeholders included representatives from the refrigeration, heating, ventilating and air conditioning industry and a consortium of Institutes of Technology and Polytechnics. Changes included: the purpose statement was updated to more accurately describe the purpose

and focus of the qualification; an extra strand in Mechanical Services was added to cater for careers in the refrigeration, heating, ventilating, and air conditioning sectors; and credit transfer arrangements were updated to include exemptions for holders of the Trade Certificate/Advanced Trade Certificate in Fitting and Turning.

Version 2 was issued following review. Changes included: total credits were increased from 240 to 244 credits; qualification was stranded to recognise production engineering as well as mechanical engineering; an optional strand in Practical Endorsement was added to recognise practical experience; the compulsory section was updated to reflect current industry requirements; credit transfer arrangements were included for people with passes in specified University or Polytechnic papers and holders of specified Trade or Advanced Trade Certificates.

Version 1 replaced the New Zealand Certificate in Engineering (NZCE): Mechanical; Power and Plant; Heating Ventilating and Air Conditioning. The final date for the award of NZCE was 31 December 2008.

## NZQF National Qualification Registration Information

Process	Version	Date	Last Date for Assessment
Registration	1	October 1998	December 2010
Review	2	February 2006	December 2012
Review	3	February 2009	December 2015
Review	4	April 2013	December 2015

### Standard Setting Body

Competenz  
PO Box 9005  
Newmarket  
Auckland 1149

Telephone 0800 526 1800  
Email [qualifications@competenz.org.nz](mailto:qualifications@competenz.org.nz)

### Other standard setting bodies whose standards are included in the qualification

InfraTrain New Zealand  
NZQA

### Certification

This certificate will display the logos of NZQA, Competenz and the organisation that has been granted consent to assess against standards that meet the requirements of the qualification (accredited).

### Classification

This qualification is classified according to the classification system listed on the Directory of Assessment Standards (DAS) and the New Zealand Standard Classification of Education (NZSCED) system as specified below.

DAS Classification		NZSCED	
Code	Description	Code	Description
360	Engineering and Technology > Engineering	030701	Engineering and Related Technologies > Mechanical and Industrial Engineering and Technology > Mechanical Engineering

**Quality Management Systems**

Providers and Industry Training Organisations must be granted consent to assess by a recognised Quality Assurance Body before they can register credits from assessment against standards. Organisation with consent to assess and Industry Training Organisations assessing against standards must engage with the moderation system that applies to those standards. Consent to assess requirements and the moderation system are outlined in the associated Consent and Moderation Requirements (CMR) for each standard.

Reviewing

## Appendix 1

### **Application Form for Exemptions National Diploma in Engineering (Level 6) with strands in Mechanical Engineering, Production Engineering, Mechanical Services and an optional Practical Endorsement strand**

To be completed by applicants and processed in the first instance through the applicant's accredited training provider or Industry Training Organisation (ITO).

**Section A.** To be completed by applicants.

**Section B.** To be completed with the details from the candidate's Academic Record. *NB Competenz will consider and approve relevant engineering papers and verify results before applications are sent to NZQA for processing.*

**Section C.** To be signed by the accredited training provider or ITO to certify that the results recorded are correct.

**Section D.** Credit Fees. The usual credit fee will apply and must be paid before the application is processed.

Completed forms are to be sent to:

Tertiary Records  
New Zealand Qualifications Authority  
PO Box 160  
WELLINGTON



**Section A – Personal Details**  
PLEASE USE BLOCK LETTERS

**Surname (family name)**

**First Names (given names):**

Enter all names in full

**NZQA Record of Achievement ID No:**

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**Date of Birth:**

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Day

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Month

19

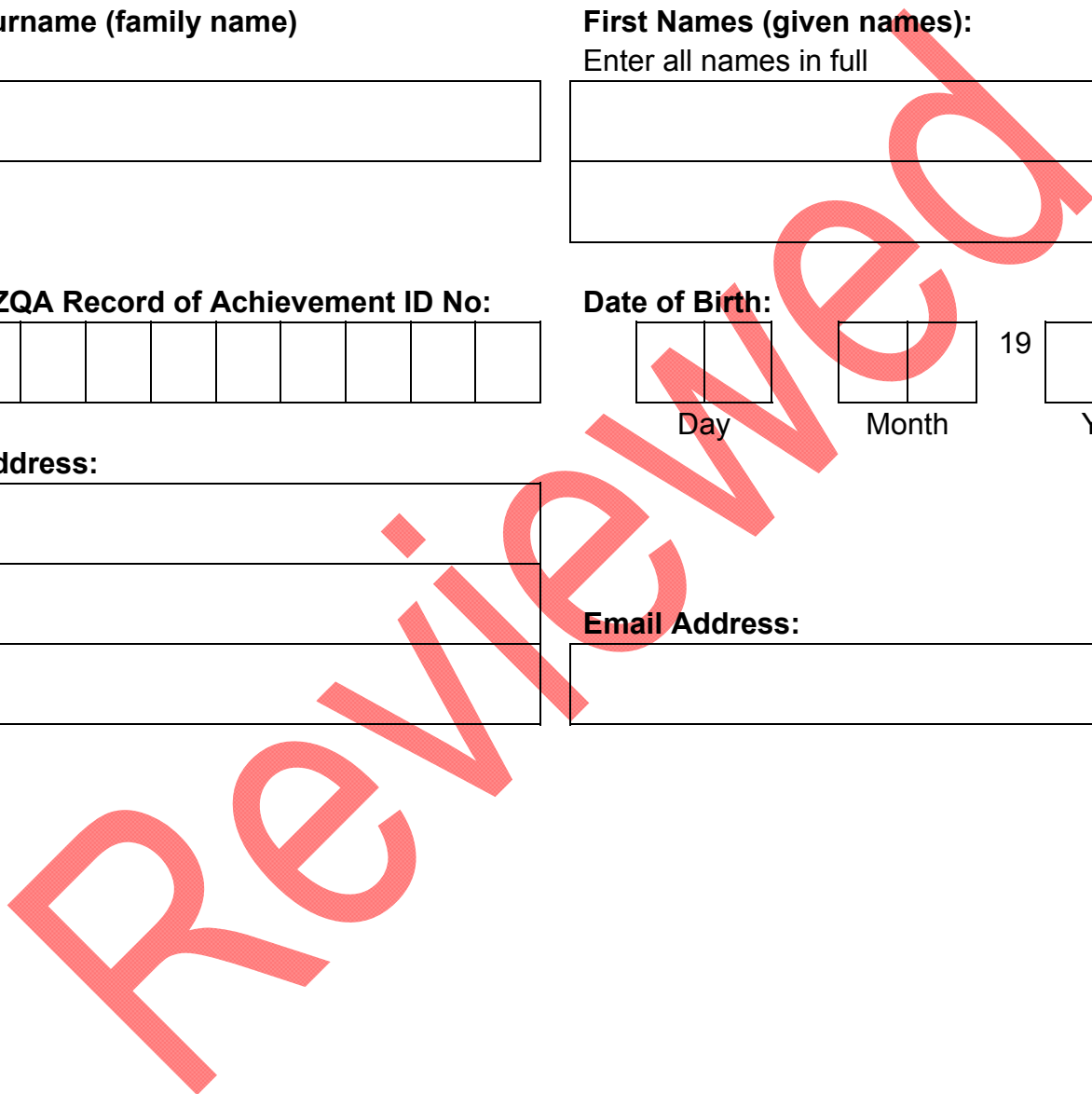
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Year

**Address:**

**Email Address:**





**Section B – Confirmation of Academic Record**

AN APPROPRIATELY RESPONSIBLE PERSON AT THE ACCREDITED TRAINING PROVIDER OR ITO MUST SIGHT DOCUMENTARY PROOF OF SUBJECT PASSES OR CERTIFICATES AWARDED.

**Exemptions for engineering papers**

Candidates with passes in relevant engineering papers from a New Zealand University or Polytechnic Degree may claim exemptions from listed standards as specified below.

<i>Credit for</i>	<i>Paper Name and Code</i>	<i>Year Passed</i>	<i>Exempt from</i>
A pass in one Engineering Intermediate Mathematics paper			21775 and 21776
A pass in one Engineering Mechanics Stage 1 paper			21773

**Exemptions for Trade or Advanced Trade Certificates**

Holders of Trade or Advanced Trade Certificates may claim exemptions from unit standards as specified below.

<i>Exempting Qualification</i>	<i>Year Awarded</i>	<i>Exempt from</i>
Trade Certificate/Advanced Trade Certificate in any one of the following: <ul style="list-style-type: none"> <li>• Boilermaking</li> <li>• Fitting and Turning</li> <li>• Fitting &amp; Welding A</li> <li>• Fitting &amp; Welding B</li> <li>• Heating, Ventilating &amp; Air Conditioning</li> <li>• Refrigeration</li> <li>• Sheetmetal Engineering</li> <li>• Toolmaking</li> <li>• Patternmaking</li> </ul>		2430, 21911, 21912, 14866



**Section C – Declaration by Accredited Tertiary Provider/Industry Training Organisation**

This is to certify that documentary proof of subject passes or certificates awarded in Section B have been sighted.

<b>Name (please print)</b>	<b>Signed by</b>
<input style="width: 100%; height: 30px;" type="text"/>	<input style="width: 100%; height: 30px;" type="text"/>
<b>Designation</b>	<b>Date</b>
<input style="width: 100%; height: 30px;" type="text"/>	<input style="width: 100%; height: 30px;" type="text"/>
<b>Organisation</b>	<b>Contact Telephone No</b>
<input style="width: 100%; height: 30px;" type="text"/>	<input style="width: 100%; height: 30px;" type="text"/>

**Section D – Credit Fees**

Exemptions sought:	_____	
21775, 21776	_____	30 credits
21773	_____	15 credits
2430, 21911, 21912, 14866	_____	19 credits
	_____	Total credits
x \$1.55 per credit fee:	\$ _____	Total NZQA credit fees

