

National Certificate in Engineering and Technology (Plastics Engineering) (Level 4) with strands in Injection Moulding, Extrusion, Blow Moulding, Pressure Thermoforming, Vacuum Thermoforming, Blown Film Extrusion, Film Conversion, Injection Stretch-Blow Moulding, and Rotational Moulding

Level	4
Credits	311-345

Purpose

The National Certificate in Engineering and Technology (Plastics Engineering) (Level 4) with strands in Injection Moulding, Extrusion, Blow Moulding, Pressure Thermoforming, Vacuum Thermoforming, Blown Film Extrusion, Film Conversion, Injection Stretch-Blow Moulding, and Rotational Moulding [Ref: 1407] is a technical qualification in the plastics industry. It is designed for people who intend to become engineering and maintenance specialists in the plastics industry. Holders of this certificate are able to undertake a wide range of activities related to the maintenance and overhaul of plastics processing and associated equipment, without supervision. They also possess significant diagnostic, machining, and equipment installation skills.

The qualification comprises compulsory standards selected to provide substantial mechanical engineering skills and knowledge supplemented by elective strands designed to give a thorough grounding in the manufacturing technology of one sector of the plastics industry.

People who have met the requirements of this qualification are encouraged to undertake further training. This could be towards the National Certificates in Plastics Processing Technology (Technical) (Level 3 and Level 4) [Ref: 0395 and 0396] for which some standards are common, and for which this qualification will also allow them to fully cross-credit standards for the prerequisite qualification for the National Certificate in Plastics Processing Technology (Technical) (Level 3) [Ref: 0395]. Other alternatives include further study in maintenance and diagnostics. Significant cross-crediting is available to certificate holders wishing to undertake the National Certificate in Mechanical Engineering (Level 4) with strands in Fitting and Machining, General Engineering, Machining, Maintenance Engineering, Toolmaking, and Electricity Supply [Ref: 1262], which in turn leads to the National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 5) [Ref: 0718]. These qualifications provide higher level engineering skills and generic management skills.

For those wishing to move directly into first line management, certificate holders may consider either the National Certificate in Business (First Line Management) (Level 3) [Ref: 0743] or the National Certificate in Business (First Line Management) (Level 4) [Ref: 0649].

Replacement Information

The National Certificate in Engineering and Technology (Plastics Engineering) (Level 4) with strands in Injection Moulding, Extrusion, Blow Moulding, Pressure Thermoforming, Vacuum Thermoforming, Blown Film Extrusion, Film Conversion, Injection Stretch-Blow Moulding, and Rotational Moulding [Ref: 1407] replaced the National Certificate in Engineering and Technology (Plastics Engineering) (Level 3) [Ref: 0477], and the National Certificate in Engineering and Technology (Plastics Engineering) (Level 4) [Ref: 0478].

Credit Range

	Core Compulsory	Injection Moulding Strand
Level 1 credits	20	4
Level 2 credits	115	49
Level 3 credits	103	-
Level 4 or above credits	48	-
Minimum totals	286	53

	Extrusion Strand	Blow Moulding Strand	Pressure Thermoforming Strand
Level 1 credits	4	4	4
Level 2 credits	46	55	44
Minimum totals	50	59	48

	Vacuum Thermoforming Strand	Blown Film Extrusion Strand	Film Conversion Strand
Level 1 credits	4	4	6
Level 2 credits	44	45	19
Minimum totals	48	49	25

	Injection Stretch-Blow Moulding Strand	Rotational Moulding Strand
Level 1 credits	5	4
Level 2 credits	37	36
Minimum totals	42	40

Requirements for Award of Qualification

Award of NQF 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 in section 7 of the New Zealand Qualifications Authority (NZQA) *Rules and Procedures* publications available at <http://www.nzqa.govt.nz/ncea/acrp/index.html>.

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

One of the following strands is required

- Injection Moulding Strand
- Extrusion Strand
- Blow Moulding Strand
- Pressure Thermoforming Strand
- Vacuum Thermoforming Strand
- Blown Film Extrusion Strand
- Film Conversion Strand
- Injection Stretch-Blow Moulding Strand
- Rotational Moulding Strand

Detailed Requirements

Core Compulsory

The following standards are required

Core Generic > Core Generic > Self-Management

ID	Title	Level	Credit
12349	Demonstrate time management	2	3

Core Generic > Core Generic > Work and Study Skills

ID	Title	Level	Credit
1978	Identify basic employment rights and responsibilities, and sources of information and assistance	1	2
4248	Describe requirements and expectations faced by employees within New Zealand workplaces	1	3

Engineering and Technology > Electrical Engineering > Core Electrical

ID	Title	Level	Credit
15851	Demonstrate knowledge of electrical safety and safe working practices for electrical workers	2	3

Engineering and Technology > Mechanical Engineering > Engineering Core Skills

ID	Title	Level	Credit
2395	Select, use and care for, engineering hand tools	2	4
2396	Select, use and maintain portable hand held engineering power tools	2	4
21906	Perform basic mechanical engineering machining operations under supervision	2	12

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
21913	Shift loads in engineering installation, maintenance, and fabrication work	2	2

Engineering and Technology > Mechanical Engineering > Engineering Drawing and Design

ID	Title	Level	Credit
2430	Draw and interpret engineering sketches under supervision	2	4
2431	Draw and interpret engineering drawings under supervision	2	8
2432	Construct engineering plane geometric shapes under supervision	2	3
4434	Demonstrate knowledge of basic geometric form in engineering	1	1

Engineering and Technology > Mechanical Engineering > Engineering Machining and Toolmaking

ID	Title	Level	Credit
2714	Produce components by performing engineering turning operations	3	15
2715	Produce components by performing engineering milling operations	3	15
22908	Demonstrate and apply knowledge of manually controlled machining operations	3	10

Engineering and Technology > Mechanical Engineering > Engineering - Materials

ID	Title	Level	Credit
4797	Demonstrate knowledge of the composition of engineering metals	3	5
20799	Demonstrate basic knowledge of engineering metals	2	4
20917	Demonstrate basic knowledge of engineering materials	2	2

Engineering and Technology > Mechanical Engineering > Engineering - Measurement

ID	Title	Level	Credit
4432	Demonstrate knowledge of, and convert, units of measure used in engineering	2	2
4433	Select, use, and care for simple measuring devices used in engineering	1	2
4435	Select, use, and care for engineering dimensional measuring equipment	2	3

ID	Title	Level	Credit
4438	Demonstrate knowledge of fits, limits, and tolerances in engineering	2	2

Engineering and Technology > Mechanical Engineering > Fluid Power - Hydraulics

ID	Title	Level	Credit
17345	Draw a diagram, and explain the operating principles, of a simple hydraulic power system	2	3
20597	Make a hydraulic power system safe	2	4
20599	Clean a hydraulic power system for service	2	4
20611	Demonstrate knowledge of hydraulics and hydraulic power systems	2	5
20613	Maintain a hydraulic power system under supervision	2	5

Engineering and Technology > Mechanical Engineering > Fluid Power - Pneumatics

ID	Title	Level	Credit
17344	Draw a diagram, and explain the operating principles, of a simple pneumatic power system	2	3
20598	Make a pneumatic power system safe	2	4
20612	Demonstrate knowledge of pneumatics and pneumatic power systems	2	5
20614	Maintain a pneumatic power system under supervision	2	5

Engineering and Technology > Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering

ID	Title	Level	Credit
2397	Service machines and equipment	2	4
2398	Monitor, under supervision, the condition of machinery and equipment	3	4
2399	Dismantle, inspect, assemble and test components under supervision	3	10
2400	Describe the principles of static and dynamic balancing, and carry out static balancing	3	4
2402	Demonstrate knowledge of lubricants and lubrication systems, and inspect lubrication systems	3	5
2403	Select and replace static seals in machines and equipment	3	5
2404	Select and replace dynamic seals in machines and equipment	3	8
2406	Dismantle, inspect, assemble and test components	4	6
2407	Monitor the condition of machinery and equipment	4	4

ID	Title	Level	Credit
2408	Align machinery and equipment	4	8
2409	Level machinery and equipment	3	4
2412	Diagnose faults, overhaul, and test components	5	8
19873	Demonstrate knowledge of bearings used in machines and equipment	3	8
19874	Service and replace bearings in machines and equipment	4	12

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
22913	Assemble and fit precision tooling	3	10

Engineering and Technology > Mechanical Engineering > Mechanical Installation

ID	Title	Level	Credit
2390	Install industrial machines	4	10

Engineering and Technology > Mechanical Engineering > Welding

ID	Title	Level	Credit
21907	Demonstrate and apply knowledge of safe welding procedures under supervision	2	3

Health > Occupational Health and Safety > Occupational Health and Safety Practice

ID	Title	Level	Credit
497	Demonstrate knowledge of workplace health and safety requirements	1	3

Humanities > Communication Skills > Interpersonal Communications

ID	Title	Level	Credit
1277	Communicate information in a specified workplace	2	3
1304	Communicate with people from other cultures	2	2
3501	Apply listening techniques	1	4
3503	Participate in a team or group to complete routine tasks	1	2
9677	Participate in a group/team which has an objective(s)	2	3

Humanities > Communication Skills > Writing

ID	Title	Level	Credit
3492	Write a short report	2	3

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23128	Demonstrate basic knowledge of plastics production processes and materials	1	3

Injection Moulding Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Injection Moulding

ID	Title	Level	Credit
252	Perform basic process operations for injection moulding	1	4
253	Operate the injection moulding machine	2	6
254	Run and monitor the injection moulding production process	2	9
256	Set up simple moulds for injection moulding	2	8
258	Service simple moulds for injection moulding	2	6
259	Service advanced moulds for injection moulding	2	4

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Extrusion Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Extrusion

ID	Title	Level	Credit
281	Perform basic extrusion process operations	1	4
282	Operate the extrusion machine	2	8

ID	Title	Level	Credit
283	Run and monitor the extrusion production process	2	12
285	Change dies and set ancillary equipment for extrusion	2	10

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Blow Moulding Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Blow Moulding

ID	Title	Level	Credit
295	Perform basic process operations for blow moulding	1	4
296	Operate the blow moulding machine	2	6
297	Run and monitor the blow moulding production process	2	10
299	Service simple tooling for blow moulding	2	7
300	Service advanced tooling for blow moulding	2	8
302	Set up simple tooling for blow moulding	2	8

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Pressure Thermoforming Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Manufacturing > Plastics Processing Technology > Thermoforming

ID	Title	Level	Credit
261	Perform basic process operations for thermoforming	1	4
262	Operate the thermoforming machine	2	6
264	Run and monitor the production process for pressure thermoforming	2	8
267	Set up simple tooling for thermoforming	2	8
269	Service simple tooling for thermoforming	2	6

Vacuum Thermoforming Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Manufacturing > Plastics Processing Technology > Thermoforming

ID	Title	Level	Credit
261	Perform basic process operations for thermoforming	1	4
262	Operate the thermoforming machine	2	6
263	Run and monitor the production process for vacuum thermoforming	2	8
267	Set up simple tooling for thermoforming	2	8
269	Service simple tooling for thermoforming	2	6

Blown Film Extrusion Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Blown Film Extrusion

ID	Title	Level	Credit
287	Perform basic process operations for blown film extrusion	1	4
288	Operate the blown film extrusion machine	2	8
289	Control and optimise mono-layer production process for blown film extrusion	2	12
293	Service mono-layer dies and extruder screws for blown film extrusion	2	9

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Film Conversion Strand

The following standards are required

Core Generic > Core Generic > Work and Study Skills

ID	Title	Level	Credit
4249	Demonstrate care and timeliness as an employee	1	3

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Film Conversion

ID	Title	Level	Credit
275	Perform basic process operations for film conversion	1	3
276	Operate the machine for film conversion	2	7
277	Set up and control simple operations for film conversion	2	10

Injection Stretch-Blow Moulding Strand

The following standards are required

Engineering and Technology > Mechanical Engineering > Mechanical Assembly

ID	Title	Level	Credit
2387	Assemble mechanical components under supervision	2	2

Manufacturing > Plastics Processing Technology > Injection Stretch-Blow Moulding

ID	Title	Level	Credit
15206	Perform basic process operations for injection stretch-blow moulding	1	5
15207	Operate injection stretch-blow moulding equipment	2	6
15208	Set and run the injection stretch-blow moulding production process	2	9
15211	Service tooling for injection stretch-blow moulding	2	6

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Rotational Moulding Strand

The following standards are required

Manufacturing > Plastics Processing Technology > Plastics Materials

ID	Title	Level	Credit
23129	Process and use plastics materials	2	6
23130	Classify and name plastics materials	2	8

Manufacturing > Plastics Processing Technology > Rotational Moulding

ID	Title	Level	Credit
16116	Perform basic process operations for rotational moulding	1	4
16117	Operate the rotational moulding machine	2	6
16119	Service moulds for rotational moulding	2	5
16120	Mount mould, set and monitor the rotational moulding production process	2	11

Transition Arrangements**Version 1**

This qualification replaced the National Certificate in Engineering and Technology (Plastics Engineering) (Level 3) [Ref: 0477], and the National Certificate in Engineering and

Technology (Plastics Engineering) (Level 4) [Ref: 0478]. There are significant changes in the content and structure of this new qualification.

Summary of differences between the qualifications

- Expiring standard 4798 in Q0477 was replaced by Core Compulsory standard 4797.
- Standards 11661, 11662, 11663, and 11664 in Q0477 were replaced by Core Compulsory standards 21906 and 22908 as these were considered to cover more appropriate skill levels.
- Expired standard 2722 in Q0477 was replaced by Core Compulsory standards 20613 and 20614, and standard 20599 was added to the Core Compulsory section.
- Expiring standards 2388 and 2670 in Q0477 were replaced by Core Compulsory standards 22913 and 21907 respectively.
- Expiring standard 2405 in Q0478 was replaced by Core Compulsory standards 19873 and 19874.
- Titles, levels and credits of standards were updated to reflect their review.
- Standards or their replacements previously required in the prerequisite qualification for the National Certificate in Engineering and Technology (Plastics Engineering) (Level 3) [Ref: 0477] have been included in this qualification.

For detailed information see Review Summaries on the NZQA website.

All existing candidates may complete the National Certificate in Engineering and Technology (Plastics Engineering) (Level 3) [Ref: 0477], and the National Certificate in Engineering and Technology (Plastics Engineering) (Level 4) [Ref: 0478] or, where applicable, transfer their existing achievements to this qualification. The last date for assessments to take place for the replaced qualifications is 31 December 2011.

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

Credit for	Exempt from
2389	2387
1305	3501
4798	4797
1300	9677
503	12349
1179	15851
2721	17344, 17345
2405	19873, 19874
2723	20597, 20598
2722	20613, 20614

Credit for	Exempt from
4796	20799
2824	21911, 21912
4795	20917
11661, 11662, 11663, 11664	21906, 22908
2670	21907
6627	21913
12299	21913
2388	22913
271	23128
272	23129
273	23130
2724	20599

Competenz has endeavoured to ensure that no person has been disadvantaged by this review. Anyone who thinks that they have been disadvantaged should, in the first instance, contact the ITO at the address below.

NQF Registration Information

Process	Version	Date	Last Date for Assessment
Registration	1	August 2008	N/A

Standard Setting Body

Competenz
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Newmarket
Auckland 1149

Telephone 0800 526 1800
Fax 09 539 9899
Email info@competenz.org.nz
Website <http://www.competenz.org.nz/>

Planned Review

Any person or organisation may contribute to the review of this qualification by sending feedback to the standard setting body at the above address.

Next Review	2013
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Other standard setting bodies whose standards are included in the qualification

Competenz
 ElectroTechnology Industry Training Organisation
 New Zealand Industry Training Organisation
 NZQA

Certification

The certificate will display the logos of NZQA, Competenz and the accredited organisation.

Classification

This qualification is classified according to the NQF classification system and the New Zealand Standard Classification of Education (NZSCED) system as specified below.

NQF Classification		NZSCED	
Code	Description	Code	Description
79	Engineering and Technology	030701	Engineering and Related Technologies > Mechanical and Industrial Engineering and Technology > Mechanical Engineering

Quality Management Systems

Providers and Industry Training Organisations must be accredited by a recognised Quality Assurance Body before they can register credits from assessment against standards. Accredited providers and Industry Training Organisations assessing against standards must engage with the moderation system that applies to those standards. Accreditation requirements and the moderation system are outlined in the associated Accreditation and Moderation Action Plan (AMAP) for each standard.

Prerequisite Diagram

