

level of qualification: 4**credit total:** 286

	Compulsory	Elective A	Elective B
level 1 credits:	10	0-6	0-20
level 2 credits:	50	0-40	0-20
level 3 credits:	53	0-113	0-20
level 4 credits:	28	0-125	0-20
level 5 and above credits:		0-20	
minimum totals:	141	125	20

registration date: 24 February 1998**final date for comment:** 28 February 2002**expiry date:** 31 December 2003**field, sub-field and domains:****ENGINEERING AND TECHNOLOGY****Mechanical Engineering**

engineering - fabrication

engineering - materials

engineering - measurement

engineering core skills

engineering drawing and design

engineering machining and toolmaking

fluid power

heating and ventilation

maintenance and diagnostics in mechanical engineering

mechanical installation

welding

SCIENCES**Mathematics**

algebra

measurement

number

trigonometry

standard-setting body responsible for the qualification:

Engineering Industry Training Organisation

other standard-setting bodies whose unit standards are included in the qualification:

Mathematics Advisory Group (General Education)

1 purpose

This level 4 national qualification is designed to enable trainees/apprentices employed in the Maintenance and Diagnostics in Mechanical Engineering discipline of Engineering to gain recognition for the relevant skills and knowledge required by industry expressed in terms of competency.

People awarded with this qualification are able to maintain and install plant and equipment utilising specific knowledge, skills and tools to required industry specifications. Industry determined that the original trades of Fitting and Turning and Fitting and Welding Section A have now been substantially refined to take on a single identity. Further emphasis has been placed on the fault finding skills of the discipline, hence the inclusion of diagnostics in the title.

This qualification leads to the proposed National Certificate in Maintenance and Diagnostics (Level 5) and/or a Diploma in Engineering.

2 regulations for the qualification**2.1 entry information for programmes of education and training assessed against the unit standards in the qualification**

Open.

2.2 recognition of prior learning

Recognition of prior learning will be carried out by accredited providers or Engineering Industry Training Organisation (EITO) registered workplace assessors.

2.3 qualification requirements

This qualification will be awarded to people who satisfy the compulsory and elective unit standards that meet the specified credit total according to the following:

Compulsory

All the unit standards listed.

Elective A

A minimum of 125 credits of which 12 credits must be at level 4 or above.

Elective B

A minimum of 20 credits at level 4 or below drawn from anywhere on the National Qualifications Framework.

unit standards required**Compulsory**

All the unit standards listed

FIELD: ENGINEERING AND TECHNOLOGY

Sub-field: Mechanical Engineering

domain: engineering - materials

Unit No.	Unit Standard Title	Level	Credit
4795	Distinguish the characteristics of engineering materials	1	2
4796	Distinguish the characteristics of engineering metals	2	3
4798	Identify and select engineering metals for specified applications	3	2

domain: engineering - measurement

Unit No.	Unit Standard Title	Level	Credit
4432	Identify and convert basic units of measure used in engineering	1	1
4433	Measure with non-complex devices used in engineering	1	2
4434	Recognise basic geometric form in engineering	1	1
4435	Select, use and care for engineering dimensional measuring equipment	2	3

domain: engineering core skills

Unit No.	Unit Standard Title	Level	Credit
2395	Select, use, and care for engineering hand tools	1	4
2396	Select, use, and maintain portable hand held engineering power tools	2	4
2824	Follow safe working practices on an engineering worksite	2	3

domain: engineering drawing and design

Unit No.	Unit Standard 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	2	3

domain: engineering machining and toolmaking

Unit No.	Unit Standard Title	Level	Credit
2714	Produce components by performing engineering turning operations	3	15
11661	Produce components by performing general engineering drilling operations	2	5
11662	Produce components by performing general engineering turning operations	2	12

domain: maintenance and diagnostics in mechanical engineering

Unit No.	Unit Standard 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
2401	Shut down and isolate machines and equipment	3	3
2402	Inspect and repair lubrication systems	3	10
2403	Select and replace static seals in machines and/or equipment	3	3
2405	Identify and replace bearings in machines and equipment	4	20
2408	Align machinery and equipment	4	8

domain: welding

Unit No.	Unit Standard Title	Level	Credit
2670	Avoid welding hazards with safe work practices	2	1
2678	Join metals using oxy-acetylene equipment	3	6

Elective A

A minimum of 125 credits of which 12 credits must be at level 4 or above.

FIELD: ENGINEERING AND TECHNOLOGY

Sub-field: Mechanical Engineering

domain: engineering - fabrication

Unit No.	Unit Standard Title	Level	Credit
2418	Lay out and mark off irregular fabrication shapes under supervision	3	15
2419	Form and shape, sheet, plate, pipe and structural sections using power machines under supervision	3	15
2424	Assemble and mechanically join sheet, plate, tube, pipe and structural sections	4	20
2425	Mechanically cut sheet, plate, tube, pipe and structural sections	4	10

domain: engineering drawing and design

Unit No.	Unit Standard Title	Level	Credit
2433	Create two dimensional engineering drawings using computer aided design system	2	6
2434	Produce detailed engineering drawings under supervision	3	15
2437	Produce mechanical and fluid power drawings	4	20

domain: engineering machining and toolmaking

Unit No.	Unit Standard Title	Level	Credit
2712	Produce components by performing engineering grinding operations	3	15
2715	Produce components by performing engineering milling operations	3	15
11663	Produce components by performing general engineering milling operations	2	12
11664	Produce components by performing general engineering surface grinding operations	2	3

domain: fluid power

Unit No.	Unit Standard Title	Level	Credit
2722	Maintain a fluid power system	2	5
2723	Make a fluid power system safe	2	8
2727	Maintain hydraulic fluid power equipment and components under supervision	3	20
2728	Maintain pneumatic fluid power equipment and components under supervision	3	20
2729	Design a hydraulic fluid power system	4	15
2731	Maintain hydraulic fluid power equipment and components	4	20
2732	Maintain pneumatic fluid power equipment and components	4	15

domain: heating and ventilation

Unit No.	Unit Standard Title	Level	Credit
3241	Install external insulation (pipe work) to plans and specifications under supervision	2	2
3242	Install external insulation (duct work) to plans and specifications under supervision	2	1
3243	Install cladding to plans and specifications under supervision	3	6

domain: maintenance and diagnostics in mechanical engineering

Unit No.	Unit Standard Title	Level	Credit
2400	Carry out static balancing and ascertain the principles of dynamic balancing	3	2
2404	Select and replace dynamic seals in machines and/or equipment	3	8
2406	Dismantle, inspect, assemble and test components	4	6
2407	Monitor the condition of machinery and equipment	4	4
2409	Level machinery and equipment	4	3
2410	Carry out non destructive testing of metal parts	4	8
2411	Test fluids used in machinery and equipment for variation from specification	4	3
2412	Diagnose faults, overhaul, and test components	5	8
2413	Test machines and equipment for vibration	5	12

domain: mechanical installation

Unit No.	Unit Standard Title	Level	Credit
2390	Install single station machine	3	12

domain: welding

Unit No.	Unit Standard Title	Level	Credit
2676	Weld stainless steel sheet with the gas tungsten arc welding process	3	6
2677	Weld aluminium with the gas tungsten arc welding process in the downhand positions	3	6
2682	Weld steel up to 10mm thick with the manual metal arc welding process in the downhand positions	3	6
2683	Cut metals using manual thermal processes	3	6
2688	Weld stainless steel tube in position with the gas tungsten arc welding process	4	10

Maintenance and Diagnostics in Mechanical Engineering (Level 4) (version 2)

FIELD: SCIENCES
 Sub-field: Mathematics
 domain: algebra

Unit No.	Unit Standard Title	Level	Credit
5223	Use formulae and equations to solve problems	1	2

domain: measurement

Unit No.	Unit Standard Title	Level	Credit
5228	Measure and use calculations to solve problems	1	2

domain: number

Unit No.	Unit Standard Title	Level	Credit
5226	Construct and use tables and graphs	1	2

domain: trigonometry

Unit No.	Unit Standard Title	Level	Credit
5251	Solve problems modelled by triangles	2	3

Elective B

A minimum of 20 credits at level 4 or below drawn from anywhere on the National Qualifications Framework.

3 accreditation option

Evaluation of documentation and visit by NZQA and Engineering Industry Training Organisation.

Where unit standards registered by another Industry Training Organisation or National Standards Body form part of the qualification, their accreditation options will prevail.

4 certification

The certificate will display the logos of the Engineering Industry Training Organisation and NZQA.

5 transition arrangements

5.1 general information

Existing qualifications affected by the change from time served apprenticeships and trade examinations to competency based units standards are:

- Trade Certificate and Advanced Trade Certificate - Fitting, Turning and Machining;
- Trade Certificate and Advanced Trade Certificate - Fitting and Welding Section A.

Effective from 1 January 1996, all off-job training programmes for 1st and 2nd year apprenticeships will have been replaced by training packages involving unit standards at levels 1 to 3 on the National Qualifications Framework.

The EITO sends every apprentice and employer promotional packs keeping them up to date with new arrangements and time lines for new qualifications and the completion of former qualifications. The EITO also keeps other ITOs and accredited providers informed of current arrangements in their engineering newsletter. All other trainees will be notified through employment and industry publications.

5.2 trade examinations/qualifications and the transition to this qualification

An extension of the former Trade Certificate qualifications including Advanced Trade Certificate will be available in 1997/8 as shown in the following schedules:

Fitting, Turning and Machining/Fitting and Welding Section A

	FORMER	NEW
1995*	Last year for 1st and 2nd assessment.	
1996	Last year for Trade Certificate examination.	All training for apprentices/trainees in their first year will be towards the new system.
1997	Resit year for 1996 candidates who did not pass the Trade Certificate examination in 1996.	All training for new system.
1998	Last year for Advanced Trade Certificate examination.	

*Those apprentices/trainees who complete the First Assessment in 1995 will transfer to the new system with unit standard credits as shown in the schedule below. Apprentices/trainees who complete Second Assessment will be able to complete Trade Certificate in 1996/7.

Components of former qualification completed	Unit standards credited for this component
First assessment	Credit - unit standards 533, 536, 2395, 2396, 2430, 2431, 2432, 2670, 2824, 4432, 4433, 4435, 4436, 4795, 4796

5.3 final date for transition arrangements

The last date for apprentices/trainees to claim credit for Trade Certificate under these transition arrangements will be 31 December 1998.

The EITO will be responsible for collecting and submitting all transition data to the Qualifications Authority.

5.4 credits from other qualifications

Credits for other qualifications than those listed above, may be sought through an accredited provider at own expense.

5.5 National Qualifications Framework Record of Learning Database

All apprentices/trainees are required to have a record of learning with the New Zealand Qualifications Authority (NZQA). The 'hook on' fee required by NZQA for this service will be the responsibility of the trainee.

5.6 appeals

Any apprentice/trainee who consider they are seriously disadvantaged by these transition arrangements should contact with details of their appeal the EITO at PO Box 62 561 Central Park, Auckland or telephone 09 5255400. It is the EITO's policy that irrespective of the broad base transition policy, no apprentice/trainee will be disadvantaged by the implementation of transition arrangements.

5.7 new apprenticeship agreements

Apprentices/trainees with training agreements commencing 1 January 1995 or later will work towards accumulating credits to satisfy the minimum requirements for the national Certificate in Maintenance and Diagnostics in Mechanical Engineering (level 4).

5.8 apprenticeships completed prior to the introduction of competency based apprenticeship

Former qualifications that have been completed will continue to be recognised by industry, and there will be no requirement to have the former qualification translated into a new qualification.

6 changes to this qualification**6.1 version 2**

This qualification has been reviewed and issued as version 2. The descriptive phrase 'Mechanical Maintenance Technology' has been deleted from the title.

The changes to the qualification have been made to improve flexibility and the availability of unit standards for differing employment situations. Some of the previous compulsory unit standards have been transferred to the elective section.

Following the review of Unit 2700, *Produce components by performing general engineering machining operations*, the replacement unit standards relating to the performance of general engineering milling and surface grinding operations have been placed in an elective list. People who have gained credit for unit standard 2700 will be granted exemption from the replacement unit standards 11661, 11662, 11663, and 11664.

Some recommended mathematics unit standards are now included in the Elective A section of the qualification.

Anyone who meets the requirements of version 1 of the qualification will also meet the requirements of version 2. It is therefore recommended that people transfer to version 2.

6.2 versions of unit standards

Any version of a unit standard contained within this qualification which retains its original unit standard identification number will continue to meet the requirements of this qualification.

Comments to:

Engineering Industry Training Organisation
Qualification Revision
PO Box 160
WELLINGTON

by February 2002.

Please Note: Providers must be accredited by the Qualifications Authority before they can offer programmes of education and training assessed against unit standards. The Qualifications Authority has published a booklet, *Guidelines and Criteria for Accreditation to offer National Certificates and National Diplomas*, which is available for \$15 from the Sales Officer, New Zealand Qualifications Authority, PO Box 160, Wellington. Telephone: (04) 802-3000; Fax: 04 802-3402.

Prerequisite Diagram