

Mechanical Engineering Qualifications Mandatory review

Draft Qualifications Landscape

Consultation on a draft Qualifications Landscape for Mechanical Engineering
August/September 2013

1. Introduction

The New Zealand Qualifications Authority (NZQA) is currently overseeing the *Mandatory Review of Qualifications*, a review of all qualifications on the New Zealand Qualifications Framework (NZQF).

The review aims to reduce the duplication and proliferation of qualifications; to ensure qualifications meet the overall needs of a particular sector and are useful, relevant and fit for purpose; and meet the new requirements for listing qualifications on the NZQF.

The review of **Mechanical Engineering qualifications** is being led by Competenz, the Standard Setting Body (SSB) with gazetted coverage for the Mechanical Engineering sector, and includes:

- The National Certificates developed by Competenz
- The Certificates and Diplomas developed by Institutes of Technology and Polytechnics (ITPs) and Private Training Establishments (PTEs), and
- The New Zealand Diplomas developed by the New Zealand Board for Engineering Diplomas (NZBED).

To ensure the views of the sector are well represented, Competenz has, in conjunction with the Heavy Engineering Research Association (HERA), the Maintenance Engineering Society of New Zealand (MESNZ), Metals NZ, the New Zealand Manufacturers and Exporters Association (NZMEA), the Employers and Manufacturers Association (EMA), the Institution of Professional Engineers New Zealand (IPENZ), the Climate Control Companies Association (CCCA), the Institute of Refrigeration, Heating & Air Conditioning Engineers (IRHACE), the ITP Trades Forum and the ITP Academic Managers Forum, established a **Governance Group** to provide strategic direction, guidance and oversight to the review process.

The Governance Group has developed this proposed draft Mechanical Engineering qualifications landscape to meet industry skills requirements and in response to the Needs Analysis Report and the NZQA Level Descriptors. It is a starting point for discussion.

We now invite feedback on this proposed landscape which will replace the current qualifications. If endorsed by this consultation these qualifications, or a revised set depending on the nature of feedback received, will be developed by working groups in October, and the draft qualifications will be available for further consultation prior to listing. Once approved, the new qualifications will replace all other Mechanical Engineering qualifications on the NZQF.

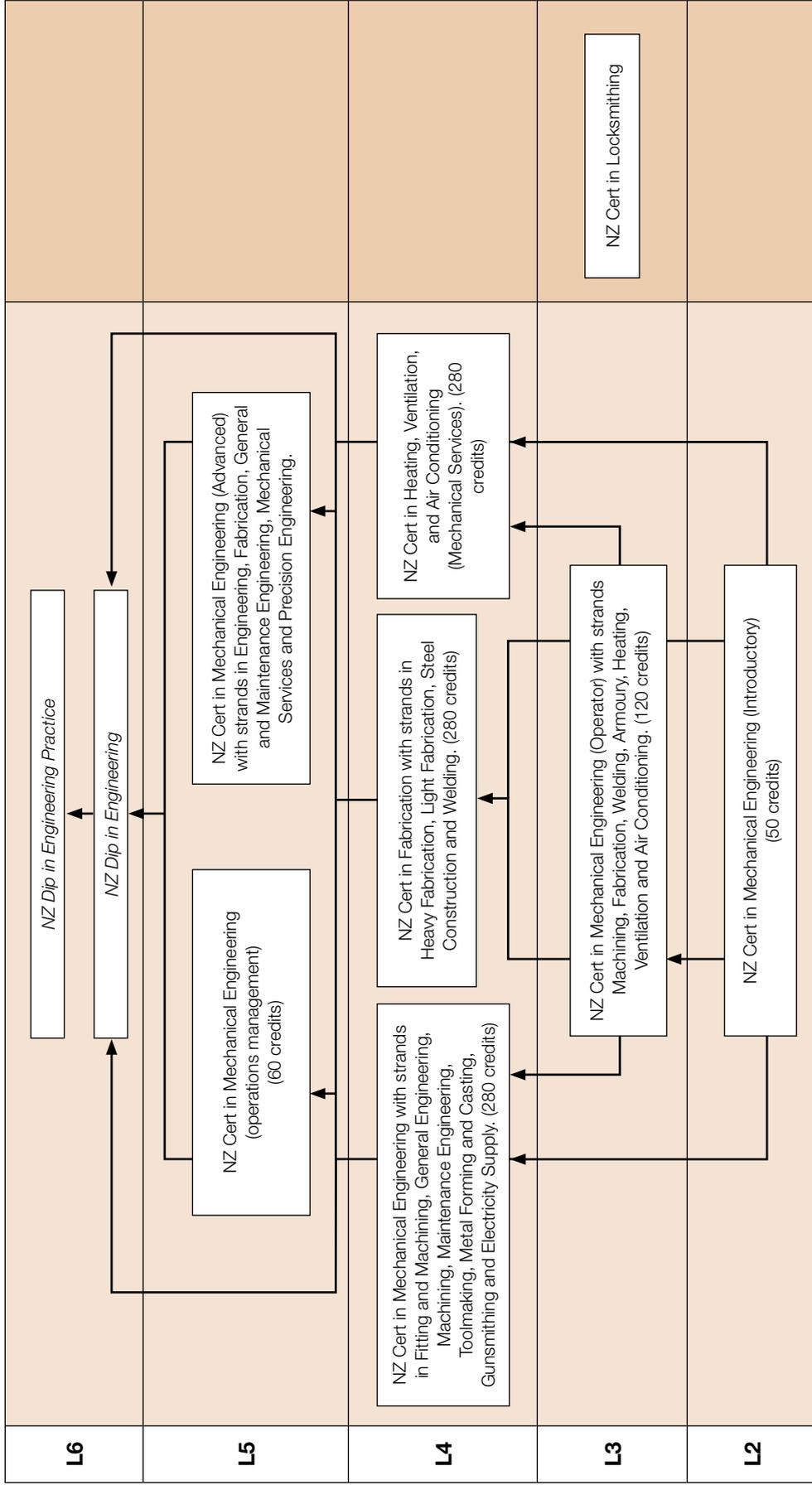
Further information about the Mandatory Review of Mechanical Engineering Qualifications, including a list of all qualifications included in the review, membership of the Governance Group, the Review Plan, and the Needs Analysis Report can be found here: <http://troq.competenz.org.nz/have-your-say/mechanical-engineering/>

2. Principles

In developing this proposed landscape, the Governance Group has identified qualifications and a structure that as far as possible meet the needs of a wide range of learners, employers and other stakeholders. The landscape responds to:

- Issues identified in the analysis of current qualifications and their use
- Needs identified in the Needs Analysis Report
- The needs of specific groups of learners
- Initial feedback from industry and provider surveys around roles and skill requirements
- Alignment with the Ministry of Education's Manufacturing and Technology Vocational Pathway
- The National Engineering Education Plan (NEEP) project report of 2010, particularly with regard to the Level 6 Diplomas in Engineering
- The definitions for New Zealand Apprenticeships announced by the Tertiary Education Commission earlier this year: <http://www.tec.govt.nz/Learners-Organisations/Learners/Learn-about/Apprenticeships/>

3. Suggested Landscape for Mechanical Engineering Qualifications



4. Notes to support proposed Landscape for Mechanical Engineering Qualifications

Level 1:

It is proposed that the existing National Certificate in Mechanical Engineering Technology and MIT Certificate in Engineering Trades qualifications at level 1 be expired. The recently introduced Manufacturing and Technology Vocational Pathway at NCEA Level 1 means that learning at this level will now be recognised by the NCEA level 1 qualification – therefore these existing qualifications are no longer required.

Level 2:

It is proposed that all existing level 2 qualifications be replaced by the New Zealand Certificate in Mechanical Engineering (Introductory) (Level 2). This qualification will provide an introduction to mechanical engineering trade skills across mechanical engineering, fabrication and welding and HVAC. Whilst the recently introduced Manufacturing and Technology Vocational Pathway at NCEA Level 2 covers similar ground, there is clearly industry support for a Level 2 “pre-trade” qualification that provides an alternative entry into a range of engineering apprenticeships for both school leavers and ‘second-chance’ learners.

Level 3:

It is proposed that all existing level 3 qualifications be replaced by the New Zealand Certificate in Mechanical Engineering (Operator) with strands in machining, fabrication, welding, HVAC and armoury (Level 3). There is a common set of skills and knowledge that span across all fields at this level. The proposal to list one qualification with multiple strands recognises this common learning whilst allowing greater flexibility. Learners will be able to move across disciplines more easily, by completing an additional strand rather than a whole new qualification.

Level 4:

It is proposed that the existing **Mechanical Engineering qualifications** should be replaced by the New Zealand Certificate in Mechanical Engineering with strands in Fitting and Machining, General Engineering, Machining, Maintenance Engineering, Toolmaking, Metal Forming and Casting, and Electricity Supply (Level 4).

A significant review of the Mechanical Engineering national qualifications was undertaken several years ago and the National Certificate in Mechanical Engineering (Level 4) with strands in Fitting and Machining, General Engineering, Machining, Maintenance Engineering, Toolmaking, and Electricity Supply was the result. It is proposed that these strands are applied to the new New Zealand qualification because feedback about the existing stranded qualification has been positive.

It is proposed that the **NC in Metal Casting Level 4** be expired and that metal casting becomes a separate strand in the new New Zealand Certificate in Mechanical Engineering Level 4 - This will ensure its future given current and likely future graduate number do not support a standalone qualification. It is further proposed that metal forming be considered as part of the new metal casting strand as this will meet a need not met within the current qualifications. .

It is proposed that the existing **level 4 Welding and level 4 Fabrication** qualifications be combined into a New Zealand Certificate in Fabrication, with strands in light fabrication, heavy fabrication and welding (Level 4). It is suggested that graduates at this level should possess a broader range of skills than is currently included in standalone welding qualifications. Many of the skill sets and knowledge are common across welding and fabrication and a combined qualification will provide for greater transferability.

The steel construction strand in the current national qualification in fabrication has not been included at this stage. The Governance Group is seeking feedback from the industry on the need and most appropriate place for a steel construction strand in the new landscape.

It is proposed that **Locksmithing** remain a standalone qualification (current a national certificate at level 4), however the GG seeks industry feedback on whether the qualification would be more relevant and fit-for-purpose if it was refocused and downsized to a level 3 qualification.

It is proposed that the **NC in Lifts and Escalators Level 4** be expired as there have been no learners enrolled in this qualification since its inception.

It is proposed that the content of the existing **NC in Heating, Ventilation and Air Conditioning Level 4** be retained as it is still in its infancy. The qualification will need to be converted to the new qualification structure.

Level 5:

It is proposed that all the existing level 5 qualifications (excluding Gunsmithing) be replaced by two new qualifications – the first for operations management and the second for advanced technical skills. These two qualifications will meet the needs of learners wishing to advance into technical supervisory/management roles or gain higher level technical skills in a particular area.

It is suggested that the **NC in Gunsmithing Level 5** be expired and gunsmithing skills and knowledge be incorporated into the machining strand of the new NZ Cert in Mechanical Engineering Level 4.

Level 6:

It is proposed that the NZDE and NZDEP developed in response to the National Engineering Education Plan (NEEP) project report be retained in their current form. Any specific needs at Level 6 identified during the course of the review will be forwarded to the NZBED Mechanical Engineering Management Committee for consideration.

Consultation questions

Please email s.brooks@competenz.org.nz to provide your response.

Note the deadline for feedback is **5pm on Wednesday 18th September 2013.**

General

1. Please provide your contact details below:

Name	
Email	
Employer	
Position	

2. Do you work within:

Tick (✓)

The Mechanical Engineering industry	
Polytechnic or Institute of Technology (ITP)	
Private Training Establishment (PTE)	
Wananga	
University	
A secondary school or other educational organisation	
Other (please specify)	
Other:	

The proposed Mechanical Engineering Qualifications Landscape

3. Does the proposed Mechanical Engineering Qualifications Landscape and approach adequately address the needs of the wider Mechanical Engineering industry?	YES	NO
If no, please explain why:		

4. What could be done to improve the proposed Mechanical Engineering Qualifications Landscape to better meet the needs of the wider Mechanical Engineering industry?
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Specific questions on proposed New Zealand qualifications

5. Does having the word 'Operator' in the title of the qualification help to clarify the level at which a graduate would be operating?	YES	NO	N/A
If no, is there a better word?			

6. At level 3, should welding be a strand of the Operator qualification, or a standalone qualification?	Strand of Operator Qualification	Standalone Qualification	N/A
What are the benefits of welding being a strand of the Operator qualification (Level 3):			
What are the benefits of welding being a standalone qualification (Level 3):			

NZ Certificate in Mechanical Engineering (Level 4) with strands in Fitting and Machining, General Engineering, Machining, Maintenance Engineering, Toolmaking, Metal Forming and Casting, and Electricity Supply

7. Is there another title for this stranded qualification that better reflects what the qualification encompasses?	YES	NO	N/A
If yes, what title would you suggest and why:			

NZ Certificate in Fabrication (Level 4) with strands in Light Fabrication, Heavy Fabrication and Welding

8. At level 4, should welding be a strand of the Fabrication qualification, or a standalone qualification?	Strand of Operator Qualification	Standalone Qualification	N/A
What are the benefits of welding being a strand of the Fabrication qualification (Level 4):			
What are the benefits of welding being a standalone qualification (Level 4):			

9. Should steel construction be a strand of a fabrication qualification?	YES	NO	N/A
If yes, should it be at level 3 or 4?	Level 3	Level 4	N/A

NC in Locksmithing (Level 4)

10. Should the existing qualification be refocused and downsized to a level 3?	YES	NO	N/A
If yes, please describe how it should be refocused:			

NC in Lifts and Escalators Level 4

11. Should the existing qualification be expired?	YES	NO	N/A
If no, please explain:			

NC in Gunsmithing Level 5

12. Should the existing qualification be expired and gunsmithing skills and knowledge be incorporated into the machining strand of the new NZ Cert in Mechanical Engineering Level 4?	YES	NO	N/A
If no, please explain:			

Appendix one

NZQF Level Descriptor Table

The table below provides a detailed description of each level in terms of learning outcomes, using common domains and dimensions of progression. Knowledge, skills and application describe what a graduate at a particular level is expected to know, do and be. The term application encompasses responsibility, behaviours, attitudes, attributes and competence.

More information at:

<http://www.nzqa.govt.nz/studying-in-new-zealand/nzqf/understand-nzquals/>

LVL	Knowledge	Skills	Application
1	Basic general and/or foundation knowledge	Apply basic solutions to simple problems Apply basic skills required to carry out simple tasks	Highly structured contexts Requiring some responsibility for own learning Interacting with others
2	Basic factual and/or operational knowledge of a field of work or study	Apply known solutions to familiar problems Apply standard processes relevant to the field of work or study	General supervision Requiring some responsibility for own learning and performance Collaborating with others
3	Some operational and theoretical knowledge in a field of work or study	Select and apply from a range of known solutions to familiar problems Apply a range of standard processes relevant to the field of work or study	Limited supervision Requiring major responsibility for own learning and performance Contributing to group performance
4	Broad operational and theoretical knowledge in a field of work or study	Select and apply solutions to familiar and sometimes unfamiliar problems Select and apply a range of standard and non-standard processes relevant to the field of work or study	Self-management of learning and performance under broad guidance Some responsibility for performance of others
5	Broad operational or technical and theoretical knowledge within a specific field of work or study	Select and apply a range of solutions to familiar and sometimes unfamiliar problems Select and apply a range of standard and non-standard processes relevant to the field of work or study	Complete self-management of learning and performance within defined contexts Some responsibility for management of learning and performance of others

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LVL	Knowledge	Skills	Application
6	Specialised technical or theoretical knowledge with depth in a field of work or study	Analyse and generate solutions to familiar and unfamiliar problems Select and apply a range of standard and non-standard processes relevant to the field of work or study	Complete self-management of learning and performance within dynamic contexts Responsibility for leadership within dynamic contexts
7	Specialised technical or theoretical knowledge with depth in one or more fields of work or study	Analyse, generate solutions to unfamiliar and sometimes complex problems Select, adapt and apply a range of processes relevant to the field of work or study	Advanced generic skills and/or specialist knowledge and skills in a professional context or field of study
8	Advanced technical and/or theoretical knowledge in a discipline or practice, involving a critical understanding of the underpinning key principles	Analyse, generate solutions to complex and sometimes unpredictable problems Evaluate and apply a range of processes relevant to the field of work or study	Developing identification with a profession and/or discipline through application of advanced generic skills and/or specialist knowledge and skills Some responsibility for integrity of profession or discipline
9	Highly specialised knowledge, some of which is at the forefront of knowledge, and a critical awareness of issues in a field of study or practice	Develop and apply new skills and techniques to existing or emerging problems Mastery of the field of study or practice to an advanced level	Independent application of highly specialised knowledge and skills within a discipline or professional practice Some responsibility for leadership within the profession or discipline
10	Knowledge at the most advanced frontier of a field of study or professional practice	Critical reflection on existing knowledge or practice and the creation of new knowledge	Sustained commitment to the professional integrity and to the development of new ideas or practices at the forefront of discipline or professional practice

Appendix two

Mechanical Engineering Qualifications Review Governance Group

Representation	Name	Nominated by
Industry	Jon Leadbeater Manufacturing Engineering Manager, Hamilton Jet	HERA
	Barry Robinson General Manager, S.A.F.E Engineering Ltd Immediate Past Chairman MESNZ	MESNZ
	Wolfgang Scholz Director Heavy Engineering Research Association	Metals NZ
	Peter Herbert Consultant, SC Technik Limited NZMEA Executive	NZMEA
	Niall Fuller CEO, Hunter Filling Systems	EMA
	Mike Lehan General Manager, Page and Macrae Ltd	IPENZ
	Grant Price (Chair) Managing Director, Heatwave Mechanical Ltd	CCCA/IRHACE
ITO	Bill Sole (Review Lead) Industry Leadership Manager, Competenz	Competenz
ITP	Kevin Uncles Director, School of Trade Training, Waiariki Institute of Technology	ITP Trades Forum
	Sue Bartlett Team Leader Academic Development, MIT	ITP Academic Managers Forum