FIELD ENGINEERING AND TECHNOLOGY

Review of *Mechanical Engineering* unit standards

Subfield	Domain	Id
Mechanical Engineering	Engineering – Materials	4795-4803
	Engineering Drawing and Design	2430-2441

Competenz has completed the review of the unit standards listed above that were registered in October 1994 and June 1995.

Date new versions published **July 2004**

New comments by date **July 2008**

Expiry date of new versions of the unit standards **December 2009**

Summary of review and consultation process

Two northern and southern pilot meetings involving Competenz, industry representatives, and accredited providers were convened September 2002 to initially deliberate the concept of Maintenance and Diagnostics as it applies to Mechanical Engineering. Group discussion centred on the mix of unit standards available to candidates in the current level 4 and level 5 qualifications, in addition to future qualification options that may be applicable to this technologically dynamic industry.

The groups were also advised that a significant number of unit standards available to candidates in the level 4 and level 5 qualifications showed an anticipated expiry date of December 2002. These unit standards were organised into logical sets and assigned to representatives on the basis of expertise and interest. Consequently, six expert sub-groups emerged from the initial pilot groups to manage the full review on a progressive basis. The full review is scheduled for completion October 2003, however, the extent and complexity of the review programme has now seen the completion date taken to mid 2004.

This review report summarises the outcomes of the third expert sub-group.

It was also recognised that some of these unit standards apply to other Competenz sectors and qualifications, including Metal Casting, Composites, Machining and Toolmaking, Heating, Ventilating and Air Conditioning, Refrigeration, and Fabrication. On this basis, representatives from these sectors were invited to provide input as applicable.

Main changes resulting from the review

Part A: Engineering Drawing and Design

- Unit standards 2430 and 2431: improved special notes.
- Unit standard 2432: title changed and improved special notes.
- Unit standard 2433: improved special notes, and the introduction of unit standard 2780 as a recommended unit standard for entry to programmes that include assessment against 2433. The recommended standard was included to emphasise the necessity for a rudimentary knowledge of pc operations prior to undertaking assessment. Title changed.

- Unit standard 2434: improved special notes. The requirement for progressive tolerance calculations removed from element 2. Title changed.
- Unit standard 2435: designated as expiring due to low usage. Replaced by new unit standard 20802. Special note 2 stresses that this unit standard is intended for users of 2D software applications only. Credit level reduced to reflect the user-friendly nature of contemporary CAD software packages.
- Unit standard 2436: improved special notes. Performance criteria range statements added/updated. Credit level reduced as per the rationale given in 20804 above. Title changed.
- Unit standards 2437, 2438, and 2439: designated as expiring due to low usage. Three unit standards merged to form one advanced manual drawing unit standard (20803), and one advanced CAD drawing unit standard (20804). Each unit standard is applicable to a range of sectors, as defined in special notes.
- Unit standard 2440 designated as expiring and not replaced.
- Unit standard 2441: improved special notes. Amended title reflects the requirement for at least two 3D models. Credit value unchanged for reasons as alluded to above.

Part B: Engineering – Materials

- Unit standard 4795: level changed from 1 to 2. New version broadens the range of engineering materials across all elements. Previous concentration on engineering metals now carried to unit standard 4796. Replaced with new unit standard 20917.
- Unit standard 4796: re-written to serve as a complementary unit standard to 4795, but with a concentration on engineering metals. More advanced elements of metal tests and heat treatments carried to later unit standards. Replaced with new unit standard 20799.
- Unit standard 4797: expanded to better address the differences between ferrous and non-ferrous metals. Credit increased to 5.
- Unit standard 4798: designated as expiring, as content covered in reviewed unit standards described above.
- Unit standard 4799: updated and expanded special notes. Previous element 3 not entirely relevant to the overall performance outcome: replaced by new element calling for interpretation of test results.
- Unit standard 4800 and 4801: addition of definitions under special notes. Assessment expectations clarified through the re-phrasing of performance criteria and addition/expansion of range items. Credit values amended in each instance. Titles changed.
- Unit standard 4802: performance outcome made more achievable through the reduction in assessment requirements, as outlined in updated special notes. Credit value reduced from 40 to 10.
- Unit standard 4803: replaced by new unit standards 20800 and 20801.

Unit standards categorised as category C or D expire at the end of December 2006.

Impact on existing provider accreditations

Current Accreditation for			**Accreditation extended to**		
Nature of accreditation	Classification or Id	Level	Nature of accreditation	Classification or Id	Level
Standard	2435	3	Standard	20802	3
Standard	2437, 2438, 2439	4	Standard	20803, 20804	4, 4
Domain	Engineering – Materials	1	Standard	20917	2
Standard	4795	1	Standard	20917	2

Current Accreditation for			Accreditation extended to		
Nature of accreditation	Classification or Id	Level	Nature of accreditation	Classification or Id	Level
Standard	4796	2	Standard	20799	2

Impact on existing qualifications

The following Competenz qualifications are affected by the outcome of this review and are currently under review to take account of changes.

Qualification Title	Classification or Id
National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 4) [Ref: 0125]	2432, 2433, 2434, 2437, 4795, 4796, 4798
National Certificate in Engineering Machining and Toolmaking (Level 4) [Ref: 0123]	2432, 2433, 2434, 2436, 4795, 4796, 4797, 4798, 4800, 4801, 4802, 4803
National Certificate in Engineering Machining and Toolmaking (Level 5) [Ref: 0719]	2433, 2436, 2440, 2441, 4802, 4803
National Diploma in Engineering (Mechanical Engineering) (Level 6) [Ref: 0534]	4796, 4800, 4801
National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 5) [Ref: 0718]	4800, 4803
National Certificate in Refrigeration and Air Conditioning (Level 4) [Ref: 0130]	2432, 4795, 4796

The following Competenz qualifications are also affected by the changes, and will be updated in due course.

Qualification Title	Classification or Id
National Certificate in Metal Casting (Technology) (Level 4) [Ref: 0129]	2432, 2433, 2436, 4795, 4796, 4797, 4798, 4800, 4801
National Certificate in Engineering – Fabrication (Level 4) with strands in Heavy Fabrication; Light Fabrication; and Welding [Ref: 0122]	2432, 2433, 2434, 2438, 4795, 4796
National Certificate in Heating, Ventilating, and Air conditioning (Mechanical Services) (Level 4) [Ref: 0124]	2432, 4795, 4796
National Certificate in Engineering (General Engineering – Mechanical) (Level 2) [Ref: 0903]	2432, 4795, 4796
National Certificate in Gunsmithing (Level 4) [Ref: 0346]	2433, 2434, 2436, 4795, 4796, 4797, 4798, 4800, 4801, 4802
National Certificate in Engineering – Fabrication (Level 5) with strands in Heavy Fabrication, Light Fabrication, and Welding [Ref: 0681]	2434, 2438, 2439
National Certificate in Heating, Ventilating, and Air conditioning (Mechanical Services) (Level 5) [Ref: 0897]	2439
National Certificate in Refrigeration and Air Conditioning (Level 5) [Ref: 0720]	2439
National Certificate in Gunsmithing (Master) (Level 5) [Ref: 0347]	2440, 2441, 4803
National Certificate in Composites (Level 4) [Ref: 0121]	4795
National Certificate in Locksmithing (Level 4) [Ref: 0452]	4795

The following qualifications are also affected by the outcome of this review. The standard setting bodies (SSBs) have been advised that they require revision.

Qualification Title	Classification or Id	SSB Name
National Certificate in Plastics Processing Technology (Level 1) with strands in Injection Moulding, Extrusion, Blow Moulding, Thermoforming, Blown Film Extrusion, Film Conversion, Injection Stretch Blow Moulding, and Rotational Moulding [Ref: 0260]	2432, 4795	Plastics Industry Training Organisation
National Certificate in Engineering and Technology (Glass Containers) (Level 2) [Ref: 0947]	2432, 4795, 4796	
National Certificate in Plastics Processing Technology (Level 2) 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: 0394]	4796	
National Certificate in Engineering and Technology (Plastics Engineering) (Level 3) [Ref: 0477]	4798	
National Certificate in Engineering and Technology (Glass Containers) (Level 3) [Ref: 0948]	4798	
National Diploma in Plastics Processing Technology (Level 5) [Ref: 1004]	4800, 4801	
National Certificate in Rigging with strands in Basic Rigging, Intermediate Rigging and Advanced Rigging [Ref: 0111]	2432	NZQA
National Certificate in Scaffolding with strands in Advanced Scaffolding, Basic Scaffolding and Suspended Scaffolding [Ref: 0110]	2432	NZQA
National Certificate in Electricity Supply (Electrical) (Level 2) with optional strands in Electrical Fitter, and Technician [Ref: 0887]	2432, 4795, 4796	Electricity Supply Industry Training Organisation
National Certificate in Electricity Supply (Mechanical Fitter) (Level 2) [Ref: 0890]	4795	
National Certificate in Electricity Supply (Mechanical Fitter) (Level 3) with strands in Hydro, Networks, and Thermal [Ref: 0891]	4796, 4798	
National Certificate in Electricity Supply (Electrical) (Level 4) with optional strands in Electrical Fitter Networks, and Electrical Fitter Hydro [Ref: 0921]	4798	
National Certificate in Gas Industry (Gas Engineering) with strands in Gas Network Operations, Gas Network Planning and Development, and Gas Utilisation [Ref: 0635]	4796, 4797	EXITO – Gas and Petrochemical

Summary of main changes to standards' Ids, classification, titles, levels, and credits

The following summary shows the changes made to the standards as a result of the review. All changes are in **bold**.

Key to review category

A Dates changed, but no other changes are made – the replacement standard carries the same Id and a new version number

B Changes made, but the overall outcome remains the same – the replacement standard carries the same Id and a new version number

C Major changes that necessitate the registration of a replacement standard with a new Id

D Standard will expire and not be replaced

Subfield Mechanical Engineering
Domain Engineering – Materials

Id	Title	Level	Credit	Review Category
4795 **20917**	Distinguish the characteristics of engineering materials **Demonstrate basic knowledge of engineering materials**	1 **2**	2 **2**	C
4796 **20799**	Distinguish the characteristics of engineering metals **Demonstrate basic knowledge of engineering metals**	2 **2**	3 **4**	C
4797	Identify the composition of engineering metals **Demonstrate knowledge of the composition of engineering metals**	3	3 **5**	B
4798	Identify and select engineering metals for specified applications	3	2	D
4799	Test the physical properties of engineering metals	4	4	B
4800	Identify the characteristics of heat treatment processes used for engineering steels **Demonstrate knowledge of heat treatment for engineering steels**	4	6 **5**	B
4801	Identify the characteristics of heat treatment processes used for engineering non-ferrous metals **Demonstrate knowledge of heat treatment for engineering non-ferrous metals**	4	3 **4**	B
4802	Complete heat treatment of engineering metals in a furnace	4	40 **10**	B
4803 **20800** **20801**	Identify heat treatment of tool steels and surface heat treatment processes for engineering metals **Demonstrate knowledge of engineering tool steels** **Demonstrate knowledge of, and undertake, surface treatment of steels**	5 **5** **5**	7 **5** **10**	C

Domain Engineering Drawing and Design

Id	Title	Level	Credit	Review Category
2430	Draw and interpret engineering sketches under supervision	2	4	B
2431	Draw and interpret engineering drawings under supervision	2	8	B
2432	Construct engineering plane geometric shapes **Construct engineering plane geometric shapes under supervision**	2	3	B
2433	Create two dimensional engineering drawings using computer aided design system **Create simple engineering drawings using computer aided design (CAD) software**	2	6	B
2434	Produce detailed engineering drawings under supervision **Manually produce detailed engineering drawings under supervision**	3	15	B
2435 **20802**	Apply productivity concepts to two dimensional computer aided design engineering drawing **Produce detailed two-dimensional engineering drawings using CAD software under supervision**	3 **3**	10 **5**	C
2436	Create simple three dimensional engineering model **Create three-dimensional engineering models under supervision**	3	10 **5**	B
2437	Produce mechanical and fluid power drawings	4	20	C
2438	Produce fabrication drawings	4	20	C
2439 **20803** **20804**	Produce heating, ventilation, refrigeration, and air conditioning drawings **Manually produce advanced two-dimensional engineering drawings** **Produce advanced two-dimensional engineering drawings using CAD software**	4 **4** **4**	20 **12** **10**	C
2440	Undertake non critical design of engineering components and assemblies	5	15	D
2441	Create complex three dimensional engineering model **Create complex three-dimensional engineering models**	5	15 **12**	B