

FIELD ENGINEERING AND TECHNOLOGY**Review of *Fluid Power* unit standards**

Subfield	Domain	Id
Mechanical Engineering	Fluid Power	2722-2738, 17344, 17345

Competenz has completed the review of the unit standards listed above that were registered in January 1995 and February 2000.

Date new versions published **May 2004**

New comments by date **May 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 in 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 show an 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 was scheduled for completion October 2003, however, the extent and complexity of the review program has now seen the completion date taken to mid 2004.

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

It was recognised that some of these unit standards applied to other Competenz sectors and qualifications, including Machining and Toolmaking and Lifts and Escalators. On this basis, representatives from these sectors were invited to provide input as applicable.

Main changes resulting from the review*Part 1: Domain changes.*

Fluid power is a generic term for the specialist areas of *hydraulics* and *pneumatics*. However, the two areas are fundamentally different in terms of function, system design, maintenance requirements, and industrial application. As such, the review group considered that hydraulics and pneumatics unit standards should be classified under separate domains, named as follows:

- *Fluid Power - Hydraulics*
- *Fluid Power - Pneumatics*

These domains were registered in October 2003, and all reviewed unit standards have been reclassified accordingly.

Part 2: Unit standard changes

The review process has resulted in the following changes to the unit standards.

- The term *fluid* has been removed from all titles. This term has been replaced by either *hydraulic* or *pneumatic*, depending on which arm of fluid power the unit standard is applicable to.
- The introduction of two new knowledge-based unit standards developed for hydraulics and pneumatics: 20611 and 20612. These two unit standards capture underpinning knowledge previously implicit in unit standards 17344 and 17345.
- Unit standards 17344 and 17345: Improved special notes to better indicate parameters for assessment.
- Unit standards 2722 and 2723: These unit standards required performance against both hydraulic and pneumatic systems, a situation not normally encountered in many work environments. Maintenance and safety performance outcomes are now captured against separate *hydraulics* and *pneumatics* unit standards of 20613, 20614, 20597, and 20598. It will be noted that while the credit value of unit standard 2723 was split proportionally between the two replacement unit standards, the credit value of 5 for unit standard 2722 was maintained for each of its replacement unit standards. The effective increase in credits more accurately reflects the extent of learning and performance required against each fluid power category.
- Unit standard 2724: Replaced by unit standard 20599, as the performance outcome is applicable to hydraulics only. Credit value of 4 has been retained as it reflects the extent of learning and performance required for this activity.
- Unit standard 2725: Improved special notes and performance criteria range items to better indicate parameters for assessment. Title changed to indicate that performance is under supervision.
- Unit standard 2726: Replaced by two new unit standards 20600 and 20601, and supported by the introduction of new unit standard 20602. All three unit standards focus on system design, with learning and performance progressing from an integrated system under supervision, to the design of a more specialised air distribution system.
- Unit standards 2727 and 2728: Reference to *maintenance* in titles changed to *servicing*, and a definition given for the latter in each unit standard. Improved special notes to better convey parameters for assessment. The same amendment rationale and improvements apply to unit standards 2731 and 2732.
- Unit standard 2729: Improved special notes, and the addition/expansion of performance criteria range items to better convey parameters for assessment.
- Unit standard 2730: Replaced by unit standard 20603, and supported by the introduction of 20604. These unit standards continue the learning and performance progression from unit standard 20602 alluded to above. Note that *logic elements* and *servo positioning* have been removed from unit standard 20603, thereby making it substantially different from its predecessor, unit standard 2730.
- Unit standard 2733: Improved special notes, and the addition/expansion of performance criteria range items.
- Unit standard 2734: Replaced by two new unit standards 20605 and 20606. Each unit standard represents a progression in fault diagnosis complexity and performance expectation, as reflected in the title, level, and special notes.
- Unit standard 2735: Replaced by unit standards 20607, 20608, and 20609
- Unit standard 2738: Replaced by unit standard 20610. Service/maintenance requirement in earlier unit standard removed. Applicable to hydraulic systems only.

- Unit standard 2736: Designated as expiring due to low usage. Unit standards 20603 and 20604, coupled with unit standard 5926 *Demonstrate knowledge of programmable logic controllers (PLC)*, may serve as a comparable performance outcome.
- Unit 2737: Designated as expiring due to low usage. A comparable performance outcome can be met via unit standard 11399, for which separate accreditation should be sought as appropriate.

Unit standards categorised as category C or D expire at the end of December 2005.

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
Subfield	Mechanical Engineering	3	Unit standard	20601, 20602	4
Subfield	Mechanical Engineering	4	Unit standard	20604	5
Domain	Fluid Power	Any	Domain/Id	Fluid Power - Hydraulics Fluid Power - Pneumatics	Same Same
Domain	Fluid Power	3	Unit standard	20601, 20602	4
Domain	Fluid Power	4	Unit standard	20604	5
Unit standard	2722	2	Unit standard	20613, 20614	2
Unit standard	2723	2	Unit standard	20597, 20598	2
Unit standard	2724	2	Unit standard	20599	2
Unit standard	2726	3	Unit standard	20600, 20601	2, 3
Unit standard	2730	4	Unit standard	20603, 20604	4, 5
Unit standard	2734	4	Unit standard	20605, 20606	4, 5
Unit standard	2735	5	Unit standard	20607, 20608, 20609	5
Unit standard	2738	5	Unit standard	20610	5

Impact on Accreditation and Moderation Action Plan (AMAP)

AMAP 0013 has been updated to reflect the changes made to the domain and standards.

Impact on existing qualifications

The following Competenz qualifications are affected by the outcome of this review, and are currently under review.

Qualification title	Reference
National Certificate in Engineering Machining and Toolmaking (Level 4)	0123
National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 4)	0125
National Certificate in Manufacturing and Mechanical Engineering (Level 1)	0126

The following Competenz qualifications are also affected by the outcome of this review, and will be revised in due course to take account of the changes made.

Qualification title	Reference
National Certificate in Composites (Level 4)	0121
National Certificate in Lifts and Escalators (Level 4) with strands in Installation, and Servicing	0662
National Certificate in Engineering (General Engineering - Mechanical) (Level 2)	0903
National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 5)	0718
National Certificate in Food Production - Baking (Craft Baking) (Level 4)	0590
National Certificate in Food and Related Products Processing (Level 2)	0342
National Certificate in Food and Related Products Processing (Level 3)	0343
National Certificate in Food and Related Products Processing (Level 4)	0344
National Certificate in Food Production - Baking (Level 2)	0588
National Certificate in Food Production - Baking (Level 3)	0589
National Certificate in Food Production - Baking (Plant Baking) (Level 4)	0591

The following qualifications are also affected by the outcome of this review. The Standard Setting Bodies, as identified, have been informed and advised of the changes made to the domain and standards.

Qualification title	Reference	Standard Setting Body
National Certificate In Electricity Supply (Mechanical Fitter) (Level 2)	0890	Electricity Supply Industry Training Organisation
National Certificate in Electricity Supply (Mechanical Fitter) (Level 4) with strands in Hydro, Networks, and Thermal; and an optional strand in Electrical Services	0918	
National Certificate in Forestry (Mechanised Harvesting)	0489	Forest Industries Training
National Certificate in Forestry (Cable Harvesting - Extraction)	0828	
National Certificate in Forestry (Ground Based Harvesting - Extraction)	0830	
National Certificate in Forestry (Log Loading)	0831	
National Certificate in Engineering and Technology (Glass Containers) (Level 2)	0947	Plastics and Materials Processing Industry Training Organisation Incorporated
National Certificate in Engineering and Technology (Plastics Engineering) (Level 3)	0477	
National Certificate in Materials Processing (Level 1) with strands in General, Plastics Injection Moulding, Plastics Extrusion, Plastics Blow Moulding, Plastics Thermoforming, Plastics Blown Film Extrusion, Plastics Film Conversion, Plastics Injection Stretch-Blow Moulding, Plastics Rotational Moulding, Plastics Film Slitting, Expanded Polystyrene Moulding, Glass Containers, and Paint Manufacturing	0172	

Qualification title	Reference	Standard Setting Body
National Certificate in Materials Processing (Level 2) with strands in General, Plastics Injection Moulding, Plastics Extrusion, Plastics Blow Moulding, Plastics Pressure Thermoforming, Plastics Vacuum Thermoforming, Plastics Blown Film Extrusion, Plastics Film Conversion, Plastics Injection Stretch-Blow Moulding, Plastics Rotational Moulding, Expanded Polystyrene Moulding, Polystyrene Pre-expansion, Glass Containers, and Paint Manufacturing	0173	
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	0394	

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

Id	Domain	Title	Level	Credit	Review Category
2722 20613 and 20614	Fluid Power Fluid Power - Hydraulics Fluid Power - Pneumatics	Maintain a fluid power system Maintain a hydraulic power system under supervision Maintain a pneumatic power system under supervision	2	5	C
2723 20597 and 20598	Fluid Power Fluid Power - Hydraulics Fluid Power - Pneumatics	Make a fluid power system safe Make a hydraulic power system safe Make a pneumatic power system safe	2	8 4 4	C
2724 20599	Fluid Power Fluid Power - Hydraulics	Clean a fluid power system for service Clean a hydraulic power system for service	2	4	C
2725	Fluid Power Fluid Power - Hydraulics	Design an open loop hydraulic fluid power system Design a hydraulic power system under supervision	3	15	B

Id	Domain	Title	Level	Credit	Review Category
2726	Fluid Power	Design a pneumatic fluid power system	3	20	C
20600 and 20601	Fluid Power - Pneumatics	Design a basic pneumatic power system under supervision	3	15	
	Fluid Power - Pneumatics	Design a basic pneumatic power system	4	15	
20602	Fluid Power - Pneumatics	Design a pneumatic power air distribution system	4	10	NEW
2727	Fluid Power Fluid Power - Hydraulics	Maintain hydraulic fluid power equipment and components under supervision Service hydraulic power system components under supervision	3	20	B
2728	Fluid Power Fluid Power - Pneumatics	Maintain pneumatic fluid power equipment and components under supervision Service pneumatic power system components under supervision	3	20 15	B
2729	Fluid Power Fluid Power - Hydraulics	Design a hydraulic fluid power system Design a hydraulic power system	4	15	B
2730	Fluid Power	Design a sequential pneumatic fluid power system	4	10	C
20603	Fluid Power - Pneumatics	Design a pneumatic sequential power control system			
20604	Fluid Power - Pneumatics	Design a complex pneumatic power control system	5	10	NEW
2731	Fluid Power Fluid Power - Hydraulics	Maintain hydraulic fluid power equipment and components Service hydraulic power system components	4	20	B
2732	Fluid Power Fluid Power - Pneumatics	Maintain pneumatic fluid power equipment and components Service pneumatic power system components	4	15	B
2733	Fluid Power Fluid Power - Hydraulics	Diagnose hydraulic fluid power system faults Diagnose hydraulic power system faults	4	20	B

Id	Domain	Title	Level	Credit	Review Category
2734	Fluid Power	Diagnose pneumatic fluid power system faults	4	20	C
20605 and 20606	Fluid Power - Pneumatics	Diagnose pneumatic power system faults under supervision	3	10	
	Fluid Power - Pneumatics	Diagnose pneumatic power system faults	4	10	
2735	Fluid Power	Specify and design integrated hydraulic fluid power systems	5	20	C
20607 and 20608 and 20609	Fluid Power - Hydraulics	Design a closed circuit hydrostatic transmission power system	5	10	
	Fluid Power - Hydraulics	Design an open circuit, proportional hydraulic power system with closed loop control	5	10	
	Fluid Power - Hydraulics	Design an open circuit, proportional hydraulic power system with open loop control	5	10	
2736	Fluid Power	Specify and design integrated pneumatic fluid power systems	5	15	D
2737	Fluid Power	Establish maintenance programmes for fluid power systems	5	15	D
2738	Fluid Power	Diagnose faults in and service specialist fluid power controllers	5	20	C
20610	Fluid Power - Hydraulics	Diagnose faults in specialist hydraulic power equipment	5	10	
20611	Fluid Power - Hydraulics	Demonstrate knowledge of hydraulics and hydraulic power systems	2	5	NEW
20612	Fluid Power - Pneumatics	Demonstrate knowledge of pneumatics and pneumatic power systems	2	5	NEW
17344	Fluid Power Fluid Power - Pneumatics	Draw a diagram, and explain the operating principles, of a simple pneumatic power system	2	3	B
17345	Fluid Power Fluid Power - Hydraulics	Draw a diagram, and explain the operating principles, of a simple hydraulic power system	2	3	B