

Field Engineering and Technology**Review of *Industrial Measurement and Control - Theory* unit standards**

Subfield	Domain	ID
Industrial Measurement and Control	Industrial Measurement and Control - Theory	2630, 2632, 2634, 2636, 2638, 2641, 2649, 2653-2655, 2659-2663, 2665, 2666, 2668, 24886-24889

The Skills Organisation has completed the review of the unit standards listed above.

Date new versions published

November 2013

Planned review date

December 2017

Summary

These unit standards constitute the theory component of the National Certificate in Industrial Measurement and Control (Level 4) [Ref: 0410]. The review of these unit standards was conducted in conjunction with the development of the New Zealand Certificate in Industrial Measurement and Control for the purpose of ensuring that the standards reflect industry best practice. The review group consisted of industry experts and training providers, with additional input occurring via a wider email network consultation group. There are further unit standards in the *Industrial Measurement and Control* subfield under development.

The changes to the unit standards fundamentally consist of a repackaging of the theory content of the Level 4 training programme to provide improved alignment with the sequence of training delivery, and improved alignment with the graduate outcomes of the new Level 4 qualification. This process has resulted in nine unit standards being set to expire and eight new unit standards being created. A further thirteen unit standards required minor changes to wording of outcomes and evidence requirements.

Main changes

- Development of a new unit standard 28077, *Demonstrate knowledge of the physical principles of instrumentation systems*. This unit standard covers the theory of measurement of pressure, level, temperature, and flow. This content has been moved from unit standards 2630, 2632, 2634, and 2636 to improve alignment with sequencing of delivery. Where necessary, the credit values of these unit standards have been adjusted to reflect the change in content.
- Unit standard 2641 has been split into two unit standards: 28080, which covers liquid analytical measurement systems, and 28081, which covers gas analytical measurement systems. Flame, gas, smoke, and heat detection, which were covered in unit standard 2668, have also been incorporated into new unit standard 28081.
- The title and outcomes of unit standard 2649 have been modified to reflect greater emphasis at a systems level rather than at individual component level.
- Unit standards 2653 and 2659 have been combined into a single unit standard 28082. This reflects the commonality between strain gauges and other types of transducers. The level of detail has also been modified to reflect that technicians typically do not work at discreet component level.
- Unit standards 2660 and 2661 have been combined into a single unit standard 28076,

and unit standards 2663 and 2666 have been combined into unit standard 28083. This improves alignment with the sequencing of training delivery.

- Unit standard 2665 now includes content relating to signal transmission used in industrial instrumentation. The credit value has been increased to reflect this increase in content. The extensive changes require that this unit standard be replaced by the new unit standard 28078.
- Unit standard 24886 has had the term 'smart' removed from the title and text, as the term is no longer relevant in the industry context.
- Unit standard 24889 has been moved to the Industrial Measurement and Control - Installation domain as this better indicates the content and assessment requirements of the unit standard. The title of the unit standard has been changed to align with the requirement for application of knowledge.
- A new unit standard, 28079, *Demonstrate and apply fundamental knowledge of digital and analogue electronics for IMC technicians*, has been developed to meet the specific electronics knowledge needs of IMC technicians. Unit standards 20432, 20433, and 24885 from the core electronics domain were found to be not fit for purpose in the IMC context.
- The context for learning and assessment of the unit standards is no longer specified in the explanatory notes so as to make the unit standards achievable in a wider range of contexts.
- The evidence requirements of all unit standards have been rewritten using the active voice to improve clarity of the statements.
- Last dates for assessment of superseded versions of Category B standards have been specified.

Superseded versions of Category B unit standards will expire at the end of December 2013 or December 2015 (please see unit standards for details).

Category C unit standards will expire at the end of December 2017

Impact on existing organisations with consent to assess

Current consent for			Consent extended to		
Nature of consent	Classification or ID	Level	Nature of consent	Classification or ID	Level
Standard	2630, 2632, 2634, 2636	3	Standard	28077	3
Standard	2641	4	Standard	28080, 28081	4
Standard	2653, 2659	3	Standard	28082	3
Standard	2663, 2666	3	Standard	28083	3
Standard	2660, 2661	4	Standard	28076	4
Standard	2665	3	Standard	28078	3
Standard	2668	3	Standard	28081	4
Standard	20432, 20433, 24885	3	Standard	28079	3
Domain	Industrial Measurement and Control - Theory	4	Standard	24889	4

Impact on Consent and Moderation Requirements (CMR)

None.

Impact on registered qualifications

Key to type of impact	
Affected	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
Not materially affected	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following Skills Organisation qualification is impacted by the outcome of this review. The standards that generated the status *Affected* are listed in **bold**.

Ref	Qualification Title	Classification or ID
0410	National Certificate in Industrial Measurement and Control (Level 4)	2630, 2632, 2634, 2636, 2638, 2641, 2649, 2653, 2654, 2655, 2659, 2660, 2661, 2662, 2663, 2665, 2666, 2668, 24886, 24887, 24888, 24889

Detailed list of unit standards – classification, title, level, and credits

All changes are in **bold**.

Key to review category	
A	Dates changed, but no other changes are made - the new version of the standard carries the same ID and a new version number
B	Changes made, but the overall outcome remains the same - the new version of the 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

Engineering and Technology > Industrial Measurement and Control > Industrial Measurement and Control - Theory

ID	Title	Level	Credit	Review Category
2630	Demonstrate knowledge of pressure measurement systems used in industry	3	6 4	B
2632	Demonstrate knowledge of level measurement systems used in industry	3	4 3	B
2634	Demonstrate knowledge of temperature measurement systems used in industry	3	5	B
2636	Demonstrate knowledge of flow measurement systems used in industry	3	6 4	B
2638	Demonstrate knowledge of control valves, actuators, and positioners	3	4	B

ID	Title	Level	Credit	Review Category
2641	Demonstrate knowledge of analytical measurement systems	4	6	C
2668	Demonstrate knowledge of flame, gas, smoke, and heat detectors	3	2	C
28080	Demonstrate knowledge of liquid analytical measurement systems	4	3	
28081	Demonstrate knowledge of gas analytical measurement and flame, gas, smoke, and heat detection	4	5	
2649	Demonstrate knowledge of signal conditioning equipment, recorders, and alarm modules Demonstrate knowledge of signal conditioners, trending recorders, and alarm systems	4	3	B
2653	Demonstrate knowledge of strain gauges and weighing systems	3	2	C
2659	Demonstrate knowledge of transducers and their applications in industrial measurement	3	5	C
28082	Demonstrate knowledge of transducers and strain gauges and their applications in industrial measurement	3	7	
2654	Demonstrate knowledge of on/off and proportional integral derivative mode control theory and controllers	4	8	B
2655	Tune control loops	4	6	B
2660	Demonstrate knowledge of advanced control loop methods	4	3	C
2661	Configure and tune advanced control loops	4	4	C
28076	Demonstrate and apply knowledge of advanced control loop methods	4	7	
2662	Demonstrate knowledge of distributed control systems	4	2	B
2663	Demonstrate knowledge of hydraulic control equipment used in industry	3	4	C
2666	Demonstrate knowledge of pneumatic control equipment used in industry	3	4	C
28083	Demonstrate knowledge of hydraulic and pneumatic control equipment used in industrial process control applications	3	6	
2665	Demonstrate knowledge of instrumentation calibration terminology and standards	3	3	C
28078	Demonstrate knowledge of industrial measurement processes, standards, and calibration	3	4	

ID	Title	Level	Credit	Review Category
24886	Demonstrate and apply knowledge of electronic configurable (smart) instruments and loops used in industry Demonstrate and apply knowledge of electronic configurable instruments and loops used in industry	4	3	B
24887	Demonstrate knowledge of electronic variable speed drives	4	3	B
24888	Prepare and interpret diagrams for instrumentation and control systems	3	3	B
28077	Demonstrate knowledge of the physical principles of instrumentation systems	3	5	New
28079	Demonstrate and apply fundamental knowledge of digital and analogue electronics for IMC technicians	3	12	New

Engineering and Technology > Industrial Measurement and Control

ID	Domain	Title	Level	Credit	Review Category
24889	Industrial Measurement and Control – Theory Industrial Measurement and Control - Installation	Demonstrate knowledge of industrial instrumentation installation Demonstrate and apply knowledge of industrial instrumentation installation	4	8	B