Title	**Demonstrate knowledge of, and apply, international measurement uncertainty principles in engineering**		
Level	**5**	**Credits**	**2**

Purpose	People credited with this unit standard are able to demonstrate knowledge of, and apply international measurement uncertainty principles in engineering in accordance with guidelines issued by the International Organisation for Standardisation.

Classification	Mechanical Engineering > Engineering - Measurement

Available grade	Achieved

Explanatory notes

1 Reference
ISO/IEC Guide 98-3: 2008. *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement*.
http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=50461

2 Definitions
Type A uncertainty – component of uncertainty arising from a random effect.
Type B uncertainty – component of uncertainty arising from a systematic effect.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of international measurement uncertainty principles in engineering.

Evidence requirements

1.1 The purpose of establishing measurement uncertainty is explained as it relates to product development and quality control.

1.2 Terms associated with measurement uncertainty are explained.

Range: uncertainty interval, level of confidence, uncertainty components, measurand.

1.3 The concept of measurement imperfection, and how it arises, is described.

Range: Type A, Type B.

1.4 Systematic effects are described in terms of how they contribute to measurement uncertainty.

Range: standard, workpiece, instrument used for measurement, people, environment (SWIPE).

1.5 Combined standard uncertainty is explained in terms of how it is used in the evaluation of results.

Outcome 2

Apply international measurement uncertainty principles in engineering.

Evidence requirements

2.1 Level of acceptable uncertainty is established for given job requirements.

Range evidence is required for three jobs.

2.2 Type A and Type B uncertainties are assessed for practical engineering measurements in accordance with the *Guide to the expression of uncertainty in measurement*.

2.3 Measurements are expressed with uncertainties in accordance with the *Guide to the expression of uncertainty in measurement*.

Planned review date	31 December 2016

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	23 May 1995	31 December 2011
Revision	2	14 April 1997	31 December 2011
Revision	3	5 January 1999	31 December 2011
Revision	4	23 May 2001	31 December 2011
Review	5	21 February 2005	31 December 2014
Review	6	17 November 2011	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz on qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.