Title	**Carry out tests and measurements using approved procedures within mechanical engineering contexts**		
Level	**5**	**Credits**	**10**

Purpose	People credited with this unit standard are able to: prepare for testing and measuring; carry out tests and measurements in accordance with approved procedures within mechanical engineering contexts; and record, analyse, and report results.

Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering

Available grade	Achieved

Explanatory notes

1 References
Health and Safety in Employment Act 1992.
Resource Management Act 1991.
American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). Standard 111-2008, *Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.* ASHRAE, 2008. Available from: http://www.ashrae.org.
Chartered Institution of Building Services Engineers (CIBSE). CIBSE *Commissioning Codes.* CIBSE, 2003. Available from: https://www.cibseknowledgeportal.co.uk/new-cibse-bookshop.
Sheet Metal and Air Conditioning Contractors' National Association (SMACNA). *HVAC Systems – Testing, Adjusting and Balancing,* Third Edition. SMACNA, 2002. Available from: http://www.smacna.org/bookstore/index.cfm.

2 Definitions
Approved procedures – include national standards, industry standards and the organisation's standards such as documented worksite procedures.
Industry practice – safe and sound practices accepted by the mechanical engineering industry.
Job specifications – instructions relevant to the safe completion of the specific task, such as technical specifications, assembly instructions, drawings, parts lists, standards, codes of practice, test and commissioning procedures, and verbal instructions.
Worksite procedures – operational procedures put in place by the candidate's employer. These include site safety procedures, equipment operating procedures, job procedures, quality assurance processes and procedures, and procedures for the handling and disposal of materials and waste.
Physical measurements – include but are not limited to – dimensions, fits and clearances, alignment, distortion, wear. Typical applications include setting up bearings, fitting of mechanical seals, and alignment of components.

3 The following apply to this unit standard:
- a All activities must comply with safe work practices.
- b All activities must be completed without supervision, and reported, within agreed timeframes.
- c All work completed must be in accordance with documented worksite procedures.
- d Equipment must be set up, started up, operated, and shut down in accordance with the organisation's documented procedures.
- e All activities must comply with: any policies, procedures, and requirements of the organisations involved; the ethical codes and standards of relevant professional bodies; the cultural requirements of the organisations and individuals involved; and any relevant legislative and/or regulatory requirements, which can include but are not limited to those listed in the references.

4 The supplied plan includes the aims of the testing and measuring activity, the nature of the required outcomes, worksite requirements, requirements and/or procedures for the use of equipment, data recording requirements, and requirements for the analysis and reporting of results.

5 Range – a minimum of six different test and/or measurement types are required to be demonstrated including: pressure, temperature, physical measurements;
and a minimum of three different types selected from – fluid flow, vibration, humidity, velocity, thermal contraction and expansion, stress, strain.

Outcomes and evidence requirements

Outcome 1

Prepare for testing and measuring.

Evidence requirements

1.1 Working documents are prepared in accordance with the supplied plan and job specifications.

Range documents – work sheets, check sheets.

1.2 Worksite is prepared to the plan requirements and job specifications.

Range accessibility, personnel safety, plant security.

1.3 Preparation ensures that equipment and materials are available, checked as functional and accurate, and calibrated, in accordance with the plan, job specifications and worksite procedures.

1.4 Briefing and preparation of personnel ensures that they are able to meet the plan requirements and job specifications.

Outcome 2

Carry out tests and measurements in accordance with approved procedures within mechanical engineering contexts.

Evidence requirements

2.1 Tests and measurements are carried out to specified standards in accordance with industry practice and worksite procedures.

Range use of equipment, test procedures, data recording, tolerances, timings.

2.2 Test results are validated in accordance with worksite procedures and industry practices.

Outcome 3

Record, analyse, and report results.

Evidence requirements

3.1 Results are recorded in accordance with plan requirements and worksite procedures.

3.2 Results are analysed in accordance with the plan, job specifications and industry practice.

3.3 Conclusions drawn from analysis are supported by valid evidence and reasoned argument.

3.4 Results are reported, distributed, and filed within agreed timeframes in accordance with the plan and worksite procedures.

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	24 February 1998	31 December 2011
Revision	2	18 September 2001	31 December 2011
Rollover and Revision	3	25 July 2006	31 December 2011
Rollover	4	20 June 2008	31 December 2014
Review	5	17 November 2011	31 December 2014
Revision	6	17 October 2013	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 qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.