

Title	Select and specify materials for mechanical engineering applications		
Level	6	Credits	20

Purpose	People credited with this unit standard are able to determine and apply selection criteria for replacement materials and determine and apply selection criteria for new applications.
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Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering
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Available grade	Achieved
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Entry information	
Recommended skills and knowledge	Unit 21785, <i>Demonstrate knowledge of and test materials for mechanical engineering applications.</i>

Explanatory notes

- 1 References
 - Building Act 2004.
 - Hazardous Substances and New Organisms Act 1996.
 - Health and Safety in Employment Act 1992.
 - Resource Management Act 1991.
- 2 Definitions
 - Industry practice* – safe and sound practices accepted by the mechanical engineering industry.
 - Mechanical engineering design project* – a project requiring the expansion or reconfiguration of existing plant and/or equipment, the design of new plant and/or equipment, or the design of an item for manufacture.
 - Stakeholders* – personnel such as: owner, contract manager, consultant engineer, contractor, internal personnel.
 - 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 other procedures for the handling and disposal of materials and waste.
- 3 The following apply to this unit standard:
 - a All activities must demonstrate safe working practices.
 - b All activities must be completed independently and reported within reasonable timeframes.
 - c 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 Range

Materials may include but are not limited to: ferrous metals, aluminium, brass, copper, zinc, magnesium, titanium, polymers, solid timber, concrete, ceramics, adhesives, composites; individually and/or in combination. Evidence of two selections involving different materials or combinations of materials is required.

Outcomes and evidence requirements

Outcome 1

Determine and apply selection criteria for replacement materials.

Evidence requirements

- 1.1 Job requirements are stated in terms of the process application, reasons for the replacement, and any specialist requirements in accordance with worksite procedures.
- Range process applications may include but are not limited to – welding, forging, casting, cutting, pressing, bending, spinning, machining, extrusion, finishing;
replacement reasons may include but are not limited to – changes in safety or production specifications, reconfiguration of structure or component, corrosion, wear, material or component failure;
specialist requirements may include but are not limited to – environment, performance, cost, availability compatibility with lubricants or process materials.
- 1.2 Where replacement is due to material failure, likely causes are identified from relevant sources in accordance with industry practice and worksite procedures.
- Range sources may include but are not limited to – results of testing, laboratory reports.
- 1.3 Where required, the assistance of qualified professionals is sought for specialist advice on causes of material failure in accordance with worksite procedures.
- 1.4 Selection criteria for replacement materials are expressed in terms of material properties, intended use, method of manufacture, cost, and availability in accordance with industry practice and worksite procedures.
- Range method of manufacture may include but is not limited to – strengthening mechanisms, joining requirements.
- 1.5 Materials selected meet selection criteria and are specified using terminology that meets the requirements of users.
- 1.6 Required documentation is completed in accordance with worksite procedures.

Range may include hard copy and/or electronic documentation.

Outcome 2

Determine and apply selection criteria for new applications.

Evidence requirements

2.1 Job requirements are stated in terms of the process application and any specialist requirements.

Range process applications may include but are not limited to – welding, forging, casting, cutting, pressing, bending, spinning, machining, extrusion, finishing;
specialist requirements may include but are not limited to – environment, performance, cost, availability compatibility with lubricants or process materials.

2.2 Selection criteria are expressed in terms of material properties, intended use, method of manufacture, cost, and availability in accordance with industry practice and worksite procedures.

Range method of manufacture may include but is not limited to – strengthening mechanisms, joining requirements.

2.3 Materials selected meet selection criteria and are specified using terminology that meets the requirements of users.

2.4 Required documentation is completed in accordance with worksite procedures.

Range may include hard copy and/or electronic documentation.

Planned review date	31 December 2016
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 October 2005	31 December 2014
Review	2	17 November 2011	N/A

Consent and Moderation Requirements (CMR) reference	0013
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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.