Title	**Apply mechanical engineering principles to mechanical power transmission**		
Level	**5**	**Credits**	**10**

Purpose	People credited with this unit standard are able to: explain and apply principles of mechanical power transmission as applied to mechanical systems and components; design mechanical power transmission systems to match operational requirements; and identify causes of mechanical power transmission problems and specify remedial action.

Classification	Mechanical Engineering > Applied Principles of Mechanical Engineering

Available grade	Achieved

Entry information	
Recommended skills and knowledge	Previously acquired competence in the transposition of formulae, the manipulation of equations, and the use of trigonometric functions; understanding of fundamental concepts of physics (mass, length, and time) and their derived units, including pressure, force, gravitational effect, velocity, acceleration, and energy; knowledge and understanding of principles of bearing design, fluid dynamics, and thermodynamics, and hold Unit 21773, *Demonstrate and apply knowledge of mechanical statics for mechanical engineering*, and Unit 21774, *Demonstrate and apply knowledge of mechanical dynamics for mechanical engineering*.

Explanatory notes

1 References
Health and Safety at Work Act 2015 and supporting Regulations.

2 Definitions
Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.
Workplace procedures refer to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

2 Range
Evidence requirements of this unit standard must be presented across the following contexts and contents:
- a principles – harmonic motion, deflection, wave motion, elasticity;
- b mechanical engineering principles – friction, stress, strain, inertia forces, torque, speed, power, relationship of power and heat;
- c components – clutches, brakes, gears, shafts (rigid and flexible), sprockets, bearings, belts, chains, pulleys, couplings, gearboxes;
- d systems – systems comprising combinations of the above components;
- e properties – reliability, efficiency, noise, maintenance requirements, fitness for purpose.

4 Assessment information
- a Examples given must be within the context of mechanical engineering or manufacturing.
- b Numerous reference texts and training manuals on mechanical engineering principles are available and may be used; however, no one textbook or source of information is envisaged. All activities must comply with applicable workplace procedures and must be consistent with accepted industry practice.

Outcomes and evidence requirements

Outcome 1

Explain and apply principles of mechanical power transmission as applied to mechanical systems and components.

Evidence requirements

1.1 Explanation of the purpose of components establishes their roles and significance in mechanical power transmission systems.

1.2 The properties of mechanical power transmission systems and components are calculated, and formulae are selected, to meet the requirements of specific mechanical engineering situations.

Range formulae for – torque, power, efficiency, speed, acceleration, forces.

1.3 Explanation of the operation of components defines their mechanical power transmission principles.

1.4 The performance of mechanical power transmission systems is assessed in terms of system and component properties.

1.5 Types of bearings, and bearing tolerances, are matched with load characteristics.

Range types of bearings – rolling bearing and plain;
loads – radial and/or thrust.

1.6 Components are matched with operational requirements.

Outcome 2

Design mechanical power transmission systems to match operational requirements.

Evidence requirements

2.1 Mechanical power transmission systems and components are designed in schematic and/or sketch form to match operational requirements.

2.2 Systems are designed to meet end-user requirements for fitness for purpose and resource usage.

2.3 Design methodology that conforms with established engineering practice relevant to the mechanical power transmission systems being designed is used.

2.4 Components are selected to conform with manufacturer's data, and to match machine and operating environment requirements.

2.5 Maintenance requirements are defined in accordance with component manufacturers' recommendations and specifications.

2.6 Systems and components are identified using terminology that meets the requirements of users.

Outcome 3

Identify causes of mechanical power transmission problems and specify remedial action.

Evidence requirements

3.1 Data is collated and analysed to establish the nature of the problem as being mechanical power transmission associated.

Range data – observations, measurements, maintenance records, operational reports, test and laboratory reports.

3.2 Probable root causes of problems are identified in terms of mechanical power transmission principles.

3.3 Remedial actions to restore operational integrity are specified.

Planned review date	31 December 2021

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	24 February 1998	31 December 2016
Review	2	27 October 2005	31 December 2016
Rollover	3	19 March 2010	31 December 2021
Review	4	20 October 2016	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 (CMRs). 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.