

Title	Demonstrate knowledge of mechanical power transmission		
Level	3	Credits	6

Purpose	People credited with this unit standard are able to demonstrate knowledge of – belt drives; chain drives; gears; shaft couplings; clutches and brakes; and variable speed drives.
----------------	---

Classification	Mechanical Engineering > Engineering Core Skills
-----------------------	--

Available grade	Achieved
------------------------	----------

Explanatory notes

- 1 Reference
Culley, Ron, ed. *Fitting and Machining*. ISBN 0724138196 (Melbourne: RMIT Publishing, 2009).
- 2 Definitions
Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.
Standard gear – typical straight cut spur gear.
- 3 Assessment information
Evidence provided must be in accordance with accepted industry practice.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of belt drives.

Evidence requirements

- 1.1 Belt drives are identified, and their principles of operation and applications explained.

Range flat belt and pulley, V-belt and pulley, positive drive (toothed) belt.
- 1.2 The term *pitch diameter* as it refers to a V-pulley is explained.
- 1.3 Calculations involving pitch diameters and revolutions per minute of two pulleys connected by a V-belt are performed.

Range two calculations.

1.4 Symptoms and causes of belt deterioration are described.

Range four symptoms and causes.

Outcome 2

Demonstrate knowledge of chain drives.

Evidence requirements

2.1 The principles of operation and application of chain drives is explained.

2.2 The term *chain pitch* is explained.

2.3 Chain adjustment methods are described.

Range two adjustments.

2.4 A method for estimating chain wear is described.

2.5 Calculations involving sprocket teeth and rotational speed of a chain drive are performed.

Range two calculations.

2.6 Common chain drive problems and their symptoms and causes are described.

Range two problems.

Outcome 3

Demonstrate knowledge of gears.

Evidence requirements

3.1 Operation and application of gear drives are explained.

Range spur gear, helical gear, double helical gear, rack and pinion, internal gearing, worm and wheel, bevel gear, planetary gears.

3.2 The terms *circular pitch*, *pitch diameter*, *gear ratio*, *module*, *diametral pitch*, *pressure angle*, *addendum*, *dedendum* and *backlash* are explained.

3.3 Calculations involving numbers of standard gear teeth and rotational speed of a gear drive are performed.

Range two calculations.

3.4 Common gear drive problems and their symptoms and causes are described.

Range two problems.

Outcome 4

Demonstrate knowledge of shaft couplings.

Evidence requirements

4.1 Shaft coupling types are identified, and their principles of operation and applications explained.

Range rigid, constant velocity, flexible, fluid, universal joint.

4.2 Common coupling problems and their symptoms and causes are described.

Range two problems.

4.3 Alignment requirements are explained for different coupling types.

Range rigid, constant velocity, flexible, fluid, universal joint.

Outcome 5

Demonstrate knowledge of clutches and brakes.

Evidence requirements

5.1 Clutches and brake types are identified, and their principles of operation and applications explained.

Range examples are – dog-tooth, cone, expanding shoe, plate, centrifugal, magnetic, sprag; band brake.
Three are required.

5.2 Common clutch and brake problems and their symptoms and causes are described.

Range two problems.

Outcome 6

Demonstrate knowledge of variable speed drives.

Evidence requirements

6.1 The advantages of using variable speed drives are explained compared to other drive options.

6.2 The operational principles of variable speed drives are described.

Range mechanical drive examples are – variable pitch, traction;
hydraulic drive examples are – hydrostatic, hydrodynamic,
hydroviscous;
electric drive examples are – direct current, alternating current,
eddy current.
Evidence of one mechanical, one hydraulic, and one electric drive.

Planned review date	31 December 2022
----------------------------	------------------

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 June 2006	31 December 2016
Review	2	17 November 2011	31 December 2021
Review	3	16 March 2017	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.