Achievement Standard

Subject Reference	Construction and Mechanical Technologies 3.25				
Title	Demonstrate understanding of a complex machine				
Level	3	**Credits**	3	**Assessment**	Internal
Subfield	Technology				
Domain	Construction and Mechanical Technologies				
Status	Registered	**Status date**	4 December 2012		
Planned review date	31 December 2016	**Date version published**	12 December 2013		

This achievement standard involves demonstrating understanding of a complex machine.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of a complex machine.	• Demonstrate in-depth understanding of a complex machine.	• Demonstrate comprehensive understanding of a complex machine.

Explanatory Notes

1 This achievement standard is derived from Level 8 of the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education at http://seniorsecondary.tki.org.nz.

Further information can be found at http://www.technology.tki.org.nz/.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools,* Ministry of Education at http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education, and the Health and Safety in Employment Act 1992.

2 *Demonstrate understanding of a complex machine* involves:
- explaining the components and function(s) of a complex machine
- explaining how a complex machine works using technical language, diagrams and symbols as appropriate
- discussing the energy efficiency of a complex machine and how this impacts on the requirements for the machine's energy system.

Demonstrate in-depth understanding of a complex machine involves:
- discussing how the components enable a complex machine to achieve its function(s)
- evaluating the energy efficiency of a complex machine.

Demonstrate comprehensive understanding of a complex machine involves:
- discussing and justifying possible ways of increasing the energy efficiency of a complex machine.

3 A *complex machine* refers to a machine with an internal energy system, and levers, inclined planes and/or screws working together to enable the machine to perform its intended function(s).

4 Internal energy systems include but are not limited to: electric motors, steam engines, turbines, combustion engines, solar energy systems.

5 Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/Resources-for-aligned-standards/Technology/Level-3-Technology.

Replacement Information
This achievement standard and AS91624 replaced AS90688 and unit standard 13413.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233