

Achievement Standard

Subject Reference	Construction and Mechanical Technologies 3.22		
Title	Implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine		
Level	3	Credits	4
		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 implementing complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine. 	<ul style="list-style-type: none"> Skilfully implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine. 	<ul style="list-style-type: none"> Efficiently implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine.

Explanatory Notes

- 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 *Implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine* involves:
- integrating the limits of a CNC machine into a graphic representation of the desired product in a computer design setting that demonstrates an understanding of CNC programming language
 - setting up and calibrating a CNC machine to software and manufacturer requirements
 - operating a CNC machine to make a product in compliance with relevant health and safety regulations
 - evaluating a CNC machine made product against its graphic representation.
- Skilfully implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine* involves:
- showing independence and accuracy in undertaking the procedures.
- Efficiently implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine* involves:
- undertaking procedures in a manner that economises time, effort, tooling and materials.
- 3 *Computer Numerical Controlled (CNC) machine* refers to 2 or 3 axis cutting, routing, embroidery or prototyping equipment that receives numerical control data from a host computer.
- 4 *Specified product* refers to a product with its associated specifications. The specified product requires an understanding of CNC programming (eg G-code) to support the application of CNC machining in its development. The specified product may be a model or a component part of a larger outcome. The specifications are of sufficient rigour to allow the student to meet the standard. The specifications need to be agreed prior to the product being made. They may be teacher-given or developed in negotiation with the student.
- 5 Setting up and calibrating a CNC machine refers to such things as ensuring that the product fits the machine, setting X, Y, and Z axis positions, and choosing correct cutting tools and speeds.
- 6 Computer design setting refers to the combination of software and hardware necessary to communicate numerical control data to a Computer Numerical Controlled (CNC) machine.
- 7 Graphic representation is the final design before machining and must be of sufficient rigour to allow the student to meet the standard.
- 8 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>.
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Replacement Information

This achievement standard replaced unit standard 7534.

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