



National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEĀ

Exemplar for Internal Achievement Standard Technology Level 2

This exemplar supports assessment against:

Achievement Standard 91366

**Undertake development and implementation of an effective
manufacturing process**

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Excellence
1.	<p>For Excellence, the student needs to undertake comprehensive development and implementation of an effective manufacturing process</p> <p>This involves establishing quality control procedures that allow for ongoing monitoring to enhance the review and refinement of the manufacturing process, in order to better suit the nature of the outcome and the constraints and/or opportunities of the manufacturing location.</p> <p>There is no student work currently available at this grade.</p> <p>The student would typically set up recording systems to keep detailed records of each critical control point. They would review these throughout the manufacturing of each batch, and at the end of each batch. They would also cross-reference this record with the testing of one sample from each finished batch. They would review the process after each batch, and consider changes that would improve the quality of the product, implementing these where appropriate.</p> <p>Comparisons would need to be made between batches, and there would be a successive improvement in consistency as a result of the implementation of improved quality control procedures.</p>

	Grade Boundary: Merit
2.	<p>For Merit, the student needs to undertake in-depth development and implementation of an effective manufacturing process</p> <p>This involves:</p> <ul style="list-style-type: none"> • modifying the techniques and the use of resources to tailor the manufacturing process to the nature of the outcome and the constraints and/or opportunities of the manufacturing location • modifying the quality control procedures to improve the quality of the feedback within the manufacturing process. <p>There is no student work currently available at this grade.</p> <p>When modifying the techniques and use of resources, the student could consider factors such as the limitations of storage, labour availability, and safe working practices and modify the process to suit. The student could implement training programmes to ensure the staff understood all of the procedures and could implement them consistently.</p> <p>When modifying the quality control procedures, the student would typically be using ongoing checking of the product to ensure that the specifications and tolerances were met. Faulty product would be rectified by reworking. There would be a good level of consistency between batches.</p>

	Grade Boundary: Achieved
3.	<p>For Achieved, the student needs to undertake development and implementation of an effective manufacturing process</p> <p>This involves:</p> <ul style="list-style-type: none"> • analysing a technological outcome to determine suitability for manufacture and making design changes as required • establishing specifications, including tolerances, required of the outcome that is to be manufactured • selecting a manufacturing process and quality control procedures that enable units to meet the established specifications and tolerances • organising and using selected resources and carrying out techniques independently and accurately in keeping with relevant codes of practice • implementing the manufacturing process using feedback from quality control to ensure the majority of the units meet the established specifications and tolerances. <p>There is no student work currently available at this grade.</p> <p>When analysing a technological outcome, students would typically have trialled and analysed the development process and identified modifications as required.</p> <p>When establishing specifications, students would typically decide the dimensions, materials and finishes to be used with appropriate tolerances.</p> <p>When selecting a manufacturing process and quality control procedures, students would typically consider their outcome and the available resources and choose batch processing. They would develop a flow diagram of processes that includes when particular quality control procedures (such as weight and dimensional checks) would be carried out.</p> <p>When organising and using resources, students would typically select and organise equipment, facilities, labour and materials, ensure safe storage and handling of these materials. They would follow their manufacturing plan and adhere to relevant codes of practice.</p> <p>When implementing the manufacturing process, students would typically produce the quantity of product using quality control checks, and adjust the process as required.</p>