**NZQA**

**Approved**

Achievement standard: 91056 Version 3

Standard title: Implement a multi-unit manufacturing process

Level: 1

Credits: 4

Resource title: A team of T-shirts

Resource reference: Generic Technology VP-1.13 v2

Vocational pathway: Manufacturing and Technology

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91056-02-7376 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

Achievement standard: 91056

Standard title: Implement a multi-unit manufacturing process

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Vocational pathway: Manufacturing and Technology

Learner instructions

# Introduction

This assessment activity requires you to implement a multi-unit manufacturing process for T-shirts to be worn, for example, at a kapa haka competition or other event.

You are going to be assessed on how you implement an effective multi-unit manufacturing process for T-shirts. You will use feedback from quality control to review and modify the process, where necessary, to improve the proportion of T-shirts meeting specifications.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

You are to prepare T-shirts for an event.

Ensure that you understand the specifications for the T-shirts. You may determine your own specifications or they may be provided by your assessor/educator. If determining your own specifications, check with your assessor/educator that these are sufficient to allow you to achieve the standard.

Identify a manufacturing system (e.g. one-off, batch, or continuous) that would enable your specifications to be met. You will be designing a manufacturing process that communicates the resources, techniques, and quality control procedures you will be using.

You need to identify:

* the labour force available to you (which could be you and/or others)
* the skills of the people in your labour force
* the equipment, materials, and floor space available to you
* the most efficient use of materials (in preparation for cutting, sewing, and printing)
* the most efficient step-by-step process for producing the T-shirts and printing on them
* quality control procedures, how these procedures will be carried out, and how the process will allow for responses to feedback and identifying faults
* any safety issues (for example safe machining practices such as mini-breaks and ergonomic exercises)
* any laws or legal issues (for example occupational health and safety (OSH) requirements for a workroom).

Decide on:

* the manufacturing process
* the resources needed to implement the process (including materials, space, equipment, and workforce) and when you will need them.

A flow diagram might help your planning.

Implement your manufacturing process to manufacture the T-shirts. You need to show evidence of:

* the techniques followed (and information about how they reflected accepted codes and practices, including safety and legal requirements) and resources used for different stages in the manufacturing process
* quality control procedures and their results, to ensure only T-shirts that met specifications were accepted
* feedback from quality control being used to review the manufacturing process and, if required, to modify the process to produce an improvement in the proportion of T-shirts meeting specifications.

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to identify and implement an effective multi-unit process for manufacturing T-shirts to meet specifications, using feedback and modification to improve the acceptability of the end product.

Learners will be assessed on the effectiveness of their manufacturing process in terms of the proportion of units produced that meet specifications.

# Conditions

Learners need to complete all of their practical work in the presence of their assessor/educator to enable judgements about the process implemented as well as the quality of the outcome.

While learners need to determine the implementation process, they may use other people to help carry out the process.

# Resource requirements

Assessors/educators must either provide or check that learners have specifications (this might include a garment specification sheet that details construction/finishing techniques, sizes, tolerances, and materials, etc.) that are suitable as a starting point.

Learners will also require access to:

* a space that allows for the manufacturing process to be carried out
* materials (for example fabric, notions and screen printing, and/or embroidery supplies)
* T-shirt pattern/s and designs for screen printing or embroidery
* tools and equipment the learner and/or their workforce need in order to work safely to manufacture the T-shirts (for example sewing and embroidery machines, irons and pressers, cutting out tables, screen printing equipment).

The following websites may be useful:

<http://www.apparelsearch.com/terms/S/Size_Specs_clothing.htm>

<http://www.consumer.org.nz/reports/consumer-guarantees-act>

<http://www.consumer.org.nz/reports/fair-trading-act>

[www.textileschool.com](http://www.textileschool.com)

# Additional information

Learners need to be familiar with:

* different types of manufacturing systems and processes, so that they can select and adapt an appropriate manufacturing process
* safe practices in manufacturing processes (for example safe machining practices, appropriate safety gear, and OSH requirements)
* legal requirements for manufacturing T-shirts (although the garments may not be for sale, learners should understand manufacturers’ responsibilities for such things as labelling for size and garment care, and meeting the requirements of the Fair Trading and Consumer Guarantees Acts)
* quality control strategies that enable the product to be constructed accurately and meet specifications.

## Other possible contexts for this vocational pathway

Implementing a multi-unit manufacturing process (e.g. bakery, butchery, catering, confectionery, dairy, electrical items, clothing, jewellery, signs, tools).

# Assessment schedule: Generic Technology 91056 – A team of T-shirts

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner implements a multi-unit manufacturing process by:* identifying a manufacturing process suitable for multi-unit manufacture of a T-shirt

For example:The learner identifies possible manufacturing systems and explains why batch processing is most appropriate. The learner creates a flow diagram of the manufacturing process.* implementing the manufacturing process by using selected resources and carrying out techniques in keeping with accepted practices, including safety and legal requirements

For example:The learner uses the flow diagram of the manufacturing process to produce multiple T‑shirts. The process is photographed and annotations describe tasks carried out.Evidence includes:* + a manufacturing specification sheet, with details (e.g. of marking, cutting and sewing instructions, tolerances, and acceptable finished measurements)
	+ application of accepted practices (e.g. for using machinery (OSH), and positioning for workers operating machines for extended periods) with supporting photographs and annotations
	+ photos showing details of the care labels inserted in the final garments
	+ how the T-shirts were manufactured following accepted codes for construction of such things as seams and hem (i.e. cover seamed as planned).

Some manufacturing faults are not identified at an earlier stage, so some finished T-shirts do not meet specifications and therefore are rejected (e.g. when sewing threads on both the plain sewer and cover seamer are not checked, there are obvious colour differences from what was required).*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner implements a refined multi-unit manufacturing process by:* identifying a manufacturing process suitable for multi-unit manufacture of a T-shirt

For example:The learner identifies possible manufacturing systems and explains why batch processing is most appropriate. The learner creates a flow diagram of the manufacturing process.* implementing the manufacturing process by using selected resources and carrying out techniques in keeping with accepted practices, including safety and legal requirements
* implementing quality control procedures suitable for the manufacturing process and ensuring that only those units that met the specifications are accepted

For example:The learner uses the flow diagram of the manufacturing process to produce multiple T‑shirts and provides photographs and explanations showing evidence of the process, tasks undertaken, and quality control checks (including results) during the manufacturing process, as identified in the flow diagram.Quality control includes:* + checking the neck binding is attached to the T-shirt at all points
	+ checking the finished length is within the measurement tolerances documented on the specification sheet for the size constructed
	+ checking the T-shirt is hemmed with the cover seamer and thread matched to the fabric
	+ checking the beginning and end of the hem blend.

T-shirts that do not meet specifications and quality control checks are identified and either rectified or rejected.*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner implements an effective multi-unit manufacturing process by:* identifying a manufacturing process suitable for multi-unit manufacture of a T-shirt

For example:The learner identifies possible manufacturing systems and explains why a batch process is most appropriate. The learner creates a flow diagram of the manufacturing process.* implementing the manufacturing process by using selected resources and carrying out techniques in keeping with accepted practices, including safety and legal requirements
* implementing quality control procedures suitable for the manufacturing process and ensuring that only those units that met the specifications are accepted
* using feedback from quality control to review and modify the manufacturing process, where necessary, leading to an improvement in the proportion of units meeting the specifications

For example:The learner uses the flow diagram of the manufacturing process to prepare multiple T‑shirts. Photographs and explanations provide evidence of the process, tasks undertaken, and quality control checks (including results) during the manufacturing process, as identified in the flow diagram.Evidence shows the learner used feedback from quality control to inform the manufacturing process, and where specifications were not being met, they improved the process to produce more T-shirts that were acceptable. For example:* + the learner discovers it is difficult for machinists to get the top-stitching on the neck band an even distance from the edge when using the regular machine foot. Changing to a compensating foot results in a greater proportion of the T-shirts meeting this quality standard
	+ the learner observes one of the machinists struggling to master the technique for a flat, even hem on a cover seamer. They transfer this machinist to another sewing task and give the hemming task to another machinist who has mastered this technique. This results in an increased number of T-shirts meeting specifications for the hem.

Specific evidence of the learner’s response to quality control feedback includes:* + ‘before and after’ photo of T-shirts, including annotations, to show how modifications have led to more acceptable results
	+ when a T-shirt meets the specifications without any change to the process, annotated photographs describe the quality.

*The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.