**NZQA**

**Approved**

Achievement standard: 91365 Version 3

Standard title: Demonstrate understanding of advanced concepts used in manufacturing

Level: 2

Credits: 4

Resource title: How are electric guitars made?

Resource reference: Generic Technology VP-2.12 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-02-2015-91365-02-8266 |
| 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: 91365

Standard title: Demonstrate understanding of advanced concepts used in manufacturing

Level: 2

Credits: 4

Resource title: How are electric guitars made?

Resource reference: Generic Technology VP-2.12 v2

Vocational pathway: Manufacturing and Technology

Learner instructions

# Introduction

This assessment activity requires you to demonstrate understanding of advanced concepts used in the manufacture of electric guitars.

You are going to be assessed on how comprehensively you demonstrate your understanding of advanced concepts used in the manufacture of electric guitars.

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

In this assessment activity you will need to research electric guitar manufacturing. Your assessor/educator may arrange a visit to a guitar manufacturing workshop or factory or arrange for an expert to talk to you. Alternatively, you could interview an expert in person or by email. You could also conduct research in a library or on the internet.

You may work individually or in a group to conduct research but you must produce your report or presentation individually. You might present your findings as a written report, a portfolio, or an oral or audio-visual presentation. Confirm the format with your assessor/educator.

As you work, gather evidence you could use in your report or presentation. You could include photographs, diagrams, notes you have written, and material from books, magazines, brochures or websites. Make sure you keep a record of the sources of this information.

Create a report or presentation in which you do the following:

* Identify the safety issues associated with electric guitar manufacturing and explain how these are addressed.
	+ Consider safety issues associated with the wood supply and other inputs, the workers, plant and equipment involved in the manufacturing process, i.e. how OSH (Occupational Health and Safety) regulations are addressed, the environmental implications of production and the final product.
	+ Consider how and why quality management techniques (such as Total Quality Management (TQM) or Six Sigma) have been important in changing practices related to safety.
* Identify new technologies and/or techniques and explain their impact on quality control and their suitability for different manufacturing systems used to produce electric guitars.
	+ Consider how and why quality management techniques (such as TQM or Six Sigma) have been important in adopting (or not adopting) particular new technologies and/or techniques.
	+ For example, you might consider how the introduction of Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) technologies has increased the possibility of quality control at the guitar manufacturer you studied. Is this technology suitable for the manufacturing system used by this manufacturer? Is it suitable for other electric guitar manufacturing systems (such as one-off custom manufacturing, batch manufacturing, assembly line manufacturing or flexible manufacturing)?
	+ Consider how the guitar manufacturer approaches quality management to ensure ongoing improvement of its processes and product. You may refer to planning, quality control, quality assurance and quality improvement techniques, and particular approaches such as Lean Manufacturing.
* Identify what influences customer, social and environmental drivers have on priorities in the electric guitar manufacturing process.
	+ For example, you could find out who the guitar manufacturer’s main customers are and why they purchase the electric guitars.
	+ Find out what social trends or values influence people’s choice of an electric guitar. For example, is there a preference for locally made products, for carbon-neutral products and/or for custom manufacturing? Which of these trends have influenced the guitar manufacturer’s decisions about its manufacturing process?
	+ What environmental considerations (such as the use of sustainable sources of wood and the choice of lacquer) have been seen as important by the manufacturer? How have these influenced the guitar manufacturer’s decisions about its manufacturing process?
* Discuss how and why quality management techniques (such as TQM or Six Sigma) have been important in changing (or not changing) manufacturing practices in response to these influences.

Use diagrams, photographs and other visuals to illustrate your discussion, as appropriate.

Make sure you acknowledge all your sources of information. You need to provide references to make it clear where your information has come from.

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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 produce a report or presentation in which they demonstrate their comprehensive understanding of advanced concepts – safety issues, the impact of new technologies and/or techniques, and customer, social and environmental influences – on the process used to manufacture electric guitars.

Learners may present their report or presentation in a format that best suits their needs. Ensure that the format selected allows the learner to meet the requirements of the standard.

# Conditions

Learners could gather and analyse their evidence independently or in groups or pairs, but they need to write their reports independently and will be assessed individually.

# Resource requirements

Learners will require access to relevant information about the manufacturing process selected for this assessment activity. You may arrange a site visit or guest speaker, for example, or guide learners in approaching a manufacturer for an interview.

Learners may also require access to a library or the internet.

Learners may require access to a camera or to photos taken during a site visit.

Useful websites related to electric guitar production include:

<http://www.youtube.com/watch?v=se4XIpmCHMQ>

<http://www.youtube.com/watch?v=jwHm1asdHvM>

<http://hotniches.jobwebmarketing.com/blog/2013/02/08/watch-cool-stuff-being-made-martin-guitar-pt-1/>

<http://www.guardian.co.uk/technology/2012/jun/15/3d-printing-revolutionising-guitar-making>

<http://www.mattsenguitars.co.nz/>

<http://www.madillguitars.co.nz/index.html>

# Additional information

None.

## Other possible contexts for this vocational pathway:

* milk powder manufacture
* meat packing and freezing
* fish filleting and freezing
* carpet manufacture
* niche furniture manufacture
* newsprint production
* the production of urea from natural gas
* the production of superphosphate
* oil refining
* electronics manufacturing
* agricultural machinery manufacturing
* the production of possum and merino yarn
* garment manufacturing.

# Assessment schedule: Generic Technology 91365 – How are electric guitars made?

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates understanding of advanced concepts used in manufacturing by:* explaining how safety issues are addressed in electric guitar manufacturing

For example: The learner explains the safety practices followed by a specific manufacturer, covering the wood supply, the manufacturing equipment and methods, packaging and storage, and safe delivery of the electric guitar to the consumer or retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out*.** identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control

For example: The learner identifies the technologies used by a specific guitar manufacturer and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control these technologies have allowed.* identifying the influences of customer, social and environmental drivers on priorities within an electric guitar manufacturing process

For example:The learner considered influences, as follows:*Customers and potential customers influence the production of electric guitars. The quality of the guitar is what is most important to them. The trend today is for a ‘clean sound’ …**Sustainability is important to customers and the general public …**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of advanced concepts used in manufacturing by: * explaining how safety issues are addressed in electric guitar manufacturing

For example:The learner explains the safety practices followed by a specific manufacturer, covering the wood supply, the manufacturing equipment and methods, packaging and storage, and safe delivery of the electric guitar to the consumer or retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out.* identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control

For example: The learner identifies the technologies used by a specific guitar manufacturer and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control these technologies have allowed.* identifying the influences of customer, social and environmental drivers on priorities within an electric guitar manufacturing process

For example:The learner considered influences, as follows:*Customers and potential customers influence the production of electric guitars. The quality of the guitar is what is most important to them. The trend today is for a ‘clean sound’ …**Sustainability is important to customers and the general public …* * explaining how quality management techniques have impacted on an electric guitar manufacturing process

For example:The learner explains what and why key changes have been made over the years to improve the efficiency of electric guitar production and the quality of the final product. Examples are given by the learner explaining how the guitar manufacturer has made use of new technologies (such as CAD/CAM) to improve quality control and why these technologies are suitable for the manufacturer’s particular manufacturing system. The explanation also covers influences with the manufacturing process that impact on quality management decisions.*The above expected learner responses are indicative only and relate to just part of what is required.*  | The learner demonstrates comprehensive understanding of advanced concepts used in manufacturing by:* explaining how safety issues are addressed in electric guitar manufacturing

For example:The learner explains the safety practices followed by a specific manufacturer, covering the wood supply, the manufacturing equipment and methods, packaging and storage, and safe delivery of the electric guitar to the consumer or retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out.* identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control

For example:The learner identifies the technologies used by a specific guitar manufacturer and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control these technologies have allowed.* identifying the influences of customer, social and environmental drivers on priorities within an electric guitar manufacturing process

For example:The learner considered influences, as follows:*Customers and potential customers influence the production of electric guitars. The quality of the guitar is what is most important to them. The trend today is for a ‘clean sound’ …**Sustainability is important to customers and the general public …* * discussing how and why quality management techniques have been important in changing manufacturing practices

For example:The learner links the branding priorities identified by the manufacturer with customer, social and environmental trends and drivers, and with ongoing quality management and improvement, as follows:*The general manager uses review techniques to keep up with global changes in the industry and how his product, processes and brand are placed within the local market. The key strategy is to extensively read industry magazines, daily newspapers and flyers, a lot of which are now available electronically. The firm wishes to remain an iconic guitar manufacturer operating in its market.**Branding is an important part of the success of the firm. It reflects its history of the family business and its reputation for quality. It is important for the brand to produce high-quality guitars using CAD/CAM processes.*The learner discusses the rationale for decisions to implement new technologies (or decisions not to implement) and other changes in the manufacturing practices. They discuss changes such as the introduction of factory filters, automated air conditioners and new packaging materials. They discuss the rationale behind the decision to keep the majority of sales in-house, allowing only a limited supply to be sold through other outlets.The learner discusses the importance of the environment on decisions made at the firm, as follows:*Environmental impact is a priority in all decisions made by the guitar manufacturer. This is a value that has been passed down from the previous generation. The firm’s retention of traditional methods and whether they will implement new technologies is influenced by this strong value.*The learner considers the impact of the manufacturing system on decisions on the adoption of new technologies and techniques, as follows:*In this firm, the general manager has responsibility for planning and implementing ongoing quality management and improvement practices. He has the specialist knowledge and skill in all aspects of the manufacture and management and is intimately involved and in control of every stage. Quality management in a larger scale factory involved in mass production would require more complex systems.**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.