Title	**Demonstrate knowledge of efficient and effective processes in mechanical engineering or fabrication**		
Level	**3**	**Credits**	**3**

Purpose	This unit standard is for use in a mechanical engineering or fabrication environment and is one of a series of three unit standards for assessing efficient and effective processes with standards 29560 and 29562. People credited with this unit standard are able to demonstrate knowledge of: adding value for a customer, producing quality fabricated, machined or metal formed products, waste minimisation, and 5S and the benefits of it's implementation in a mechanical engineering or fabrication environment.

Classification	Mechanical Engineering > Engineering Core Skills

Available grade	Achieved

Recommended skills and knowledge	Unit standard 29560, *Demonstrate knowledge of efficient and effective workplace procedures in mechanical engineering or fabrication,* or demonstrate equivalent skills and knowledge.

Explanatory notes

1 Definitions

5S refers to a systematic and methodical approach allowing teams to organise their workplace in the safest and most efficient manner.

Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Efficient and effective processes refers to processes that add value for customers with fewer resources through optimizing the flow of work, improving quality and reducing waste. This includes but is not limited to what is commonly referred to as Lean Manufacturing.

Quality product refers to the group of features and characteristics of a saleable good which determine how well it meets the needs of customers and which can be controlled by a manufacturer.

Workplace procedures refers to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

2 Assessment information
Examples/evidence given must be within the context of mechanical engineering or fabrication and must meet applicable worksite procedures and accepted industry practice. Numerous reference texts and training manuals on lean/process improvement are available and may be used; however no one textbook or source of information is envisaged.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of adding value for a customer.

Range customer – internal, external.

Evidence requirements

1.1 The process of adding value to a product is outlined in terms of how it meets customer and organisational needs.

1.2 The difference between non-essential and essential non-value adding steps in a process is described.

1.3 Value adding and non-value adding steps are identified for a given simple process.

Outcome 2

Demonstrate knowledge of producing quality fabricated, machined or metal formed products.

Evidence requirements

2.1 The management of quality during production is described in terms of how it contributes to meeting customer needs.

2.2 The effects poor quality can have on a mechanical engineering or fabrication organisation are explained.

Range effects include – dissatisfied customers, poor morale, viability of business and jobs.

2.3 Checks to ensure quality prior to starting and during production of fabricated, machined or metal forming components are identified for a given task.

Range examples of checks – correct tools and equipment, parts meet specification, correct alignment of parts, measurements, comparison with drawing, functional test, pattern condition. Evidence is required of quality checks for a minimum of two different given tasks involving a minimum of three different checks.

2.4 Methods to mistake proof production of fabricated, machined or metal forming components are described.

Range examples of mistake proofing – standard operating procedures; jigs; fixtures; go/no go gauges; buddy checking; non-interchangeable parts; core and mould setting features.
Evidence is required of five examples of mistake proofing.

2.5 Methods to minimise the risk of damage during production of fabricated, machined or metal forming components are described.

Range examples of damage minimisation - simulation run of operations, use of correct tool for the job, development of patterns for trial runs, correct material handling, use of sacrificial materials (e.g. vice soft jaws).
Evidence is required of five examples of damage minimisation.

2.6 Systems and techniques that contribute to the production of a quality product are described.

Range examples of systems and techniques - ensuring supervisor instructions are fully understood, implementation of a quality management system (QMS), accurate measuring and marking out, selection of materials.
Evidence is required of a minimum of five systems or techniques.

Outcome 3

Demonstrate knowledge of waste minimisation in a mechanical engineering or fabrication workplace.

3.1 Waste in a mechanical engineering or fabrication workplace is identified and strategies to minimise the waste are described.

Range evidence is required of examples of the minimisation of three different forms of waste.

3.2 Single piece flow is described and the benefits over batch manufacturing are described.

Range benefits include but are not limited to - waste minimisation, increased profitability, elimination of unnecessary work in progress.

Outcome 4

Demonstrate knowledge of 5S and the benefits of it’s implementation in an engineering or fabrication workplace.

Evidence requirements

4.1 The steps of the 5S process are listed and briefly described.

4.2 The benefits of implementing 5S in a mechanical engineering or fabrication workplace are explained.

Range examples of benefits – improved safety, greater efficiency, higher staff morale, higher quality product, quicker job changeovers. Evidence is required of a minimum of five different benefits.

Planned review date	31 December 2021

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2016	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz at qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.