

<b>Title</b>	<b>Explain principles of TPM applied in an organisation using competitive systems and practices</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>10</b>

<b>Purpose</b>	People credited with this unit standard are able to explain: the fundamental concepts and principles of Total Productive Manufacturing (TPM); the principles of workplace ownership of equipment by individuals, teams and the organisation; the principles of holistic measurement and calculate Overall Equipment Effectiveness (OEE); the principles of work area management; and the principles of establishing basic equipment condition.
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<b>Classification</b>	Manufacturing Skills > Competitive Systems and Practices
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<b>Available grade</b>	Achieved
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**Explanatory notes**

1 Definitions

*Basic equipment condition* is a term used to describe a state of equipment where elimination of looseness, contamination and incorrect lubrication has occurred. The term is also used to describe the systematic process of achieving this state by industry. The term operator equipment management and autonomous maintenance may also be used.

*Competitive systems and practices* may include, but are not limited to: lean operations, agile operations, preventative and predictive maintenance approaches, monitoring and data gathering systems, such as Systems Control And Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems, statistical process control systems, including six sigma and three sigma, Just in Time (JIT), kanban and other pull-related operations control systems, supply, value, and demand chain monitoring and analysis, 5S, continuous improvement (kaizen), breakthrough improvement (kaizen blitz), cause/effect diagrams, overall equipment effectiveness (OEE), takt time, process mapping, problem solving, run charts, standard procedures, current reality tree. Competitive systems and practices should be interpreted so as to take into account; the stage of implementation of competitive systems and practices; the size of the enterprise; the work organisation, culture, regulatory environment and the industry sector.

*Overall Equipment Effectiveness (OEE)* is the combination of the main factors causing loss of productive capacity from equipment/plant and is:  $OEE = \text{availability} \times \text{performance} \times \text{quality rate}$ ; where availability takes in to account losses due to breakdowns, set up and adjustments; performance takes into account losses due to minor stoppages, reduced speed and idling; quality rate takes into account losses due to rejects, rework and start up waste.

*Total Productive Manufacturing (TPM)* is an application of total quality management techniques (including total employee involvement, continuous improvement, workplace ownership and holistic measurement) to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE. TPM is one of the techniques covered by the term Competitive Manufacturing. Similar strategies referenced within the Australian Competitive Manufacturing units of competency include Total Preventative Maintenance/Total Productive Maintenance and Reliability Centred Maintenance (RCM).

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## Outcomes and evidence requirements

### Outcome 1

Explain the fundamental concepts and principles of TPM in an organisation using competitive systems and practices.

### Evidence requirements

- 1.1 The explanation establishes how the TPM Pillars help to achieve TPM outcomes.
- Range TPM pillars: maintenance excellence, autonomous maintenance, process and equipment improvement, education and training, operator or early equipment management, process and quality improvement, safety, health and environmental management.
- 1.2 The explanation establishes three outcomes and four benefits achieved through application of TPM principles.
- 1.3 The explanation defines the TPM principles.
- Range TPM principles: Continuous Improvement, Holistic Measurement, Ownership, Total Employee Involvement.
- 1.4 The explanation establishes how the features of TPM support continuous improvement and equipment management.
- Range features: management support, site leadership, cross functional, area based teams, systematic approach, documentation of meetings, documentation of procedures, standards and specifications, review, measurement, on-going evaluation. Evidence of five is required.

**Outcome 2**

Explain the principles of workplace ownership of equipment by individuals, teams and the organisation.

**Evidence requirements**

- 2.1 The explanation establishes the interdependence between the ownership of equipment by individuals, teams and the organisation and resultant equipment performance.
- 2.2 The explanation establishes how methods support maintenance and operating staff to work together to improve the operation of equipment.
- Range operator involvement in maintaining plant, maintenance staff involvement in machine performance, effective communication regarding machine performance.
- 2.3 The explanation establishes definitions of base skills and mastery skills as they relate to equipment maintenance and ownership.

**Outcome 3**

Explain the principles of holistic measurement and calculate OEE.

**Evidence requirements**

- 3.1 The explanation establishes the components in OEE.
- 3.2 The calculation of OEE is completed from supplied data.
- 3.3 The explanation establishes the six big losses and how these impact on equipment performance.

**Outcome 4**

Explain the principles of work area management.

**Evidence requirements**

- 4.1 The explanation identifies the objectives of work area management.
- 4.2 The explanation identifies components of work area management.
- Range: includes but is not limited to: five areas of focus.

**Outcome 5**

Explain the principles of establishing basic equipment condition.

**Evidence requirements**

- 5.1 The explanation covers reasons for establishing basic equipment condition in terms of impact on quality, machine reliability, equipment life, and the reduction of accidents.
- 5.2 The explanation establishes the seven steps required to achieve basic equipment condition.
- 5.3 The explanation establishes the definitions of maintenance and servicing.

<b>Planned review date</b>	31 December 2020
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	23 January 2002	31 December 2016
Review	2	27 September 2005	31 December 2018
Review	3	10 December 2015	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0013
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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 (CMRs). 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.

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**Comments on this unit standard**

Please contact Competenz at [qualifications@competenz.org.nz](mailto:qualifications@competenz.org.nz) if you wish to suggest changes to the content of this unit standard.