



Australian Government

**Assessment Requirements for MEM29010
Plan and implement preventative
maintenance procedures in an Industry 4.0
manufacturing workplace**

Assessment Requirements for MEM29010 Plan and implement preventative maintenance procedures in an Industry 4.0 manufacturing workplace

Modification History

Release 1. New unit.

Performance Evidence

There must be evidence the candidate has demonstrated the ability to:

- identify Industry 4.0 related systems used in at least two workplaces or work locations
- identify data relevant to preventative maintenance on at least two occasions from at least one Industry 4.0 related system
- review procedures, products and processes for possible causes of deviations from patterns of normal use for at least two workplace systems or major equipment items
- establish a plan for at least two preventative maintenance tasks. The plans are to include:
 - work order/authority to conduct maintenance
 - description of equipment or component to undergo maintenance including:
 - purpose
 - operational characteristics
 - available resources such as drawings, manufacturer's documentation, previous maintenance records
- WHS requirements and procedures
- equipment shut down and isolation procedures
- data collection and connectivity status before, during, and after maintenance
- assessment of equipment failure characteristics including availability of fail-safe mode
- link failure characteristics to maintenance systems
- identification of production windows
- creation of a work schedule
- required physical and human resources including:
 - tools, equipment and spares
 - task team members
- identification of critical equipment and components
- plant performance and history
- availability of spares
- procedures to test success of maintenance including test run of equipment
- information to be recorded during and after completion of maintenance.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- types of maintenance including:
 - preventative versus breakdown or corrective maintenance
 - predictive versus preventative maintenance
- maintenance terminology
- the role of data in supporting analyses related to preventative and predictive maintenance including:
 - failure mode and effects analysis (FMEA)
 - mean time between failures (MTBF)
 - overall equipment efficiency (OEE)
- basic condition monitoring principles, processes and resources including information from:
 - on board operating and fault reporting data transmission by equipment
 - external condition monitoring through:
 - vision systems or vibration monitoring
 - other types of condition monitoring sensors
 - diagnostic reports obtained from supervisory control and data acquisition system (SCADA) or other enterprise or equipment software
 - product or process quality analyses
 - non-destructive testing techniques and reports
 - inspection by maintenance employees and other experts
- dependency of predictive and preventative maintenance analytics on data collection and processing strategies within the workplace
- advantages of preventative and predictive maintenance in an Industry 4.0 workplace environment including:
 - maintenance of production through reduced downtime due to unplanned stoppages
 - increased equipment efficiency and reliability
 - maintenance of connectivity and data flow from sensors, processors and other equipment
- maintenance roles within a typical manufacturing or engineering workplace including:
 - operator maintenance
 - role of maintenance tradespersons including contractors
 - technical and professional engineering employees
- strategies for maintaining or improving data collection for preventative and predictive maintenance purposes including:
 - review of available software and its capabilities in regard to maintenance
 - review of sensors, run sheets, maintenance reports and other data collection strategies
 - vision systems
 - remote visual inspection and other inspection techniques

- non-destructive testing techniques relevant to maintenance including:
 - thermography
 - vibration analysis
 - oil analysis
- preventative maintenance task plan content including:
 - work order/authority to conduct maintenance
 - description of equipment or component to undergo maintenance including:
 - purpose
 - operational characteristics
 - available resources such as drawings, manufacturer's documentation, previous maintenance records
 - maintenance task scheduling window
 - WHS requirements
 - equipment shut down and isolation procedures
 - data collection and connectivity status before, during and after maintenance
 - implementation procedures
 - potential failure characteristics including fail-safe mode availability
 - required tools, equipment and spares
 - information to be recorded during and after completion of maintenance
 - equipment spares.
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Assessment Conditions

- Assessors must:
 - have vocational competency in planning and implementing preventative maintenance procedures in an Industry 4.0 manufacturing workplace at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- There must be access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>