



Australian Government

**Assessment Requirements for MEM29013
Integrate sensors into digital manufacturing
processes**

Release: 1

Assessment Requirements for MEM29013 Integrate sensors into digital manufacturing processes

Modification History

Release 1. New unit.

Performance Evidence

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

- report on the current use of sensors in the workplace including descriptions of:
 - types and locations of sensors
 - physical properties measured by the installed sensors
 - range of data collected
 - sensor data transmission, processing and networking
- report on the opportunity to increase the amount and quality of collected data through:
 - use of additional sensor locations and types
 - use of intelligent sensors including sensors incorporating self-testing and self-calibration
 - use of feedback loops and edge processing of sensor data
- read logic flow and state diagrams
- install and correctly calibrate four different types of sensors including:
 - installing and calibrating at least one transducer,
 - connecting at least two sensors to a 5G network
 - following networking protocols and interfacing standards for installing sensors including:
 - input/output (I/O) – digital and analog
 - handshaking.

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:

- sensors in a smart factory or workplace and their contribution to:
 - providing data for visibility on processes, materials and equipment
 - issue identification and troubleshooting
 - reliability including preventative and predictive maintenance
- sensors and transducers as sources of data for different levels in an organisation including:
 - process or equipment control
 - operations management and quality control

- predictive and preventative maintenance
- fault diagnosis
- data analytics for economic gain
- similarities and differences between a sensor and a transducer including:
 - sensors and transducers as devices that detect changes in their surrounding environment or the object to which they are attached
 - a sensor gives output in the same format as its input information
 - a transducer converts the input signal into an electrical signal
- principles for classifying sensors including:
 - output signal –
 - energy source - active (requiring external power) and passive (no power source required)
 - contact and non-contact with input stimulus
 - type of output measurement - absolute or relative measurement of input stimulus
 - other classifications
- characteristics to consider when selecting sensors including:
 - robustness including:
 - sensitivity to interference
 - shielding/housing needs
 - environmental limits– dust, moisture, temperature etc.
 - interfacing and signal conditioning
 - networking including:
 - 5G
 - WiFi
 - wired
 - cloud
 - two-way communication
 - data processing requirements including:
 - on board processing
 - adjacent or edge processor
 - network or cloud-based processor
 - location requirements including:
 - physical connections
 - positioning to maximise gathering of information
 - current and voltage
 - output devices/ actuators
 - cost
- status register functions: carry[©], Digit Carry (DC), Zero (Z) bits
- accuracy – measured value versus true value
- sensor saturation or threshold point

- developments in sensor technology including awareness of the following and their potential application:
 - nano sensors
 - micro sensors
 - nuclear sensors
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Assessment Conditions

- Assessors must:
 - have vocational competency in integrating sensors into digital manufacturing processes 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>