



**Australian Government**

# **MEM23124 Measure and analyse noise and vibration**

**Release: 1**

# MEM23124 Measure and analyse noise and vibration

## Modification History

Release 1. Supersedes and is equivalent to MEM23124A Measure and analyse noise and vibration.

## Application

This unit of competency defines the skills and knowledge required to monitor, measure and analyse noise and vibration. It includes equipment calibration and use, analysis of data, adherence to standards for exposure limits along with consideration of work health and safety (WHS) and mitigation measures.

It applies to machinery and equipment-generated noise and vibration, including mechanical shock generated in commercial and industrial environments.

It is suitable for people working as asset maintenance technicians or noise and vibration specialists, for people working as technicians in engineering or related industries and for those pursuing careers and qualifications in engineering or related disciplines.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

MEM23004 Apply technical mathematics

## Competency Field

Engineering science

## Elements and Performance Criteria

| Elements                                                    | Performance Criteria                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Elements describe the essential outcomes.</i>            | <i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>                                                                                                                                                                                                                                                                                                                                |
| 1. Determine scope of investigation into noise or vibration | <p>1.1 Follow standard operating procedures (SOPs) and comply with WHS requirements at all times</p> <p>1.2 Identify machinery and equipment to be investigated for noise and vibration measurement and analysis</p> <p>1.3 Determine stakeholders to be consulted on analysis tasks</p> <p>1.4 Determine software required for the analysis of the task</p> <p>1.5 Determine regulatory, standards and risk management noise and</p> |

| <b>Elements</b>                                   | <b>Performance Criteria</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <i>Elements describe the essential outcomes.</i>  | <i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>                                                                                                                                                                                                                                                                                                                                                                    |
|                                                   | vibration compliance requirements<br>1.6 Investigate sustainability implications of noise and vibration<br>1.7 Apply systems-thinking, continuous improvement, problem-solving and constraint and contingency management<br>1.8 Determine available sources for any required technical and professional assistance                                                                                                                                                        |
| 2. Prepare for noise measurement and analysis     | 2.1 Identify noise exposure limits appropriate to the equipment, process and employee, community and environmental context<br>2.2 Review and identify available sound measuring equipment and components, and their suitability for required measurements<br>2.3 Select sound measuring equipment<br>2.4 Select and use appropriate personal protective equipment (PPE)                                                                                                   |
| 3. Measure and analyse sound data                 | 3.1 Set up and site sound measurement equipment for desired measurements<br>3.2 Calibrate sound measurement equipment<br>3.3 Take sound measurements using appropriate techniques for application and environment<br>3.4 Process, analyse and interpret noise data<br>3.5 Relate data to plant and equipment performance<br>3.6 Review options for noise elimination, mitigation and protection measures<br>3.7 Prepare report and make recommendations based on analysis |
| 4. Prepare for vibration measurement and analysis | 4.1 Identify vibration exposure limits appropriate to the equipment, process and employee, community and environmental context<br>4.2 Review and identify available vibration measuring equipment and components, and their suitability for required measurements<br>4.3 Select vibration measuring equipment                                                                                                                                                             |

| Elements                                         | Performance Criteria                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Elements describe the essential outcomes.</i> | <i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>                                                                                                                                                                                                                                                                                                       |
| 5. Measure and analyse vibration and shock data  | 5.1 Set up and site or mount vibration and shock measurement equipment<br>5.2 Calibrate equipment<br>5.3 Take accurate measurements<br>5.4 Process, analyse and interpret vibration and shock data<br>5.5 Relate data to plant and equipment performance<br>5.6 Review options for vibration and shock elimination or damping and isolating<br>5.7 Prepare report and make recommendations based on analysis |
| 6. Investigate and report                        | 6.1 Investigate developments in acoustic, vibration and shock measurement<br>6.2 Investigate the use of condition monitoring in predictive maintenance programs<br>6.3 Record and report results of review, measurement, analysis and recommendations<br>6.4 Provide documentation including calculations, data records, analysis and assessments                                                            |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

|                                     |                                                                                                                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Sound measuring equipment includes: | <ul style="list-style-type: none"> <li>• microphones</li> <li>• cables and connectors</li> <li>• meters</li> </ul> |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|

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|                                                                          | <ul style="list-style-type: none"> <li>• recorders</li> <li>• analysers</li> <li>• computer and software.</li> </ul>                                                                                                                                                                                                                                                    |
| Set-up and measurement techniques include:                               | <ul style="list-style-type: none"> <li>• microphone positioning</li> <li>• meter time constants</li> <li>• frequency filter settings.</li> </ul>                                                                                                                                                                                                                        |
| Purpose for sound measurements includes:                                 | <ul style="list-style-type: none"> <li>• simple sound level or spectrum</li> <li>• limited or full frequency band</li> <li>• standards to be met</li> <li>• impulsive or consistent noise.</li> </ul>                                                                                                                                                                   |
| Vibration includes:                                                      | <ul style="list-style-type: none"> <li>• continuous</li> <li>• sporadic</li> <li>• whether or not associated with noise</li> <li>• mechanical shock.</li> </ul>                                                                                                                                                                                                         |
| Vibration and shock measuring equipment includes:                        | <ul style="list-style-type: none"> <li>• accelerometer</li> <li>• impedance heads</li> <li>• cables</li> <li>• mounting media</li> <li>• calibrators</li> <li>• preamplifier</li> <li>• meters</li> <li>• filters</li> <li>• recorders</li> <li>• analysers</li> <li>• computer and software.</li> </ul>                                                                |
| Appropriate technical and professional assistance includes:              | <ul style="list-style-type: none"> <li>• technical support and advice relating to elements which have intrinsic dangers</li> <li>• professional support for technologies.</li> </ul>                                                                                                                                                                                    |
| WHS, regulatory requirements and enterprise procedures includes:         | <ul style="list-style-type: none"> <li>• WHS acts, regulations and relevant standards</li> <li>• codes of practice from Australian and overseas engineering and technical associations and societies</li> <li>• risk assessments</li> <li>• registration requirements</li> <li>• safe work practices</li> <li>• state and territory regulatory requirements.</li> </ul> |
| Continuous improvement includes one or more of the following techniques: | <ul style="list-style-type: none"> <li>• balanced scorecard</li> <li>• current and future state mapping</li> <li>• measuring performance against benchmarks</li> <li>• process improvement, problem-solving and decision-making</li> <li>• data management, generation, recording, analysing, storing and use of software</li> </ul>                                    |

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|                                                                     | <ul style="list-style-type: none"><li>• training for improvement systems participation</li><li>• technical training.</li></ul>                                                                 |
| Constraints and contingencies include one or more of the following: | <ul style="list-style-type: none"><li>• financial</li><li>• organisational</li><li>• procedural</li><li>• cultural</li><li>• physical (resources, access or logistical limitations).</li></ul> |

## Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23124A Measure and analyse noise and vibration.

## Links

Companion Volume implementation guides are found in VETNet -

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