



**Australian Government**

# **MEM18009 Perform precision levelling and alignment of machines and engineering components**

**Release: 2**

# **MEM18009 Perform precision levelling and alignment of machines and engineering components**

## **Modification History**

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM18009 Perform precision levelling and alignment of machines and engineering components (Release 1).

Release 1. Supersedes and is equivalent to MEM18009B Perform levelling and alignment of machines and engineering components.

## **Application**

This unit of competency defines the skills and knowledge required to undertake levelling and alignment measurements/readings and perform levelling and/or alignment and adjustment tasks on machines and engineering components.

It applies to the setting up and use of precision levelling and alignment devices and where all adjustments are performed according to designated procedures in conformance to specifications.

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

**Band: A**

**Unit Weight: 4**

## **Pre-requisite Unit**

|          |                                                              |
|----------|--------------------------------------------------------------|
| MEM09002 | Interpret technical drawing                                  |
| MEM11011 | Undertake manual handling                                    |
| MEM12023 | Perform engineering measurements                             |
| MEM12024 | Perform computations                                         |
| MEM13015 | Work safely and effectively in manufacturing and engineering |
| MEM14006 | Plan work activities                                         |
| MEM16006 | Organise and communicate information                         |
| MEM18001 | Use hand tools                                               |
| MEM18002 | Use power tools/hand held operations                         |

|          |                                                        |
|----------|--------------------------------------------------------|
| MEM18003 | Use tools for precision work                           |
| MEM18006 | Perform precision fitting of engineering components    |
| MEM18055 | Dismantle, replace and assemble engineering components |

## Competency Field

Maintenance and diagnostics

## Elements and Performance Criteria

| Elements describe the essential outcomes.                        | Performance criteria describe the performance needed to demonstrate achievement of the element.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------|-----|---------------------------------------|
| 1 <b>Determine job requirements</b>                              | <table><tr><td>1.1</td><td>Follow standard operating procedures (SOPs)</td></tr><tr><td>1.2</td><td>Comply with work health and safety (WHS) requirements at all times</td></tr><tr><td>1.3</td><td>Use appropriate personal protective equipment (PPE) in accordance with SOPs</td></tr><tr><td>1.4</td><td>Identify job requirements from specifications, drawings, job sheets or work instructions</td></tr></table>                                                                                                                                   | 1.1 | Follow standard operating procedures (SOPs)                                                                 | 1.2 | Comply with work health and safety (WHS) requirements at all times  | 1.3 | Use appropriate personal protective equipment (PPE) in accordance with SOPs                                                       | 1.4 | Identify job requirements from specifications, drawings, job sheets or work instructions |     |                                       |
| 1.1                                                              | Follow standard operating procedures (SOPs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 1.2                                                              | Comply with work health and safety (WHS) requirements at all times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 1.3                                                              | Use appropriate personal protective equipment (PPE) in accordance with SOPs                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 1.4                                                              | Identify job requirements from specifications, drawings, job sheets or work instructions                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 2 <b>Undertake levelling and alignment measurements/readings</b> | <table><tr><td>2.1</td><td>Determine task requirements by inspection of equipment to be levelled and/or aligned</td></tr><tr><td>2.2</td><td>Select the correct appropriate levelling and/or alignment procedure</td></tr><tr><td>2.3</td><td>Select correct and appropriate levelling or alignment devices/equipment and set up to procedures or manufacturers' recommendation</td></tr><tr><td>2.4</td><td>Apply and utilise principles of levelling and alignment</td></tr><tr><td>2.5</td><td>Take measurements/readings and record</td></tr></table> | 2.1 | Determine task requirements by inspection of equipment to be levelled and/or aligned                        | 2.2 | Select the correct appropriate levelling and/or alignment procedure | 2.3 | Select correct and appropriate levelling or alignment devices/equipment and set up to procedures or manufacturers' recommendation | 2.4 | Apply and utilise principles of levelling and alignment                                  | 2.5 | Take measurements/readings and record |
| 2.1                                                              | Determine task requirements by inspection of equipment to be levelled and/or aligned                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 2.2                                                              | Select the correct appropriate levelling and/or alignment procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 2.3                                                              | Select correct and appropriate levelling or alignment devices/equipment and set up to procedures or manufacturers' recommendation                                                                                                                                                                                                                                                                                                                                                                                                                         |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 2.4                                                              | Apply and utilise principles of levelling and alignment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 2.5                                                              | Take measurements/readings and record                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 3 <b>Perform levelling and/or alignment</b>                      | <table><tr><td>3.1</td><td>Perform levelling realignment calculations using method appropriate for the levelling/alignment application</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                  | 3.1 | Perform levelling realignment calculations using method appropriate for the levelling/alignment application |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |
| 3.1                                                              | Perform levelling realignment calculations using method appropriate for the levelling/alignment application                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |                                                                                                             |     |                                                                     |     |                                                                                                                                   |     |                                                                                          |     |                                       |

Elements describe the essential outcomes.

**tasks**

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 3.2 Level equipment to specifications using appropriate tools, equipment and techniques
- 3.3 Complete levelling and alignment task to specifications
- 3.4 Complete any records required by SOPs

## Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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.

**Levelling and/or alignment procedures include one (1) or more of the following:**

- face and rim
- reverse indicator
- use of jacking bolts and shimming material
- use of levelling equipment
- thermal expansion checks

**Equipment includes one (1) or more of the following**

- machines
- components
- assemblies
- sub-assemblies

**Levelling and alignment devices/equipment include one (1) or more of the following:**

- precision levels
- spirit levels
- line levels
- optical levels
- electronic levels
- laser levels
- dial indicators
- special type dial indicator fixtures

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.

- magnetic bases
- straight edges
- feeler gauges
- bench centres
- vee blocks
- plumb line
- folding wedges
- straight edges
- shimpack materials
- dumpy levels

## Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM18009 Perform precision levelling and alignment of machines and engineering components (Release 1).

Release 1. Supersedes and is equivalent to MEM18009B Perform levelling and alignment of machines and engineering components.

## Links

Companion Volume implementation guides are found in VETNet -

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

# **Assessment Requirements for MEM18009 Perform precision levelling and alignment of machines and engineering components**

## **Modification History**

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM18009 Perform precision levelling and alignment of machines and engineering components (Release 1).

Release 1. Supersedes and is equivalent to MEM18009B Perform levelling and alignment of machines and engineering components.

## **Performance Evidence**

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists and drawings to perform levelling and alignment of machines and engineering components
- selecting appropriate levelling and/or alignment procedure in accordance with task requirements
- selecting appropriate levelling and alignment devices/equipment appropriate to the task
- performing levelling/alignment tasks, including levelling or alignment calculations, using appropriate tools, equipment and techniques to specifications.

## **Knowledge Evidence**

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- principles of levelling and alignment
- numerical operations, geometry and calculations/formulae for levelling and alignment
- effects on equipment performance and life of non-level or out-of-alignment components
- techniques, tools, equipment and procedures to carry out the levelling and/or alignment
- reasons for selecting tools, techniques and equipment.

## **Assessment Conditions**

- Assessors must:
  - have vocational competency in performing levelling and alignment of machines and engineering components 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.
- Assessment must occur in a functioning workplace. Where assessment in the workplace would be unsafe, impractical or threatens the environment, assessment must occur in a sufficiently rigorous simulated environment that reflects the circumstances that would be experienced in a functioning workplace. Assessment must cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include 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.

## Links

Companion Volume implementation guides are found in VETNet -

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