



**Australian Government**

# **MEM23149 Contribute to the design of commercial and industrial exhaust systems**

**Release: 1**

# MEM23149 Contribute to the design of commercial and industrial exhaust systems

## Modification History

Release 1. Supersedes and is equivalent to MEM23149A Contribute to the design of commercial and industrial exhaust systems.

## Application

This unit of competency defines the skills and knowledge required to contribute to the design of commercial and industrial exhaust systems, including industrial dust extraction systems or to undertake the complete design for less complex systems. Commercial and industrial exhaust systems include those designed to manage dust, fumes, explosive gases or noxious gases.

The unit applies to technicians in organisations that design whole commercial and industrial exhaust systems or undertake design modifications to existing systems as part of manufacturing, installation, commissioning, servicing and maintenance activities.

It applies to design work undertaken as part of a design team comprising engineers and other technicians and to individual design tasks within the scope of the technician's skill and knowledge.

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 commercial or industrial exhaust system requirement | 1.1 Obtain and implement work health and safety (WHS) and environmental requirements for the work area<br>1.2 Determine requirements for a commercial or industrial exhaust system using relevant standards, codes and authority information<br>1.3 Consult appropriate personnel to ensure that work is coordinated |

| Elements                                         | Performance Criteria                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Elements describe the essential outcomes.</i> | <i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>                                                                                                                                                                                                                   |
|                                                  | effectively with others<br>1.4 Obtain equipment and resources needed for the task in accordance with organisational procedures                                                                                                                                                                                           |
| 2. Design exhaust system                         | 2.1 Prepare design and drawings for commercial and industrial system scenarios in accordance with organisational procedures<br>2.2 Plan design development work to meet scheduled timelines<br>2.3 Provide solutions to unplanned situations consistent with organisational procedures                                   |
| 3. Document design                               | 3.1 Validate specifications of exhaust system designed as meeting all relevant standards and codes for intended application<br>3.2 Verify final design using organisational procedures for compliance and regulatory requirements<br>3.3 Prepare final system design documents to industry standards for client approval |

## 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.

|                                  |                                                                                                                                                                                                                                                                                 |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WHS requirements include:</b> | <ul style="list-style-type: none"> <li>• legislation</li> <li>• protective equipment</li> <li>• material safety management systems</li> <li>• hazardous substances and dangerous goods code</li> <li>• local safe operation procedures</li> <li>• awards provisions.</li> </ul> |
| <b>Environmental</b>             | <ul style="list-style-type: none"> <li>• relevant legislation, regulations and codes</li> </ul>                                                                                                                                                                                 |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>requirements include:</b>              | <ul style="list-style-type: none"><li>• correct handling and disposal of liquid and solid waste</li><li>• elimination or minimisation of gas, fume, vapour and smoke emissions, including fugitive emissions</li><li>• dust elimination, minimisation and control</li><li>• minimisation of energy and water use</li><li>• elimination or control of excessive noise</li><li>• use and recycling of refrigerants.</li></ul> |
| <b>Appropriate personnel include:</b>     | <ul style="list-style-type: none"><li>• supervisor, leading hand, foreman or manager</li><li>• engineer</li><li>• technician</li><li>• trainer or mentor</li><li>• team member</li><li>• customer.</li></ul>                                                                                                                                                                                                                |
| <b>Resources include:</b>                 | <ul style="list-style-type: none"><li>• relevant codes</li><li>• manufacturer specifications.</li></ul>                                                                                                                                                                                                                                                                                                                     |
| <b>Organisational procedures include:</b> | <ul style="list-style-type: none"><li>• use of tools and equipment</li><li>• instructions, including job sheets, plans, drawings and designs</li><li>• reporting and communication</li><li>• manufacturer specifications</li><li>• operational procedures</li><li>• industry standards.</li></ul>                                                                                                                           |
| <b>Equipment includes:</b>                | <ul style="list-style-type: none"><li>• computer workstation and software, either stand alone or networked</li><li>• test apparatus</li><li>• appropriate tools of trade, equipment and materials.</li></ul>                                                                                                                                                                                                                |

## Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23149A Contribute to the design of commercial and industrial exhaust systems.

## Links

Companion Volume Implementation Guides are available on VETNet -

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

# Assessment Requirements for MEM23149 Contribute to the design of commercial and industrial exhaust systems

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## Performance Evidence

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

- identifying and interpreting drawings and specifications and requirements appropriate to the design task
- implementing work health and safety (WHS) procedures and practices including the use of risk control measures
- demonstrate the use of software tools related to design commercial or industrial exhaust systems
- determining performance aspects of the system, applying noise abatement measures and balancing fan duct systems on at least two occasions
- preparing the design, drawings and specifications of commercial or industrial exhaust systems consistent with codes and regulations for two different systems
- communicating technical and procedural requirements to others
- dealing with unexpected situations
- documenting technical information and designs in accordance with procedures.

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

## 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:

- WHS requirements
- appropriate personnel
- organisational procedures
- relevant codes and regulations
- commercial and industrial exhaust system types
- duct design
- fluid dynamics including laminar and turbulent flow, friction and pressure loss
- outlet design and location including consideration of:
  - environmental requirements
  - noise

- access protection against pests
- cycling and operation control
- dust collection and control including:
  - filter types
  - cyclone and shaker type collectors
- motor ratings
- fan types
- noise control
- sound and flame proofing
- environmental requirements
- resource and equipment requirements.

## Assessment Conditions

- Assessors must:
  - have vocational competency in contributing to the design of commercial and industrial exhaust systems 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.
- 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.

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