



Australian Government

CPCPMS3035A Install and test ducting systems

Release 1

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Modification History

Prerequisite unit changed

Changes to performance criteria, required skills and knowledge, range statement and critical aspects

Not equivalent to CPCPMS3015A

Unit Descriptor

This unit of competency specifies the outcomes required to install and test ducting systems used for ventilation systems, heating and/or cooling systems, and exhaust systems.

Application of the Unit

Site location for work application may be either domestic or commercial and may be a new work site or an existing structure being renovated, extended, restored or maintained.

Licensing/Regulatory Information

In some jurisdictions, this unit of competency may form part of accreditation, licensing, legislative, regulatory or certification requirements.

Pre-Requisites

CPCPCM2043A Carry out WHS requirements

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | | |
|---|-------------------------------|-----|---|
| 1 | Prepare for work. | 1.1 | Plans and specifications are obtained. |
| | | 1.2 | <i>Work health and safety</i> (WHS) and <i>environmental requirements</i> installing and testing ducting systems are adhered to throughout the work. |
| | | 1.3 | <i>Quality assurance requirements</i> are identified and adhered to according to workplace requirements. |
| | | 1.4 | Tasks are planned and sequenced in conjunction with others involved in or affected by the work and <i>statutory and regulatory authorities'</i> requirements. |
| | | 1.5 | <i>Tools and equipment</i> , including personal protective equipment, are selected and checked for serviceability. |
| | | 1.6 | Work area is prepared to support efficient installation and testing of ducting systems. |
| 2 | Identify system requirements. | 2.1 | Quantity and type of <i>ducting system materials</i> , including in-duct equipment, are calculated from plans, specifications and relevant <i>information</i> . |
| | | 2.2 | Allowances for fabrication or assembly are determined and transferred. |
| | | 2.3 | <i>Materials</i> are identified, ordered and collected according to workplace procedures. |
| | | 2.4 | Materials and equipment are checked for compliance with standards, docket and order form, and acceptable condition and <i>faults are reported</i> . |

- 3 Install and insulate duct system.
- 3.1 System is set out to comply with plans and specifications.
 - 3.2 Duct supports and fixings are positioned to comply with plans, specifications and manufacturer recommendations.
 - 3.3 Duct work is installed according to plans and specifications.
 - 3.4 Circumferential joints are assembled and sealed according to plans, specifications and manufacturer recommendations.
 - 3.5 Duct system is installed in specified location, without damage or distortion to surrounding environment or other services and according to standards.
 - 3.6 Insulation materials are fixed according to plans and specifications.
 - 3.7 Insulation materials are installed in specified location without damage to surrounding environment and according to plans, specifications, standards and manufacturer recommendations.
 - 3.8 ***Diffusers and terminal devices*** are installed according to plans and specifications and with no damage to ceiling or finished surfaces.
 - 3.9 ***Sustainability principles and concepts*** are applied throughout the installation.
- 4 Test duct work system.
- 4.1 Test requirements are determined from plans and specifications.
 - 4.2 Appropriate test equipment is selected for specified tests.
 - 4.3 Duct system is tested under pressure according to instructions and workplace procedures.
 - 4.4 Leak sources are identified and repaired using specified procedures and materials, to ensure correct flow operation.
 - 4.5 Details of test data are recorded in format required by

the specification.

- 5 Clean up.
 - 5.1 Work area is cleared and materials disposed of, reused or recycled according to legislation, regulations, codes of practice and job specification.
 - 5.2 Tools and equipment are cleaned, checked, maintained and stored according to manufacturer recommendations and workplace procedures.
 - 5.3 Documentation is completed according to workplace requirements.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
 - access information
 - determine requirements
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - follow instructions
 - report faults
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals
- initiative and enterprise skills to identify and report to appropriate personnel any faults in tools, equipment or materials
- literacy skills to:
 - complete workplace documentation
 - document ducting system tests
 - read and interpret:
 - documentation from a variety of sources
 - plans and specifications
- numeracy skills to apply measurements and calculations
- planning and organising skills to:
 - plan and sequence tasks with others
 - plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technical skills to install, insulate and test ducting for ventilation, heating, cooling and exhaust systems, including in-duct equipment
- technology skills to:
 - access and understand site-specific instructions in a variety of media
 - use mobile communication technology

Required knowledge

- applicable Australian standards
- application of flow rates, pressure and volume principles to testing procedures

- characteristics of materials used in the system being tested
- electrical and electronic principles and safety requirements
- job safety analysis (JSA) and safe work method statements (SWMS)
- levelling and alignment processes
- WHS regulations relevant to the work activity
- personal protective equipment requirements and use
- processes of installing, insulating and testing ducting
- SI system of measurement
- statutory requirements
- system types and identification of system components
- techniques for setting out, assembling, fixing and jointing duct work systems and components, including insulation and acoustic materials
- types of repairs for detected leaks in the duct work system

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment providing that simulated or project-based assessment techniques fully replicate plumbing and services workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of:

- locating, interpreting and applying relevant information, standards and specifications to install and test small ducting systems
- applying safety requirements throughout the work sequence, including electrical safety requirements and the use of personal protective clothing and equipment
- given the plans and specifications, installing, insulating, testing and balancing from a plenum box or chamber a supply of heated air to three outlet grills; the installation shall incorporate hard and flexible duct work, including one transition piece and dampeners, ensuring:
 - application of sustainability principles and concepts
 - correct identification of requirements and details of proposed installation
 - correct selection and use of appropriate processes, tools and equipment
 - completing all work to specification
 - compliance with regulations, standards and organisational quality procedures and processes
 - communicating and working effectively and safely with others.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the minimum task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry-related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning

experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Work health and safety is to be according to commonwealth, state and territory legislation and regulations and may include:

- handling of materials
- hazard control
- personal protective clothing and equipment prescribed under legislation, regulations and workplace policies and practices
- safe operating procedures, including recognising and preventing hazards associated with:
 - hazardous materials and substances
 - identifying and testing for electrical hazards
 - service lines
 - surrounding structures and facilities
 - trip hazards
 - use of tools and equipment
 - work site visitors and the public

- working at heights
- working in proximity to others
- use of firefighting equipment
- use of first aid equipment
- workplace environment and safety.

Environmental requirements may include:

- clean-up protection
- waste management.

Quality assurance requirements may include:

- Environment Protection Authority (EPA)
- internal company quality assurance policy and risk management strategy
- International Standards Organisation
- site safety plan
- workplace operations and procedures.

Statutory and regulatory authorities include:

- commonwealth, state or territory, and local authorities administering applicable Acts, regulations and codes of practice.

Tools and equipment may include:

- duct lifter
- hand and power tools
- in-duct equipment, including:
 - fire dampers
 - noise attenuation fittings
 - volume control dampers
- ladders
- lifting and load shifting equipment, including:
 - chain blocks
 - elevated work platforms
 - forklifts
 - hand trolleys
 - hoists and jacks
 - rollers
 - scaffolds
- measuring equipment
- pittsburgh lock forming machine
- sheet metal rollers
- spot welders

- test equipment, including:
 - manometers
 - micro-manometers.

Ducting system materials:

- may include:
 - diffusers
 - ducting
 - fixings and supports
 - in-duct equipment
 - insulation
 - joints
 - plenum box and chamber
 - terminal devices
- may be:
 - flexible
 - sheet metal
 - a combination.

Information may include:

- charts and hand drawings
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions
- material safety data sheets (MSDS)
- memos
- organisation work specifications and requirements
- plans and sketches
- regulatory and legislative requirements, particularly those pertaining to:
 - building codes
 - WHS and environmental requirements
 - plumbing regulations
- relevant Australian standards
- safe work procedures relating to installing and testing ducting heaters
- signage
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.

Materials:

- may include:
- ducting:
 - fixings and supports
 - sheet metal:
 - flexible
 - combination
 - in-duct fittings:
 - plastic
 - sheet metal
 - insulation
- insulation and acoustic materials may be:
 - acoustic and non-acoustic materials
 - externally insulated
 - fibreglass tissue factory bonded to the insulation
 - flexible aluminium laminate fabric
 - perforated double-sided aluminium foil factory bonded to the insulation
 - perforated zincanneal or other metal sheet fixed in the duct so that continuous insulation is obtained
 - resin-bonded mineral wool or glass fibre in faced or unfaced semi-rigid batt or board form, weight 20 to 100kg and m³
 - sheet materials
 - surface facings of PVC-coated fibreglass mesh factory bonded to the insulation
 - thermal and acoustic insulation for duct work and air handling equipment, handling air between 2 and 65°C
 - thermal insulation and sound absorption materials of resin-bonded mineral wool or glass fibre in unbound flexible blanket form, weight 20 to 65 kg and m³.

Fault reporting:

- may be written or verbal
- is to be according to company's workplace procedures.

Diffusers and terminal devices may include:

- combined diffusers
- control devices
- cushion heads

- grills
- light fittings
- outlets taken directly from duct and on flexible branch
- pressure-reducing devices
- registers
- variable air volume (VAV) boxes.

Sustainability principles and concepts:

- cover the current and future social, economic and environmental use of resources
- may include:
 - efficient use and recycling of material
 - efficient energy retention
 - ensuring integrity of ductwork system
 - selecting appropriate products and components to ensure minimal environmental impact.

Unit Sector(s)

Functional area

Unit sector Plumbing and services

Custom Content Section

Not applicable.