



Australian Government

Department of Education, Employment and Workplace Relations

CPCPMS4002A Commission air and water systems

Release: 1

CPCPMS4002A Commission air and water systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit of competency specifies the outcomes required to test and commission air and water heating and cooling systems.

It covers preparing for the work, determining testing requirements, preparing systems for balancing, and the physical balancing, testing and commissioning of the systems and completion of work finalisation processes, including recording.

Application of the Unit

Application of the unit This unit applies to:

- ducting systems for air conditioning, heating or ventilation purposes in buildings Class 1 or 2 with a maximum static pressure of 0.75kPa and a maximum velocity of 12.5 metres per second
- pipng systems conveying heating and chilled water operating at a maximum pressure of 700kPa or a maximum temperature of 100°C, with a maximum output of 50kW and total air quantities not exceeding 950 litres per second.

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

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work.	1.1. Information, plans and specifications are obtained. 1.2. Safety (OHS) requirements associated with testing and commissioning air and water systems, and workplace environmental requirements, are adhered to throughout the work. 1.3. Quality assurance requirements are identified and adhered to in accordance with workplace requirements. 1.4. Tasks are planned and sequenced in conjunction with others involved in or affected by the work and statutory and regulatory authority requirements. 1.5. Tools and equipment for testing and commissioning air and water systems, including personal protective equipment, are selected and checked for serviceability. 1.6. Work area is prepared to support efficient testing and commissioning process.
2. Determine testing requirements.	2.1. Equipment is checked for safe operation and correct functioning. 2.2. Equipment performance data is checked against plans, specification requirements and other relevant information. 2.3. Instruments and associated equipment suitable for measuring quantities are selected in accordance with job specification.
3. Prepare system for balancing.	3.1. Dampers are set in the open or specified position and operational check of system-related fans and ducting is carried out in accordance with workplace procedures. 3.2. Automatic control devices are energised to provide maximum demand for airflow. 3.3. Piping system is checked for flow direction and leaks, and operational check of system and related pumps is carried out. 3.4. All manual and automatic valves are set in the specified position.
4. Balance, test and commission system.	4.1. Valves or throttling devices are adjusted to achieve specified water flow ratings. 4.2. Air volumes moved by system fans are measured. 4.3. Dampers and terminal devices are correctly adjusted

ELEMENT**PERFORMANCE CRITERIA**

	to achieve specified airflow ratings.
	4.4. Automatic controls and devices are set to specified settings.
	4.5. Testing and balancing of system is carried out in accordance with job specification and/or manufacturer recommendations.
	4.6. Test and monitored results are documented in format required by job specification and/or manufacturer.
5. Restore work area.	5.1. Work area is cleared and materials disposed of or recycled in accordance with state and territory legislation and workplace procedures.
	5.2. Tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturer recommendations and workplace procedures.
	5.3. Documentation is completed in accordance with workplace requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills for this unit are:

- 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
 - plan and sequence tasks with others
 - read and interpret:
 - documentation from a variety of sources
 - drawings and specifications
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals

REQUIRED SKILLS AND KNOWLEDGE

- written skills to:
 - complete workplace documentation
 - record test and monitored results
- identifying and accurately reporting to appropriate personnel any faults in tools, equipment or materials
- numeracy skills to apply measurements and calculations
- organisational skills, including the ability to 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
- technological skills to:
 - access and understand site-specific instructions in a variety of media
 - use mobile communication technology
- test, balance and commission air conditioning, heating and ventilation ducting and piping systems.

Required knowledge

Required knowledge for this unit is:

- application of mechanical, hydraulic, electric and electronic principles and safety requirements
- design concepts, tests and performance standards for measuring various water and air systems
- effect of bacteria in water, and potential impact on health
- environmental impact of gases and EPA requirements
- job safety analysis (JSA) and safe work method statements (SWMS)
- operating principles and characteristics of system components used in water and air systems
- performance standards for balancing systems
- processes of commissioning air and water systems
- relevant information sources for the work activity
- relevant statutory and authority requirements related to installing, testing, balancing, commissioning and operation of air and water systems
- SI system of measurements
- standards applicable to testing, balancing and commissioning air and water systems
- workplace and equipment safety requirements.

Evidence Guide

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 testing, balancing and commissioning air and water systems
- applying safety requirements throughout the work sequence, including the use of personal protective clothing and equipment
- as a minimum, the ability to balance and commission an air conditioning system (up to 150 megajoules) for a domestic situation and a commercial air conditioning system for a structure of at least four floors, plus balance and commission a hydronic water heating system for a structure of at least four floors, ensuring:
 - correct identification of details of the plan
 - correct selection and use of appropriate processes, tools and equipment
 - completion of 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

EVIDENCE GUIDE

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 working 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

EVIDENCE GUIDE

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

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.

Safety (OHS) is to be in accordance with 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

RANGE STATEMENT

with:

- hazardous materials and substances
- other machines
- surrounding structure and facilities
- trip hazards
- underground services
- use of tools and equipment
- work site visitors and the public
- working at heights
- working in confined spaces
- working in proximity to others
- use of firefighting equipment
- use of first aid equipment
- workplace environment and safety.
- clean-up protection
- ozone management
- stormwater protection
- waste management.
- Environment Protection Authority (EPA)
- internal company quality assurance policy and risk management strategy
- International Standards Organisation
- site safety plan
- workplace operations and procedures.
- state or territory statutory authority
- statutory plumbing authority.
- elevated work platforms
- hand and power tools
- ladders
- scaffolds
- test equipment.
- charts and hand drawings
- diagrams or sketches
- instructions issued by authorised organisational or external personnel
- job drawings
- manufacturer specifications and instructions
- material safety data sheets (MSDS)
- memos

Environmental requirements are to cover water quality management and may include:

Quality assurance requirements may include:

Statutory and regulatory authorities include:

Tools and equipment may include:

Information may include:

RANGE STATEMENT

- organisation work specifications and requirements
- regulatory and legislative requirements, particularly those pertaining to:
 - building codes
 - OHS and environmental requirements
 - plumbing regulations
- relevant Australian standards
- safe work procedures relating to testing, balancing and commissioning air and water systems
- signage
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.

Unit Sector(s)

Unit sector Plumbing and services

Co-requisite units

Co-requisite units Nil

Functional area

Functional area