



Australian Government

CPCPGS4011C Design and size consumer gas installations

Release 1

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Modification History

This version first released with CPC08 Construction, Plumbing and Services Training Package Version 9.

- Reference to standard updated in required knowledge section

Equivalent to CPCPGS4011B Design and size consumer gas installations

Unit Descriptor

This unit of competency specifies the outcomes required to design, size and document a consumer's gas installation, including consumer piping operating up to a pressure of 200kPa, fluing, ventilation and appliance installation associated with natural gas (NG), simulated natural gas (SNG), liquefied petroleum gas (LPG) and tempered liquefied petroleum gas (TLPG) for a building of minimum four floors and multiple buildings supplied through one gas source (billing meter or storage tank).

It covers preparing for work, determining gas installation design requirements, detailed planning of the layout, and completing work finalisation processes, including records and documentation.

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

Work associated with this unit is undertaken within the scope of AS5601 Gas installations and local licensing requirements (gas, electrical and plumbing).

Pre-Requisites

Not applicable.

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 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

1	Prepare for planning	1.1	Nature and scope of planning task are identified and confirmed.
		1.2	<i>Work health and safety</i> (WHS) and <i>environmental requirements</i> associated with planning, sizing and documenting layout of <i>gas installations</i> are adhered to throughout the work.
		1.3	Work is organised and sequenced in conjunction with others involved in or affected by the work.
		1.4	<i>Tools and equipment</i> required for planning, sizing and documenting layout of gas installations, including personal protective equipment, are selected and checked for serviceability, and faults are rectified or referred for action.
		1.5	Work area in which planning process is to be conducted is prepared.
2	Identify system requirements.	2.1	<i>Information</i> and specifications for required work are obtained and confirmed, if necessary by site inspection.
		2.2	Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work.
		2.3	Quantity, location and type of take-off materials and fixtures are determined from plans and specifications.
		2.4	Gas installations are sized according to relevant Australian standards, and <i>statutory and regulatory authority</i> and workplace requirements.

- 3 Plan system layout.
- 3.1 Layout of gas installations is planned according to building plans, relevant Australian standards and workplace procedures.
- 3.2 **Materials** required are specified and optimised according to relevant Australian standards from proposed design.
- 3.3 Plans are recorded according to regulatory authorities' and workplace requirements.
- 3.4 **Sustainability principles and concepts** are observed when preparing for and undertaking work process.
- 4 Restore work area.
- 4.1 Work area is restored according to workplace procedures.
- 4.2 Tools and equipment used in the process are refurbished and left according to workplace procedures.
- 4.3 Information is accessed and documentation, including work backup, 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:
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - follow instructions
 - identify requirements, including system requirements
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication
- initiative and enterprise skills to identify and report to appropriate personnel any faults in tools, equipment or materials
- literacy skills to:
 - access and understand site-specific instructions in a variety of media
 - read and interpret:
 - documentation from a variety of sources
 - regulations, relevant Australian standards, plans, specifications and drawings
 - record plans in writing and complete workplace documentation
- numeracy skills to apply measurements and calculations
- planning and organising skills to:
 - organise and sequence tasks with others
 - plan and set out work
- technical skills to plan, size and document layout of gas installations for single and multiple buildings consisting of a minimum of four floors
- 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
- technology skills to:
 - access and understand site-specific instructions in a variety of media
 - use mobile communication technology

Required knowledge

- AS/NZS 5601 Gas installations, including the use of tables
- building and construction industry terminology
- drawing and sketching techniques, including the use of conventional symbols

- gas safety, including combustion characteristics and effects
- general electrical safety requirements
- impact of ventilation on design
- job safety analysis (JSA) and safe work method statements(SWMS)
- planning, sizing and layout of gas installations
- processes for accessing information and for calculating material requirements
- relevant statutory and authority requirements related to planning, sizing and layout of gas installations
- SI system of measurement
- types and properties of fuel gas, including pressure and flow rates
- types, characteristics, uses and limitations of gas pipe work and reticulation materials, including joining techniques and systems
- use of computers and computer-aided design (CAD) software
- workplace and equipment safety requirements

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, relevant Australian standards and specifications to the planning, sizing and layout of gas installations
- applying safety requirements throughout the work sequence, including electrical safety requirements and the use of personal protective clothing and equipment
- designing, sizing and documenting the layout of three gas installations, which are to include any combinations covering:
 - pipe sizing and pressures up to 200kPa
 - at least one NG installation
 - at least one LPG installation
 - at least one domestic installation
 - at least one commercial installation
 - a caravan installation
 - a marine installation, including the installation of an LPG leak detection system in a mono hull vessel
- installations planned and documented must include:
 - multiple buildings
 - a two stage LPG system
 - five or more gas appliances
 - domestic and commercial Type A gas appliances
 - a common flue system
 - a minimum of three piping materials

- an over-pressure protection device
- a subsidiary meter
- plans and documentation should ensure:
 - application of sustainability principles and concepts
 - identification, evaluation and incorporation of sustainability principles and concepts into the design
 - correct identification of location, design and details of proposed services
 - correct selection and use of appropriate processes, tools and equipment
 - completion of all work to specification
 - compliance with regulations, relevant Australian 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:
 - electrical components and safety
 - gas fires and explosions
 - 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.

Environmental requirements may include:

- air pollution
- clean-up protection
- environmental protection
- waste management.

Gas installations may include:

- liquefied petroleum gas
- natural gas
- simulated natural gas
- tempered liquefied petroleum gas.

- Tools and equipment*** may include:
- computers running appropriate CAD software
 - drawing instruments
 - measuring equipment.
- Information*** may include:
- charts and hand drawings
 - instructions issued by authorised organisational or external personnel
 - job drawings
 - 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
 - gas regulations
 - WHS and environmental requirements
 - plumbing regulations
 - relevant Australian standards, including AS5601 Gas installations
 - safe work procedures relating to planning, sizing and documenting the layout of gas installations
 - signage
 - verbal, written and graphical instructions
 - work bulletins
 - work schedules, plans and specifications.
- Statutory and regulatory authorities*** include:
- commonwealth, state or territory, and local authorities administering applicable Acts, regulations and codes of practice.
- Materials*** may include:
- building plans and specifications.
- Sustainability principles and concepts:***
- cover the current and future social, economic and environmental use of resources
 - may include:
 - use of efficient design principles to ensure minimal environmental impact
 - incorporation of efficient use of material into

the design, including recycling of material

- choice of efficient energy and water appliances
- correct handling of hazardous materials
- disposing of waste material to ensure minimal environmental impact.

Unit Sector(s)

Plumbing and services

Custom Content Section

Not applicable.