



**Australian Government**

# **CPCPGS4022A Service Type A gas appliances**

**Release 1**

## **CPCPGS4022A Service Type A gas appliances**

### **Modification History**

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

Not equivalent to CPCPGS4012A

### **Unit Descriptor**

This unit of competency specifies the outcomes required to diagnose and repair faults on domestic and commercial Type A gas appliances.

### **Application of the Unit**

Site location for work application may be a customer's premises.

### **Licensing/Regulatory Information**

Work associated with this unit is undertaken within the scope of AS5601 (AG601) Gas installations and local licensing requirements (gas, electrical and plumbing).

### **Pre-Requisites**

Nil

### **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 work.                               | 1.1 Appliance specifications and servicing and manufacturer manuals are obtained for planned work activity.                                                                                                |
|   |                                                 | 1.2 <b>Work health and safety (WHS)</b> and <b>environmental requirements</b> associated with servicing <b>Type A gas appliances</b> are adhered to throughout the work.                                   |
|   |                                                 | 1.3 <b>Quality assurance requirements</b> for company operations are identified and adhered to.                                                                                                            |
|   |                                                 | 1.4 <b>Tools, equipment</b> and <b>materials</b> are selected consistent with servicing needs, checked for serviceability, and faults are rectified or referred for action.                                |
|   |                                                 | 1.5 Tasks are planned in conjunction with others involved in or affected by the work.                                                                                                                      |
|   |                                                 | 1.6 Work area is prepared to support efficient conduct of servicing the Type A gas appliance.                                                                                                              |
|   |                                                 | 1.7 Electrical safety checks and isolation procedures are completed and recorded to manufacturers' and other <b>statutory and regulatory authorities'</b> requirements before servicing work is commenced. |
|   |                                                 | 1.8 <b>Sustainability principles and concepts</b> are observed when preparing for and undertaking work process.                                                                                            |
| 2 | Disassemble and assemble Type A gas appliances. | 2.1 Appliance specifications and servicing and manufacturer manuals are obtained and analysed to confirm assembly and disassembly techniques and sequences.                                                |
|   |                                                 | 2.2 Preliminary diagnosis is completed to focus and minimise disassembly requirement.                                                                                                                      |
|   |                                                 | 2.3 Disassembly and reassembly are carried out safely and in a sequential manner.                                                                                                                          |
|   |                                                 | 2.4 Appliance is assessed to ensure it complies with relevant standards and manufacturer specifications prior to commissioning and return to service.                                                      |

- 3 Diagnose and remedy electrical and electronic circuitry faults.
- 3.1 Electrical safety checks and isolation procedures are completed and recorded to manufacturer and other authorities' requirements before servicing work is commenced.
  - 3.2 Electrical circuit and wiring diagrams are read and correctly interpreted to identify potential fault pathways and locations.
  - 3.3 Appropriate *testing techniques*, procedures and equipment are selected and applied to diagnose faults in circuit wiring, components and ignition systems.
  - 3.4 Cause of fault is determined and confirmed.
  - 3.5 Most appropriate corrective action is selected after a complete analysis of options.
  - 3.6 Repair, replacement and *adjustment* action is taken according to manufacturer specifications or service manuals.
  - 3.7 Appliance is assessed to ensure it complies with relevant standards and manufacturer specifications prior to commissioning and return to service.
- 4 Diagnose and remedy gas system faults on Type A gas appliances.
- 4.1 Electrical and gas safety checks and isolation procedures are completed and recorded to manufacturer and other authorities' requirements before servicing work is commenced.
  - 4.2 Gas system plans and diagrams are read and correctly interpreted to identify potential fault pathways and locations.
  - 4.3 Appropriate testing techniques, procedures and equipment are selected and applied to diagnose gas system faults.
  - 4.4 Flue gases are analysed according to recognised industry practice and local authorities' requirements.
  - 4.5 Cause of fault is determined and confirmed.
  - 4.6 Most appropriate *corrective action* is selected after a complete analysis of options.

- 4.7 Repair, replacement and adjustment action is taken according to manufacturer specifications or service manuals.
    - 4.8 Appliance is assessed to ensure it complies with relevant standards and manufacturer specifications prior to commissioning and return to service.
- 5 Clean up work area.
  - 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, serviced and stored according to manufacturer recommendations and workplace procedures.
  - 5.3 **Information** is accessed and documentation 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
  - 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, 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:
  - read and interpret:
    - documentation from a variety of sources
    - regulations, 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
- 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:
  - prepare for the work, fault diagnosis, disassembly, repair and replacement, reassembly and completion of work finalisation processes
  - service equipment and complete job records
- technology skills to:
  - access and understand site-specific instructions in a variety of media
  - use mobile communication technology

### Required knowledge

- AS5601 Gas installations, including the use of tables
- basic electrical theory, including:

- characteristics of electromotive force (EMF)
- characteristics of fuses, circuit breakers, residual current devices and earthing systems
- combustion characteristics and effects
- conduction
- current flow
- ignition systems
- insulation
- isolation procedures
- Ohm's law
- burners and burner adjustment
- characteristics of conversion from one gas type to another
- classification of appliances and identification of related components
- electrical safety, including isolation procedures and requisite precautions
- gas appliance regulators
- gas appliance thermostats
- gas safety, including:
  - combustion characteristics and effects
  - isolation procedures
- job safety analysis (JSA) and safe work method statements (SWMS)
- operation of flame failure systems used in Type A gas appliances
- processes for accessing information and for calculating material requirements
- SI system of measurement
- types and properties of fuel gas, including pressure and flow rates
- workplace and equipment safety requirements

## Evidence Guide

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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 determine requirements and maintain Type A gas appliances
- applying safety requirements throughout the work sequence, including applying equipotential bonding procedures and using personal protective clothing and equipment; and isolating appliances from gas and electrical services
- performing the following servicing activities and functions:
  - application of sustainability principles and concepts
  - disassembly, reassembly, testing and recommissioning of a minimum of two different Type A gas appliances
  - conduct evaluative tests on electrical and electronic components, including central processing units, printed circuit boards and associated parts, in order to diagnose and remedy faults and malfunctions
  - conduct evaluative tests on gas systems to diagnose and remedy faults and malfunctions on the components listed in the range statement
  - convert a Type A gas appliance to operate on another gas type, according to AS5601, any local utility's requirements and manufacturer specifications
- servicing activities and function should ensure:
  - 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 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

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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
- identifying and testing for electrical hazards
- 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
  - 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:

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

***Type A gas appliances:***

- are badged appliances of less than 500 megajoules (MJ) for which an Australian Gas Association (AGA) and Australian Liquefied Petroleum Gas Association (ALPGA) approval scheme exists
- include:
  - decorative heaters
  - ducted heating systems
  - gas stoves and hot plates
  - heated water storage
  - instant heated water heaters
  - space heaters
- mechanical components and gas appliance systems, which may include:
  - combustion chambers
  - heat exchangers
  - primary flues.

***Quality assurance requirements*** may include:

- AGA requirements
- Environment Protection Authority (EPA)
- internal company quality assurance policy and risk management strategy
- International Standards Organisation
- maintenance of Type A gas appliances complying with appropriate Australian standards
- site safety plan
- workplace operations and procedures.

***Tools and equipment*** may include:

- lifting and load shifting equipment, including:
  - chain blocks

- forklifts
- hand trolleys
- hoists and jacks
- rollers
- measuring equipment
- test equipment and instruments, including:
  - dual probe voltage tester
  - manometers
  - multi- meters
  - megohmmeter
  - hand and power tools
  - spanners
  - wrenches.

**Materials** for the maintenance of Type A gas appliances:

- may include:
  - piping materials
  - regulators and meters
  - Type A gas appliances
  - other approved materials
- are to comply with appropriate standards for the maintenance of Type A gas appliances.

**Statutory and regulatory authorities** include:

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

**Sustainability principles and concepts:**

- cover the current and future social, economic and environmental use of resources
- may include:
  - efficient energy use
  - efficient use and recycling of material
  - correct handling of hazardous materials
  - disposing of waste material to ensure minimal environmental impact
  - selecting appropriate components to ensure minimal environmental impact.

**Testing techniques** include de-energised and energised tests,

- capacitors
- electric motors

which may include:

- heat activated switches
- ignition systems (basic, ignition and re-ignition, flame safeguard systems, hot surface ignition)
- printed circuit boards
- relay time delay and conventional
- solenoid coils
- thermistors
- thermostats, direct and indirect wired
- time clocks, mechanical and electronic
- transformers.

**Adjustment** and calibration are to include:

- dip switches
- fan limit controls
- fan speed settings
- heat anticipators
- thermostats.

**Corrective action**, such as component removal and replacement, is to include:

- burners
- combination controls
- fans
- pilots
- rail cocks, thermostats and associated components
- solenoid valve regulators
- thermocouples.

**Information** may include:

- charts and hand drawings
- diagrams, sketches and graphics
- instructions issued by authorised organisational or external personnel
- job drawings
- manufacturer specifications and instructions
- maps
- material safety data sheets (MSDS)
- memos
- organisation work specifications and requirements
- regulatory and legislative requirements, particularly those pertaining to:
  - building codes
  - WHS and environmental requirements
  - plumbing and gasfitting authority regulations

- relevant Australian standards, including AS/NZS3000 Electrical installations, AS/NZS4836 Safe working on low-voltage electrical installations, AS5601 (AG601) Gas installations
- safe work procedures relating maintaining Type A gas appliances
- signage
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.

## **Unit Sector(s)**

### **Functional area**

**Unit sector** Plumbing and services

## **Custom Content Section**

Not applicable.