

<b>Title</b>	<b>Demonstrate knowledge of domestic gas appliances for electrical appliance servicing</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>4</b>

<b>Purpose</b>	<p>This unit standard covers basic principles of domestic gas ranges, ovens, cook-tops, heaters, and driers. It is intended for use in the training of electrical technicians and service persons. It does not cover gas-fitting.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– outline legislation, codes of practice, and standards applicable to the servicing of domestic gas appliances;</li> <li>– state the essential requirements for the safe operation of gas appliances;</li> <li>– demonstrate knowledge of the gases used in domestic appliances and the principles of their combustion;</li> <li>– demonstrate knowledge of the operating principles of domestic gas appliances; and</li> <li>– demonstrate knowledge of safe servicing procedures applicable to domestic gas appliances.</li> </ul>
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<b>Classification</b>	Electrical Engineering > Electrical Appliance Servicing
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<b>Available grade</b>	Achieved
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**Guidance Information**

- 1 This unit standard has been developed for learning and assessment off-job.
- 2 References
  - Building Act 2004, and associated regulations;
  - Gas Act 1992, and associated regulations;
  - Hazardous Substances and New Organisms Act 1996, and associated regulations;
  - Health and Safety in Employment Act 1992, and associated regulations;
  - New Zealand Building Code – Compliance Documents C3-Spread of fire, G4-Ventilation, G10-Piped services, G11-Gas as an energy source;*
  - NZ GCP 1:1993, *New Zealand Gas Code of Practice for Inspection, Testing and Certification of Gasfitting Work done Under Supervision*, Issued by the Secretary of Commerce in accordance with the Gas Act 1992 (Ministry of Economic Development, ISSN 1172-3416) available at the Ministry of Business, Innovation and Employment ([Energy Safety website](#)).
  - NZS 5261:2003, *Gas installation*;
  - NZS 5262:2003, *Gas appliance safety*;
  - Plumbers, Gasfitters and Drainlayers Act 2006, and associated regulations; and all subsequent amendments and replacements.

**3 Definition**

*Electrical technicians and service persons* – for the purposes of this unit standard means, people who hold or who are working towards electrical registration as an Electrical Service Technician, Electrical Appliance Serviceperson (endorsed to disconnect and connect), or Electrical Appliance Serviceperson.

**4 Range**

- a Domestic gas appliances are limited to gas ranges, ovens, cook-tops, heaters, and driers.
- b The range and depth of subject knowledge is such as to facilitate competent and safe electrical servicing of ranges, ovens, cook-tops, heaters and driers, but excludes gas-fitting and maintenance.

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**Outcomes and performance criteria****Outcome 1**

Outline legislation, codes of practice, and standards applicable to the servicing of domestic gas appliances.

**Performance criteria**

1.1 Legislation and regulations relevant to servicing of gas appliances are outlined.

Range Building Act 2004 and associated regulations; Gas Act 1992 and associated regulations; Hazardous Substances and New Organisms Act 1996 and associated regulations; Health and Safety in Employment Act 1992 and associated regulations; Plumbers, Gasfitters and Drainlayers Act 2006.

1.2 A brief outline of standards and codes of practice relevant to servicing of gas appliances is given.

Range NZGCP 1; NZS 5261; NZS 5262; New Zealand Building Code – Building Industry Authority Approved Documents C3, G4, G10, G11.

**Outcome 2**

State the essential requirements for the safe operation of gas appliances.

**Performance criteria**

2.1 The essential design and construction requirements for gas appliances are stated.

Range requirements – appliance designed and constructed so as to operate safely; fittings designed and constructed so as to fulfil intended purpose; materials appropriate for their intended purpose; combustion requirements; mechanical strength; appropriate control of surface temperature; avoidance of

accidental release of combustion products; non-hazardous gas leakage rate; limit on gas release during ignition and extinction to prevent accumulation of unburned gas; minimisation of risk of explosion in event of external fire; safe operation in event of abnormal fluctuation or failure of auxiliary supply; non-hazardous failure of one safety, controlling or regulating device; non-overrule of safety devices by controlling devices; avoidance of electrical hazard; marking.

- 2.2 The essential installation requirements for gas appliances are stated.
- Range requirements – assembly and installation instructions adequate for all envisaged sites; flueing; requirements and restrictions regarding adequate ventilation; limitation on room size and use; clearance from combustible materials; assembly and installation in accordance with specifications and instructions.
- 2.3 The essential commissioning requirements for gas appliances are stated.
- Range requirements – gas type, pressure, and input rate; flow of fresh air for combustion; avoidance of unburned gas and dispersal of combustion products; commissioning in accordance with specifications and instructions.
- 2.4 The essential operating requirements for gas appliances are stated.
- Range requirements – safe use and servicing; protection from interference with important manufacturing or commissioning adjustments; clear markings on all levers and controlling and setting devices; non-hazardous temperatures of levers and controlling devices; clear warning notices in English of any restrictions on use; operation in accordance with instructions; consumer's instruction booklet; keeping flammable and combustible materials at safe distance.

### Outcome 3

Demonstrate knowledge of the gases used in domestic appliances and the principles of their combustion.

#### Performance criteria

- 3.1 The gases commonly used for fuel are described with reference to their principal constituents, method of distribution, and physical characteristics.
- Range gases – natural gas, liquefied petroleum gas; distribution – pipe line, tanker, cylinder; physical properties – calorific values, relative densities, safety considerations for leakage, odourisers.
- 3.2 The basic principles of combustion, including explosive combustion, are described.

Range requirements of fuel, oxygen and heat; normal oxygen source; initial heat source from ignitor; combustion products; safety considerations; upper and lower explosive limits; flammability limits.

3.3 The requirements for efficient combustion and operation are stated.

Range primary air, secondary air, mixing of gas and primary air; effect of excess air flow on efficiency, primary air shutters; burner injectors and relation to gas type; typical atmospheric burners, venturi throats, control of combustion air flow, flame appearance; flame impingement on vessels; flue losses.

3.4 The requirements for flueing arrangements are stated.

Range operation of flued and unflued appliances; flue gas dilution; conventional flues; balanced flues; fan assisted appliances; flue terminals and their positioning.

3.5 The products and characteristics of incomplete combustion and their health consequences are described.

Range carbon monoxide, aldehydes.

3.6 Symptoms of incomplete combustion and action required are described.

Range discovery of adverse health symptoms, identification of floating flames or flame roll-out, reporting of adverse health symptoms by users, application of gas-fitting competencies to correct.

#### **Outcome 4**

Demonstrate knowledge of the operating principles of domestic gas appliances.

#### **Performance criteria**

4.1 Basic electrical sources of igniting combustion are described.

4.2 Devices used for control, safety and protection, including temperature control are identified and their functions described.

4.3 Appliance operation is explained with the aid of sketches showing all major components, and with reference to operation under normal and abnormal conditions.

#### **Outcome 5**

Demonstrate knowledge of safe servicing procedures applicable to domestic gas appliances.

**Performance criteria**

- 5.1 Disconnection and reconnection procedures of gas appliances from the gas supply are described with reference to health and safety.
- 5.2 Testing procedures following servicing are described with reference to operational testing, and health and safety procedures.

**This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.**

**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	28 January 2001	31 December 2013
Review	2	20 June 2006	31 December 2022
Rollover and Revision	3	20 September 2012	31 December 2022
Revision	4	15 January 2014	31 December 2022
Review	5	28 January 2021	31 December 2022

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.