

## Standards of Training in Safe Gas Work

### Domestic Natural Gas Training Specification

This training specification represents the minimum requirement for a new entrant into the gas industry.

#### Off-the-Job Training Requirements

The performance criteria (PC), knowledge and understanding (K&U) requirements for off-the-job training are structured to be consistent with the core competencies found in the ACS domestic core unit CCN1.

The PC and K&U are based on that specified in CCN1 with additional criteria (other than matters of gas safety) to cover situations that may be encountered when working in the downstream gas industry.

The minimum guided learning hours assigned to each unit are detailed below.

Domestic Core Unit	Minimum Guided Learning Hours
Safety, Legislation and Standards	35
Gas Emergency Actions and Procedures	14
Products and Characteristics of Combustion	28
Ventilation for Domestic Gas Burning Appliances	21
Installation of Pipework and Fittings	35
Tightness Testing and Purging	21
Checking and/or Setting Meter Regulators	14
Unsafe Situations, Emergency Notices and Warning Labels	21
Operation and Positioning of Emergency Isolation Controls and Valves	7
Checking and Setting Appliance Burner Pressures and Gas Rates	14
Operation and Checking of Appliance Gas Safety Devices and Controls	21
Chimney Standards	14
Chimney Installation, Inspection and Testing	21
Re-establish Existing Gas Supply and Re-light Appliances	14
<b>Total:</b>	<b>280</b>

Appliances (At least one appliance must be selected)	Minimum Guided Learning Hours
Central Heating Boilers (Wet)	14
Optional Elements for Central Heating Boilers, Systems and Controls	21
Ducted Air Heaters	7
Water Heaters	7
Fires and Wall Heaters	7
Cookers	7
Laundry Appliances	7
<b>Total:</b>	<b>70</b>

## **On-the-Job Work Experience**

Off-the-job training must be complemented by gaining real world experience under the supervision of a qualified Gas Safe registered engineer who will be required to provide witness testimony to the work experience entered into the candidate's portfolio of evidence. This must include (but not be limited to) the following elements:

- Testing for tightness.
- Purging.
- Pipework installation.
- Checking ventilation.
- Testing safety controls.
- Inspection of flue systems.
- Testing of flue systems
- Re-establishing gas supplies and re-lighting appliances.
- Identification of appliance or pipework faults/defects.
- Working on appliances relevant to the work categories undertaken.

It is recognised that gaining real world work experience can be unpredictable and therefore its quality and range could vary greatly from one situation to another. To illustrate this 2 examples are highlighted below where work experience has been gained by being supervised by:

- A sole trader offering a limited range of services.
- A number of different engineers working for a national company offering a full range of services.

Taking this into consideration the work experience can be facilitated in one of two ways:

1. The portfolio of work experience must provide evidence representative of a minimum of 12 weeks work experience and cover the elements specified above. If after 12 weeks experience some elements have not been met, with the consent of the training provider up to 2 elements could be covered in a simulated environment.
2. Where all the elements of the specified work experience have been met on more than one occasion and this has been endorsed by a suitable quality management system the minimum time element can be reduced to 8 weeks.

# **Safety, Legislation and Standards**

## **Performance Criteria**

In relation to electrical supplies, tools and components you will need to be able to:

- P1 Prove safe electrical isolation before working on gas appliances, systems and components.
- P2 Measure voltage and resistance values using appropriate test instruments.
- P3 Visually inspect electrical power tools for safe condition before use.

## **Knowledge and Understanding**

In relation to working on downstream domestic gas installations you will need to know and understand:

- K1 Application of the Gas Safety Installation and Use Regulations.
- K2 Asbestos related hazards and application of adequate safety measures.
- K3 Safety precautions when other hazardous materials are encountered whilst working in the downstream gas industry.
- K4 Your responsibilities regarding health, safety and the environment.
- K5 Use of personal protective equipment.
- K6 Information available to Gas Safe registered operatives:
  - Legislative Normative and Informative Document List.
  - Industry Standard Updates.
  - Safety Alerts.
  - Technical Bulletins.

# **Gas Emergency Actions and Procedures**

## **Knowledge and Understanding**

In relation to emergency actions, you will need to know and understand:

- K1 Priorities and actions when dealing with a gas escape.
- K2 Properties of Natural Gas.

# Products and Characteristics of Combustion

## Performance Criteria

In relation to complete and incomplete combustion, you will need to be able to:

- P1 Identify correct and incorrect flame pictures.
- P2 Identify signs of incomplete combustion within and in the locality of an appliance installation.

In relation to carbon monoxide (CO) detectors and indicators, you will need to be able to:

- P3 Identify, install and commission different types of CO detectors.

In relation to combustion performance analysis, you will need to be able to:

- P4 Undertake combustion performance analysis on a range of appliances.

## Knowledge and Understanding

In relation to complete and incomplete combustion, you will need to know and understand:

- K1 Combustion equations for complete and incomplete combustion.
- K2 Air requirements for complete combustion.
- K3 Causes of incomplete combustion.

In relation to carbon monoxide (CO) detectors and indicators, you will need to know and understand:

- K4 CO poisoning and detection.

In relation to combustion performance analysis, you will need to know and understand:

- K5 Actions to take when undertaking combustion performance analysis.

# Ventilation for Domestic Gas Burning Appliances

## Performance Criteria

In relation to providing ventilation for domestic gas burning appliances, you will need to be able to:

- P1 Measure the free area of a range of different types of ventilation air vents and grilles.
- P2 Identify correct and incorrect ventilation provision.

## Knowledge and Understanding

In relation to providing ventilation for domestic gas burning appliances, you will need to know and understand:

- K1 Factors affecting ventilation.
- K2 Design and types of ventilation provision.
- K3 Calculating ventilation requirements.
- K4 Ventilation labels and notices.

# Installation of Pipework and Fittings

## Performance Criteria

In relation to the installation of domestic pipework and fittings, you will need to be able to:

- P1 Joint pipework using soldered, threaded, washer, union and compression fittings.
- P2 De-commission metered gas installations, tee in to existing copper pipework and re-commission installation on completion.
- P3 Demonstrate correct use of temporary continuity bond.
- P4 Identify a range of installation pipework safety defects.

## Knowledge and Understanding

In relation to the installation of domestic pipework and fittings, you will need to know and understand:

- K1 Factors to consider when installing gas installation pipework.
- K2 Copper and mild steel pipe and fittings standards, suitability and use.
- K3 Jointing and cleaning agents for jointing copper and threaded pipework fittings.
- K4 Restrictions on use of union and compression fittings.
- K5 Requirements for supporting and clipping gas installation pipework.
- K6 Pipework protection, sleeving and sheathing requirements.
- K7 Pipe sizing.
- K8 Medium pressure gas supplies.



# Tightness Testing and Purging

## Performance Criteria

In relation to testing and purging domestic natural gas installations, you will need to be able to:

- P1 Test domestic low pressure gas installations for tightness using air.
- P2 Test domestic low pressure gas installations for tightness using gas.
- P3 Purge domestic low pressure gas installations.
- P4 Trace and repair a gas escape.
- P5 Test existing domestic natural gas installations for tightness with a medium pressure gas supply without a meter inlet valve.
- P6 Test existing domestic natural gas installations for tightness with a medium pressure gas supply with a meter inlet valve.

## Knowledge and Understanding

In relation to testing and purging domestic natural gas installations, you will need to know and understand:

- K1 Types of pressure gauge and perceptible movement.
- K2 Application of permissible pressure drops.
- K3 Electronic token meter tamper devices.
- K4 Dealing with let by.
- K5 Actions to take when a smell of gas persists after a satisfactory test or after the ECV has been turned off.
- K6 Calculating installation and purge volumes.
- K7 Testing pipework of diameter > 35 mm or total IV > 0.035 m<sup>3</sup>.
- K8 Testing before working on an installation.

# Checking and/or Setting Meter Regulators

## Performance Criteria

In relation to checking and/or setting domestic meter regulators on natural gas installations, you will need to be able to:

- P1 Measure and record the installation standing pressure.
- P2 Measure and record the installation working pressure.
- P3 Determine if the installation working pressure is correct or incorrect.
- P4 State the actions to take if the working pressure is incorrect.

## Knowledge and Understanding

In relation to checking and/or setting domestic meter regulators on natural gas installations, you will need to know and understand:

- K1 The effects of low and high flow rates on a meter regulator.
- K2 The effects of pressure absorption across primary meter installation.
- K3 The operation of a gas meter regulator.
- K4 Identifying a medium pressure meter/regulator installation.

# **Unsafe Situations, Emergency Notices and Warning Labels**

## **Performance Criteria**

In relation to unsafe situations, emergency notices and warning labels, you will need to be able to:

- P1 Identify and classify different categories of unsafe situations.
- P2 Demonstrate the procedure to follow for each classification of unsafe situation.
- P3 Complete, explain and issue appropriate warning/advisory notices.

## **Knowledge and Understanding**

In relation to unsafe situations, emergency notices and warning labels, you will need to know and understand:

- K1 Gas Industry Unsafe Situation Procedure (GIUSR).
- K2 Situations reportable under RIDDOR.
- K3 Correct use of notices and labels.

# **Operation and Positioning of Emergency Isolation Controls and Valves**

## **Performance Criteria**

In relation to the operation and positioning of emergency isolation controls and valves, you will need to be able to:

- P1 Identify incorrectly positioned emergency isolation controls and valves.
- P2 Identify correctly positioned emergency isolation controls and valves.
- P3 Demonstrate dealing with incorrectly positioned emergency isolation controls and valves.
- P4 Identify the correct labels to attached emergency isolation controls and valves.

## **Knowledge and Understanding**

In relation to the operation and positioning of emergency isolation controls and valves, you will need to know and understand:

- K1 Inside and outside meter positions.
- K2 Multi-occupancy building installations:

## **Checking and Setting Appliance Burner Pressures and Gas Rates**

### **Performance Criteria**

In relation to checking and setting appliance burner pressures and gas rates, you will need to be able to:

- P1 Measure appliance operating pressure.
- P2 Measure appliance gas rate.

### **Knowledge and Understanding**

In relation to checking and setting appliance burner pressures and gas rates, you will need to know and understand:

- K1 Requirements for range rated appliances.
- K2 Causes and effects of pressure loss.
- K3 Use of electronic pressure gauge.

# **Operation and Checking of Appliance Gas Safety Devices and Controls**

## **Performance Criteria**

In relation to gas safety devices and controls you will need to be able to:

- P1 Identify gas safety devices and controls.
- P2 Check gas safety devices and controls for correct operation and carry out any corrective action where necessary.
- P3 Explain the operation of gas safety devices and controls.

## **Knowledge and Understanding**

In relation to gas safety devices and controls you will need to know and understand:

- K1 The principles of operation of gas safety devices and controls.
- K2 The sequence of operation of gas safety devices and controls.
- K3 Information required for spare part identification.

## Chimney Standards

### **Knowledge and Understanding:**

In relation to chimney standards you will need to know and understand the requirements for installing gas appliances to the following flue systems:

- K1 Existing solid fuel chimney.
- K2 Pre-cast flue.
- K3 Individual natural draft open flue.
- K4 Fanned draft open flue.
- K5 Shared open flue.
- K6 Room sealed natural draft.
- K7 Room sealed fanned draft.
- K8 Balanced compartments for open flue appliances.
- K9 Shared room sealed flue.
- K10 Flue systems for condensing appliances.
- K11 Vertex flue systems.

# Chimney Installation, Inspection and Testing

## Performance Criteria

In relation to chimney testing you will need to be able to:

- P1 Visually inspect chimney systems to confirm correct and incorrect installation.
- P2 Perform a flue flow test on an open flue system.
- P3 Perform a spillage test on an appliance connected to an open flue system.
- P4 Perform a spillage test on a room sealed fan assisted positive pressure appliance.
- P5 Inspect a concealed fanned flue installation.

## Knowledge and Understanding:

In relation to chimney installation inspection and testing you will need to know and understand:

- K1 Causes of leakage of combustion products from room sealed positive combustion chamber pressure appliances.
- K2 Installation and testing appliances when MIs are not available.
- K3 Actions to take when inspection hatches are not available for flues in voids.
- K4 Chimney information requirements.



## **Re-establish Existing Gas Supply and Re-light Appliances**

### **Performance Criteria**

In relation to re-establishing an existing domestic gas supply and re-lighting the appliances, you will need to be able to:

- P1 Check the installation is gas tight.
- P2 Purge the installation and appliances of air.
- P3 Establish a stable flame on each appliance.
- P4 Visually inspect each appliance and identify any unsafe situations.
- P5 Confirm satisfactory operation of user controls.

### **Knowledge and Understanding**

In relation to re-establishing an existing domestic gas supply and re-lighting the appliances, you will need to know and understand:

- K1 Actions to take when an un-commissioned appliance is identified.
- K2 Actions to take if pipework and appliance(s) are not tested (commissioned) when the gas supply is re-established.

## **Domestic Appliances**

### **Performance Criteria**

In relation to domestic gas appliances, for each appliance you will need to be able to:

- P1 Install the appliance to a prepared point.
- P2 Commission the appliance to MIs.
- P3 Service the appliance to MIs.
- P4 Identify gas related safety defects.
- P5 Undertake combustion performance analysis (where applicable).

For appliance categories that can incorporate an air/gas ratio valve you will need to be able to:

- P6 Check the air/gas ratio valve is set correctly at high and low limits in accordance with manufacturer's instructions and adjust if necessary.

### **Knowledge and Understanding**

In relation to domestic gas appliances, for each appliance you will need to know and understand:

- K1 How to identify and diagnose gas safety faults.
- K2 Suitable and unsuitable room/space locations.
- K3 Clearances— proximity of combustible materials – fire proofing of compartments.
- K4 Operation of gas safety control devices
- K5 Condensate removal and disposal (where applicable)
- K6 When to carry out combustion performance analysis

For appliance categories that can incorporate an air/gas ratio valve you will need to know and understand:

- K7 The principle of adjustment of air/gas ratio valves.

# Optional Elements for Central Heating Boilers, Systems and Controls

## Performance Criteria

In relation to central heating controls, you will need to be able to:

- P1 Measure and interpret resistance readings to ensure that it is safe to establish/re-establish the electrical supply:
- P2 Measure and interpret voltage readings to ensure safe electrical operation.
- P3 Wire the electrical components of a:
  - Y plan control system.
  - S plan control system.
- P4 Wire a programmable room thermostat to a combi boiler

## Knowledge and Understanding

In relation to central heating system design, you will need to know and understand:

- K1 The component parts of an open vented system.
- K2 The component parts of a sealed system.
- K3 System plans including S Plan and Y Plan.
- K4 Energy efficiency requirements.

In relation to central heating controls, you will need to know and understand:

- K5 Basic electrical principles:
  - Voltage.
  - Current.
  - Resistance.
  - Ohm's law.
- K6 The basic operating principles and wiring connections of:
  - Motorised valves.
  - Room thermostats.
  - Time controls.
  - Time and temperature controls.
  - Pump over-run requirements.
- K7 Energy efficiency requirements.