City & Guilds Level 3 Certificate in Complex Domestic Natural Gas Installation and Maintenance

City & Guilds Level 3 Certificate in Emergency Service Operations

6132

Units Handbook

Version 1 as of June 2005

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City & Guilds
1 Giltspur Street
London, EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400 **www.city-and-guilds.co.uk**

Level 3 Certificate in Complex Domestic Natural Gas Installation and Maintenance

Standards and Units

Award 6132

City & Guilds Level 3 Certificate: Complex Domestic Natural Gas Installation and Maintenance

Knowledge Units:

301 Common complex gas processes
302 Improvement of business products and services in the gas industry
303 Complex gas activities for cookers and laundry appliances
304 Complex gas activities for central heating and water heating appliances
305 Complex gas activities for metering systems
306 Complex gas activities for pipework

City & Guilds Level 3 Certificate: Gas Emergency Service Operations

Knowledge Units:

501 Install complex gas system components
502 Contribute to the control, rectification and monitoring of gas emergencies
503 Commercial natural gas changeover for gas emergency operations
504 Liquefied petroleum gas changeover for gas emergency service operations

Level 3 Certificate in Complex Domestic Natural Gas Installation and Maintenance

Unit 301 Common complex gas processes

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 301 Common complex gas processes.

Rationale and unit content:

This unit covers the following knowledge and understanding areas
The knowledge areas in which the Candidate has to demonstrate competence are:

Knowledge items common to the complex gas activities for the design, specification, planning, installation, commissioning and decommissioning, servicing and maintenance of

- Gas appliances within the Level Three range – Cookers and Laundry – Central Heating and Hot Water Heating – Meters

- Gas pipework systems including pipework and controls, and flues

Unit 301 contains the following **9 outcomes**
The candidate will be able to:

1 identify customer's requirements
2 design systems to meet customers' needs
3 produce and monitor work programmes
4 negotiate job contract terms and conditions
5 plan the work activities to be carried out
6 prepare work locations for the installation of systems and components
7 establish service and maintenance requirements for systems and components
8 establish maintenance requirements for systems and components
9 diagnose the cause and rectify faults in systems and components

Connection with other awards

This gas certificate unit-301 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and Maintenance and the following units:

Unit 001 Design Natural Gas Systems
Unit 002 Specify Programmes for Working on Natural Gas Systems
Unit 003 Plan the Work Activities for Natural Gas Systems and Components
Unit 014 Install Complex Natural Gas Systems and Components
Unit 015 Service and Maintain Complex Natural Gas Systems and Components

Unit 301 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	001.1	001.1.1, 1.2, 1.5, 1.6	1-3, 5, 6
2	001.2	001.2.1-2.5	1-4
3	002.1	002.1.1-1.4	1-4
4	002.2	002.2.1-1.4	1-3
5	003.1	003.1.3, 1.4, 1.6, 1.7, 1.8	2-5
6	014.1	014.1.1-1.4, 1.6, 1 .7, 1 .9	1-4, 6-9
7	015.1	015.1.1, 1.4	1-3
8	015.2	015.2.1, 2.2	1, 2
9	015.3	015.3.1, 3.3	1, 2

Assessment

The outcomes from this Gas certificate unit 301 will be assessed by multiple choice question papers covering the nine outcomes.

Outcome 1
Identify Customer's Requirements

The candidate will be able to describe

1 how to obtain information from site drawings and plans, and discussion with customer
- a how to access the range of documents that contain the job information
- b how to extract from job information, the details required for the design operation
- c the importance of checking with the customer, or main contractor, any requirements that need confirmation

2 how to carry out site surveys
- a the purpose of a site survey
- b the range of information that can be collected by a site survey of existing property
- c the range of information that can be collected by a site survey of new build property
- d methods of measuring key dimensions in the proposed system location
- e methods of recording key characteristics of the proposed system location
- f the importance of making permanent copies of the information gathered during a site survey
- g the importance of ensuring safe and secure storage for survey information

3 the range of documentation detailing industry requirements
- a the range of information contained in each of the job or contract documents, including the job specification, the site drawings and plans
- b the sources of legislation which govern the design and layout of systems
- c the sources of legislation which govern the types, sizes, and positioning of appliances within the system

4 how to obtain agreement from the customer to progress a selected design option
- a methods of presenting the design option
- b the importance of choosing a presentation style of method that recognises the customer's level of technical ability or understanding
- c the importance encouraging the customer to ask questions and confirming that the customer understands the design option
- d recording the customer's agreement to the selected option, and obtaining written agreement from the customer

Outcome 2
Design Systems to meet Customers' needs

The candidate will be able to describe

1 the range of job information that is required to carry out design work:
new buildings
existing properties
- a how to confirm that all required information is available to progress the design activity
- b the different ranges of information required for the design activity for a system in a new unoccupied building, and an existing occupied building
- c the range of reference publications appropriate to the system being designed
- d the range of electronic data (computer programmes) on system design

2 how to calculate the requirements of system components – size and specification
- a how to access technical reference material to determine the availability of components to meet the design specification
- b how to calculate system outputs for the design specification
- c how to interpret technical information to select the required sizes and output of components and appliances to meet the system output

3 methods of presenting design information to customer's drawings:
specifications
quotations
- a how to prepare detailed drawings to show all key features of the system
- b how to prepare a design specification which meets the customer's confirmed requirements
- c how to prepare a quotation for the design using recommended conventions of presentation
- d the importance of using a method of presentation for design information which presents information clearly, and unambiguously

4 how Information Technology (IT) may be used in presenting design information
- a how to access and use the range of design programmes for systems
- b how to access and use the range of IT standard documentation for specifications and quotations
- c how to use electronic methods to transmit design data

Outcome 3
Produce and Monitor Work Programmes

The candidate will be able to describe

1 How to determine the following for specific jobs
material requirements
labour requirements
plant and equipment requirements
- a the job or contract documents that contain the information required to identify material requirements
- b how to access manufacturers' information on materials, components, and appliances
- c how to estimate materials requirements for a contract
- d the requirements of health and safety legislation with regards to minimum labour force for work activities
- e how to estimate labour requirements for a contract
- f how to estimate plant and equipment requirements for a contract
- g conventions for presenting lists of materials, tools and equipment, labour
- h how to use electronic storage systems for lists of materials, tools and equipment, and labour

2 How to produce basic work programmes in bar chart format to identify key stages in job progress
- a the purpose of a work programme
- b the typical information contained on a work programme
- c the uses of bar charts in work programming
- d how to construct a bar chart for typical job data

3 How to develop work programmes which meet the requirements of customer and/or main contractor work programmes
- a the other individuals and organisations whose work activities need to be considered when drawing up a work programme
- b the key stages of a typical contract
- c the importance of being able to identify points within the gas installation programme where attendance of other trades may be necessary

4 How to schedule inspection or approval visits into work programmes
- a the types of gas installation work which will require inspection by outside bodies
- b the points within a typical contract programme where work inspections will need to be carried out
- c how to contact the inspecting body to arrange visits

5 How to specify job payment requirements which meet work progress, job contract and business requirements
- a how to identify information within the contract which details interim and final payment dates and conditions
- b how to schedule job payments
- c how to measure completed work as the basis for interim payment claims
- d the purpose of payment retention
- e how to check payments made against the payment schedule

6 Typical situations in which the work programme may have to be adjusted and how to obtain approval to adjust the work programme

- a typical causes of delays which require adjustment to gas installation work programmes
- b how to liaise with others to obtain agreement to adjustments to gas installation work programmes
- c circumstances where it may be necessary to reschedule labour, plant and equipment, and payments as a result of re-programming
- d how to modify or adjust other schedules that are linked to the work programme

Outcome 4
Negotiate Job Contract Terms and Conditions

The candidate will be able to describe

1 The basic forms of job agreement applicable to the size of contract
- quotations and acceptance letters
- formal contract documents
- orders for material supply

a the basic forms of contract for use with gas installation work
b the signatories to the different forms of contract
c the main conditions covered by standard forms of contract
d the purpose of estimates and quotations, style conventions for quotations and acceptance letters
e the range of documents for material supply – material orders – invoices – delivery notes – damage or deficiency reports

2 the circumstances in which deviations or variations to the contract may prove necessary
a typical circumstances which may require re-negotiation of the contract
b the actions to take when contract re-negotiation becomes necessary

3 the actions necessary to obtain agreement with customers or suppliers to deviations or variations to the contract conditions
a the importance of ensuring that all parties agree the amended conditions to the contract
b the importance of obtaining the signatures of all parties to the amended contract

Outcome 5
Plan the Work Activities to be carried out

The candidate will be able to describe

1 The regulations governing system design, installation and operation
   a the range of legislative and guidance documentation governing the installation of gas systems and appliances
   b how to access information on the operation of systems and components

2 The main construction features of buildings into which the systems are installed
   a the main construction features of buildings into which gas systems or appliances are to be installed
   b the provisions within the building structure that are intended to accommodate gas systems components or appliances, including flues
   c provisions within/external to the building structure for incoming services

3 How to obtain detail from installation programmes and how to monitor progress against the programme
   a the types of information contained on installation programmes, or work schedules
   b how to assess ongoing job progress against a work programme

4 How to negotiate variations to work programmes and the need to obtain written acceptance to major work or material variations
   a typical circumstances which may lead to variations in a work programme
   b how to recognise when variations to the work programme will be necessary
   c the other persons or organisations whose work activities may be affected by changes to the gas installation programme
   d how to negotiate variations to the work programme
   e the importance of obtaining customer agreement to variations to the work programme
   f the importance of recording details of any changes to the work programmes, of recording the agreement of all parties, and of keeping documentation secure

Outcome 6

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the sources of information on the preparatory work necessary for the system or component installation
   a interpret complex electrical data, drawings, plans, manufacturers' instructions
   b identify any potential problems with the proposed location of components

2 the criteria for carrying out risk assessment on electrical systems
   a the types of electrical system for which risk assessment may need to be carried out
   b how to access the job specification to obtain the information required for the risk assessment
   c how to assess the levels of risk
   d how to present the information in the risk assessment

3 regulations, recommendations governing safety in the workplace, general responsibilities of the operative for his/her own safety and that of others
   a how to identify the types of asbestos product that may be found in work locations
   b the immediate actions to take if asbestos is found or suspected in the work locations

4 how to protect customer's property or the building fabric prior to the work commencing
   a the importance of reporting details of existing damage to customers' property and keeping records of reports
   b the importance of reporting and recording any building fabric faults or constraints which could impede job progress

5 the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
   a rectify and report as appropriate any damage to tools and equipment

6 how to ensure that the customer is fully briefed on all aspects of the installation programme
   a circumstances in which it would be appropriate to amend specifications
   b how to obtain agreement of the appropriate persons to any variations in the specifications
   c the possible outcomes of the system installation not complying with regulations, recommendations or the requirements of good practice

Outcome 7

Establish Service and Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
   a the importance of ensuring that all diagnostic data is available before job commencement
   b how to interpret specifications for the rectification of basic systems and components

2 the tools and equipment required for routine maintenance operations
   a the importance of ensuring that diagnostic equipment is available and of a suitable standard
   b how to use diagnostic tools and equipment

3 the complex diagnostic instrumentation for use on gas, electrical systems and flues

Outcome 8

Establish Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
   a how to set system controls to ensure appliance/systems efficiency

2 the service and maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine service and maintenance activities
   a how to inspect systems and components to ensure compliance with industry requirements
   b how to inspect component and appliance wiring
   c how to use thermal and flue gas analysis to confirm appliance/system efficiency

Outcome 9

Diagnose the Cause and Rectify Faults in Systems and Components

The candidate will be able to describe

1 the work action and sequences required to rectify faults in systems and components
   a how and when to replace system or appliance components
   b the performance, work actions, and sequences for rectification of faults on complex systems and appliances

Level 3 Certificate in Domestic Natural Gas Installation and Maintenance

Unit 302 Improvement of business products and services in the gas industry

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 302 Improvement of business products and services in the gas industry.

Rationale and unit content:

This unit covers the following knowledge and understanding areas
The knowledge areas in which the Candidate has to demonstrate competence are:

Work activities for the installation, commissioning and decommissioning and service and maintenance of

- Cookers and Laundry appliances
- Central Heating and Water Heating appliances
- Warm Air and Water Heating appliances
- Space Heating and Leisure appliances
- Meters
- Gas pipework systems

Unit 302 contains the following **3 outcomes**
The candidate will be able to:

1 promote the image of the business to others
2 identify and recommend opportunities for improving customer care
3 demonstrate environmental awareness within the workplace

Connection with other awards

This gas certificate unit-302 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and Maintenance and the following units:
Unit 009 Contribute to the improvement of business products and services for all natural gas related work

Unit 302	NVQ Element	NVQ PCs	NVQ Range
Outcome			
1	009.1	009.1.1-1.4	all
2	009.2	009.2.1, 2.3, 2.4	all
3	009.3	009.3.1-3.3	all

Assessment

The outcomes from this Gas certificate unit 013 will be assessed by multiple choice question papers covering the three outcomes

Outcome 1
Promote the image of the business to others

The candidate will be able to describe

1 the importance of correct personal presentation – clothing worn and manner
   a the effect that poor personal presentation has on customer attitudes towards the individual and the company
   b that the range of personal presentation characteristics includes clean and appropriate work clothing, headwear, footwear
   c that personal hygiene is important to personal presentation

2 the range of actions designed to promote the employing business that are within the candidate's day to day routine
   a that the range of actions that can contribute to promoting the business include punctuality, personal presentation, tidiness of the work location, clearing up and storing tools and equipment during on termination of work periods
   b the importance of maintaining a correct balance between friendliness and over familiarity when dealing with customers

3 the types of actions that produce positive and negative responses
   a that the actions likely to produce negative responses in customers includes an unwillingness to co-operate with customers when help is requested
   b that poor time keeping produces a negative attitude in customers
   c that due regard for the customers property, furnishings, decorations, including the provision of protective measures, and cleaning up as the job progresses produces a positive response

4 the range of promotional information appropriate to different work situations ensuring that information provided is appropriate to its intended use
   a the range of information that the company provides for general distribution
   b the range of information that may be requested by private customers, including information on the company, other products, guidance on systems or appliance operation
   c the range of information that may be requested by fellow workers/other trades

5 the methods of presenting information that are appropriate to the situation or the person requesting the information
   a the importance of presenting information in a positive manner
   b the importance of presenting information in a manner which recognises the level of technical understanding of the recipient
   c situations where verbal/informal presentation of information is an appropriate response to a request for information, and situations where written/printed information would be more suitable

Outcome 2

Identify and recommend opportunities for improving customer care

The candidate will be able to describe

1 The typical formal and informal approaches to ensuring a system of customer service
   a the main differences between a formal and informal approach to customer service
   b the advantages of having a formal approach to customer service

2 The typical details contained in written statements of customer service policy
   a that details within a typical customer service policy will include the range of work covered, replacement of components, standards of workmanship, guarantee periods, costs of service

3 The work actions necessary to support the businesses customer service policy
   a the importance of accepting responsibility for responding to customer complaints/advice on faulty components or appliances
   b the importance of promptly passing customer complaints to the company

4 The checks to be carried out during work activities to ensure customer satisfaction with the service provided, and the measures to be taken where deficiencies in customer service are identified
   a the importance of asking customers if they are satisfied with the service
   b the actions to take if customers express dissatisfaction with the service

5 The actions necessary to record and report any deficiencies in the performance of systems or components
   a the importance of ensuring that customers understand the company's complaints procedures
   b the importance of promptly reporting to the company, any faults that cannot be corrected
   c the importance of promptly reporting to the company any customer complaints of serving procedures

6 The methods of dealing with customer complaints arising from dissatisfaction with work standards or attitude of the workforce
   a the importance of reporting promptly to the company any complaints of dissatisfaction with work standards
   b the importance of trying to ensure that relationships with customers do not breakdown because of an inappropriate attitude

Outcome 3
Demonstrate environmental awareness within the workplace

The candidate will be able to describe

1 the potential implications for the environment of the work procedures used in installing or maintaining systems or components
   a the work practices that have a potential for waste water, fuel, materials
   b methods of working which reduce consumption of water, fuel, materials

2 alternative 'low risk' materials, products and procedures
   a the use and effectiveness of different insulating materials
   b the range of environmentally friendly materials used for gas installation
   c the range of system components and controls that are designed to effect economic use of water, and fuels

3 prefabrication and installation methods that reduce material wastage
   a the work practices that are intended to minimise wastage of materials, including accurate measurement and cutting of materials
   b the importance of replacing any materials (eg insulators) that are designed to prevent waste, upon completion of repair or maintenance work

4 the importance of reporting hazards to the environment that arises from work procedures and (within the scope of the candidate's area of responsibility) endorsing that appropriate actions are taken.
   a the importance of reporting and circumstance within the work location that may be a hazard to the environment, eg examples of material waste, waste of resources
   b the importance of reporting any working practice or procedure that could cause waste of materials, or non-renewable resources
   c the importance of promptly reporting any hazardous material within the work location eg asbestos
   d the importance of ensuring (within the area of responsibility of the operative) that action is taken on reports

5 the range of information that needs to be passed to the customer to ensure the correct and economical use of energy dependant systems
   a the importance of ensuring that all appropriate information on the operation of systems, components, and controls is passed to the customer
   b the importance of ensuring that the customer understands all appropriate information, including warning signs that the systems is not operating correctly

6 The general advice that can be given to customers on methods of reducing waste of resources, and effecting savings
   a any general advice that should be given to customers which will help them to maximise efficiency of systems, reduce wastage or effect savings in systems operating costs

7 The disposal methods used by the organisation for waste materials
   a the types of waste materials which are reclaimable
   b the types of waste materials whose disposal is controlled by legislation, or licensing
   c local waste collection and disposal procedures for industrial/building waste

Level 3 Certificate in Domestic Natural Gas Installation and Maintenance

Unit 303 Complex gas activities for cookers and laundry appliances

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 303 Complex gas activities for cookers and laundry appliances.

Rationale and unit content:

This unit covers the following knowledge and understanding areas
The knowledge areas in which the Candidate has to demonstrate competence are:

Knowledge items common to the complex gas activities for the:

- Design
- Specification
- Planning
- Installation
- Commissioning and decommissioning
- Service and maintenance

Of Cookers and Laundry Appliances

Unit 303 contains the following **4 outcomes**
The candidate will be able to:

1 prepare work locations for the installation of systems and components
2 establish service and maintenance requirements for systems and components
3 establish maintenance requirements for systems and components
4 diagnose the cause and rectify faults in systems and components

Connection with other awards

This gas certificate unit-303 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and Maintenance and the following units:
Unit 014 Install Complex Natural Gas Systems and Components – Cookers and Laundry Appliances
Unit 015 Service and Maintain Complex Natural Gas Systems and Components

Unit 303 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	014.1	014.1.1, 1.2	1, 2
2	015.1	015.1, 1.4	1-3
3	015.2	015.2.1, 2.2	1, 2
4	015.3	015.3.1, 3.2, 3.4	1-5

Assessment

The outcomes from this Gas certificate unit 303 will be assessed by multiple choice question papers covering the four outcomes

Outcome 1

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the criteria for carrying out risk assessment on electrical systems
   - a the types of electrical system for which risk assessment may need to be carried out
   - b how to access the job specification to obtain the information required for the risk assessment
   - c how to assess the levels of risk
   - d how to present the information in the risk assessment

Outcome 2

Establish Service and Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
   a the range of diagnostic data including charts, and wiring diagrams
   b the importance of ensuring that all diagnostic data is available before job commencement
   c how to interpret specifications for the rectification of basic systems and components

2 the tools and equipment required for routine maintenance operations
   a the importance of ensuring that diagnostic equipment is available and of a suitable standard
   b how to use diagnostic tools and equipment
   c the complex diagnostic instrumentation for use on gas, electrical systems and flues

Outcome 3

Establish Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
   a how to set system controls to ensure appliance/systems efficiency

2 the service and maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine service and maintenance activities
   a how to inspect systems and components to ensure compliance with industry requirements
   b how to inspect component and appliance wiring
   c how to use thermal and flue gas analysis to confirm appliance/system efficiency

Outcome 4

Diagnose the Cause and Rectify Faults in Systems and Components

The candidate will be able to describe

1 how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
   a how to locate gas and electrical faults on systems and appliances

2 the work procedures for the rectification of faults in systems or components which will ensure minimum disruption to customers and routines
   a the persons, including customers, co-workers, other system users, with whom it may be necessary to liaise when carrying out routine service and maintenance on cookers and laundry appliances

Level 3 Certificate in Domestic natural gas installation and maintenance

Unit 304 Complex gas activities for central heating and water heating appliances

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 304 Complex gas activities for central heating and water heating appliances.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

Knowledge items common to the complex gas activities for the:

- Design
- Specification
- Planning
- Installation
- Commissioning and decommissioning
- Service and maintenance

Of Central Heating and Water Heating appliances

Unit 304 contains the following **8 outcomes**
The candidate will be able to:

1 identify customer's requirements
2 design systems to meet customers' needs
3 produce and monitor work programmes
4 plan the work activities to be carried out
5 prepare work locations for the installation of systems and components
6 establish service and maintenance requirements for systems and components
7 establish maintenance requirements for systems and components
8 diagnose the cause and rectify faults in systems and components

Connection with other awards

This gas certificate unit-304 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and Maintenance and the following units:
Unit 001 Design Natural Gas Systems
Unit 002 Specify Programmes for Working on Natural Gas Systems
Unit 003 Plan the Work Activities for Natural Gas Systems and Components

Unit 014 Install Complex Natural Gas Systems and Components – Central Heating and Water Heating Appliances
Unit 015 Service and Maintain Complex Natural Gas Systems and Components
Unit 015 Service and Maintain Complex Natural Gas Systems and Components

Unit 304 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	001.1	001.1.1, 1.4	3, 4
2	001.2	001.2.1	1
3	002.1	002.1.3	4
4	003.1	003.1.1, 1.3, 1.4, 1.5	1-5
5	014.1	014.1.1, 1.2	1, 2
6	015.1	015.1, 1.4	1-3
7	015.2	015.2.1, 2.2	1, 2
8	015.3	015.3.1, 3.3	1-3

Assessment

The outcomes from this Gas certificate unit 304 will be assessed by multiple choice question papers covering the eight outcomes

Outcome 1
Identify Customer's Requirements

The candidate will be able to describe

1 the range of documentation detailing industry requirements
   a the sources of legislation which govern the design and layout of systems for central heating and water heating appliances
   b the sources of legislation which govern the types, sizes, and positioning of central heating and water heating appliances
   c the sources of information which govern the materials used for central heating and water heating appliance installations
   d the sources of information which govern provisions within the building fabric for central heating and water heating appliances

2 how to identify possible design options which meet key criteria
   a how to prepare design options which meet the customer's requirements, in terms of performance, type, finish, positioning, cost of central heating and water heating appliances
   b how to prepare design options which meet the constraints of the site structure and features in terms of accommodating central heating and water heating appliances within the building structure
   c how to prepare design options which meet industry requirements, in terms of meeting all legislative requirements, recommendations on central heating and water heating appliance design, and the requirements of good practice

Outcome 2
Design Systems to meet Customers' needs

The candidate will be able to describe

1 positioning requirements for components within systems and standard system layouts
   - a the requirements of legislation or recommendations governing the layout of central heating and water heating appliances
   - b the requirements of legislation or recommendations governing the pipe sizes, materials and positions for central heating and water heating appliances
   - c the requirements of legislation or recommendations governing the sizes, materials, positioning of central heating and water heating appliances

Outcome 3
Produce and Monitor Work Programmes

The candidate will be able to describe

1 how to develop work programmes which meet the requirements of customer and/or main contractor work programmes
   a the importance of being able to identify points within the central heating and water heating appliance installation programme where attendance of other trades may be necessary

Outcome 4
Plan the Work Activities to be carried out

The candidate will be able to describe

1 the system types and their intended functions: - system components and layouts
   a the central heating and water heating appliance types to be considered within the planning activity
   b the systems other than gas eg water supply, heating, electrical supply or earth continuity systems that need to be considered when planning for central heating and water heating appliance installation
   c the function of all central heating and water heating appliances that need to be taken account of by the planning activity
   d the layout of all central heating and water heating appliances that need to be taken account of by the planning activity
   e how to access records and reports of central heating and water heating appliance installations to obtain details of the layout of systems

2 the regulations governing system design, installation and operation
   a how to access information on the operation of central heating and water heating appliances

3 the main construction features of buildings into which the systems are installed
   a the provisions within the building structure that are intended to accommodate central heating and water heating appliances, including flues

4 the sources of information on the design of specific systems – plans and drawings – specifications
   a the sources of information on the installation of the central heating and water heating appliances that are the focus of the planning activity, including plans and drawings, technical information
   b the sources of information on construction activities that will have to be considered during the planning for the installation of central heating and water heating appliances

5 the installation requirements for systems – installation sequences and routine liaison with others in the overall construction programme
   a the typical central heating and water heating appliance installation procedures and work sequences
   b the other persons including the customer, householder with whom it would be necessary to liaise during the central heating and water heating appliance installation process
   c the points within the installation process at which liaison with others would be necessary
   d how to ensure that the gas installation work fitted into ongoing construction operations

Outcome 5

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the criteria for carrying out risk assessment on electrical systems
   - a the types of electrical system for which risk assessment may need to be carried out
   - b how to access the job specification to obtain the information required for the risk assessment
   - c how to assess the levels of risk
   - d how to present the information in the risk assessment

Outcome 6

Establish Service and Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
   a the range of diagnostic data including charts, and wiring diagrams
   b the importance of ensuring that all diagnostic data is available before job commencement
   c how to interpret specifications for the rectification of appliances and components

2 the tools and equipment required for routine maintenance operations.
   a the importance of ensuring that diagnostic equipment is available and of a suitable standard
   b how to use diagnostic tools and equipment
   c the complex diagnostic instrumentation for use on gas, electrical systems and flues

Outcome 7

Establish Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
   a how to set system controls to ensure appliance/systems efficiency

2 the service and maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine service and maintenance activities
   a how to inspect central heating and water heating appliances to ensure compliance with industry requirements
   b how to inspect central heating and water heating appliance component and appliance wiring
   c how to use thermal and flue gas analysis to confirm central heating and water heating appliance/system efficiency

Outcome 8

Diagnose the Cause and Rectify Faults in Systems and Components

The candidate will be able to describe

1 how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
   a how to locate gas and electrical faults on central heating and water heating appliances

2 the work action and sequences required to rectify faults in systems and components
   a how and when to replace central heating and water heating appliance components
   b the performance, work actions, and sequences for rectification of faults on complex systems and appliances

Level 3 Certificate in Domestic Natural Gas Installation and Maintenance

Unit 305 Complex gas activities for metering systems.

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 305 Complex gas activities for metering systems.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:

Knowledge items common to the complex gas activities for the:

- Design
- Specification
- Planning
- Installation
- Commissioning and decommissioning
- Service and maintenance

Of Metering systems

Unit 305 contains the following **4 outcomes**
The candidate will be able to:

1 prepare work locations for the installation of systems and components
2 establish service and maintenance requirements for systems and components
3 establish maintenance requirements for systems and components
4 diagnose the cause and rectify faults in systems and components

Connection with other awards

This gas certificate unit-305 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and
Unit 014 Install Complex Natural Gas Systems and Components – Meters
Unit 015 Service and Maintain Complex Natural Gas Systems and Components

Unit 305 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	014.1	014.1.1, 1.2, 1.6	1, 2, 6
2	015.1	015.1, 1.4	1-3
3	015.2	015.2.1, 2.2	1, 2
4	015.3	015.3.1, 3.2, 3.4	1-5

Assessment

The outcomes from this Gas certificate unit 305 will be assessed by multiple choice question papers covering the four outcomes

Outcome 1

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the criteria for carrying out risk assessment on electrical systems
   a the types of electrical system for which risk assessment may need to be carried out
   b how to access the job specification to obtain the information required for the risk assessment
   c how to assess the levels of risk
   d how to present the information in the risk assessment

2 how to ensure that the customer is fully briefed on all aspects of the installation programme
   a circumstances in which it would be appropriate to amend specifications
   b how to obtain agreement of the appropriate persons to any variations in the specifications
   c the possible outcomes of the meter installation not complying with regulations, recommendations or the requirements of good practice

Outcome 2

Establish Service and Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
   a the range of diagnostic data including charts, and wiring diagrams
   b the importance of ensuring that all diagnostic data is available before job commencement
   c how to interpret specifications for the rectification of meters

2 the tools and equipment required for routine maintenance operations.
   a the importance of ensuring that diagnostic equipment is available and of a suitable standard
   b how to use diagnostic tools and equipment
   c the complex diagnostic instrumentation for use on gas, electrical systems and flues

Outcome 3

Establish Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
   a how to set meter controls to ensure appliance/systems efficiency

2 the service and maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine service and maintenance activities
   a how to inspect meters to ensure compliance with industry requirements
   b how to inspect meters and earth continuity wiring

Outcome 4

Diagnose the Cause and Rectify Faults in Systems and Components

The candidate will be able to describe

1 how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
   a how to locate gas and operational faults on meters

2 the work procedures for the rectification of faults in systems or components which will ensure minimum disruption to customers and routines
   a the persons, including customers, co-workers, other system users, with whom it may be necessary to liaise when carrying out routine service and maintenance on meters

Level 3 Certificate in Domestic Natural Gas Installation and Maintenance

Unit 306 Complex gas activities for pipework

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 306 Complex gas activities for pipework.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:
Knowledge items common to the complex gas activities for the:

- Design
- Specification
- Planning
- Installation
- Commissioning and decommissioning
- Service and maintenance

Of Pipework

Unit 306 contains the following **8 outcomes**
The candidate will be able to:

1 identify customer's requirements
2 design systems to meet customers' needs
3 produce and monitor work programmes
4 plan the work activities to be carried out
5 prepare work locations for the installation of systems and components
6 establish service and maintenance requirements for systems and components
7 establish maintenance requirements for systems and components
8 diagnose the cause and rectify faults in systems and components

Connection with other awards

This gas certificate unit-306 is linked to the NVQ scheme 6012-03 Level 3 Gas Service Installation and Maintenance and the following units:
Unit 001 Design Natural Gas Systems
Unit 002 Specify Programmes for Working on Natural Gas Systems
Unit 003 Plan the Work Activities for Natural Gas Systems and Components
Unit 014 Install Complex Natural Gas Systems and Components – Systems Pipework
Unit 015 Service and Maintain Complex Natural Gas Systems and Components

Unit 306 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	001.1	001.1.1, 1.4	3, 4
2	001.2	001.2.1	1
3	002.1	002.1.3	4
4	003.1	003.1.1, 1.3, 1.4, 1.5	1-5
5	014.1	014.1.1, 1.2	1, 2
6	015.1	015.1.1, 1.4	1-3
7	015.2	015.2.1, 2.2	1, 2
8	015.3	015.3.1, 3.3	1-3

Assessment

The outcomes from this Gas certificate unit 306 will be assessed by multiple choice question papers covering the eight outcomes

Outcome 1
Identify Customer's Requirements

The candidate will be able to describe

1 the range of documentation detailing industry requirements
   a the sources of legislation which govern the design and layout of systems pipework
   b the sources of legislation which govern the types, sizes, and positioning of systems pipework
   c the sources of information which govern the materials used for systems pipework installations
   d the sources of information which govern provisions within the building fabric for systems pipework

2 how to identify possible design options which meet key criteria
   a how to prepare design options which meet the customer's requirements, in terms of performance, type, finish, positioning , cost, of systems pipework
   b how to prepare design options which meet the constraints of the site structure and features in terms of accommodating systems pipework within the building structure
   c how to prepare design options which meet industry requirements, in terms of meeting all legislative requirements, recommendations, installation design, and the requirements of good practice for systems pipework

Outcome 2
Design Systems to meet Customers' needs

The candidate will be able to describe

1 positioning requirements for components within systems and standard system layouts
   a the requirements of legislation or recommendations governing the layout of systems pipework installations
   b the requirements of legislation or recommendations governing the pipe sizes, materials and positions for systems pipework installations

Outcome 3
Produce and Monitor Work Programmes

The candidate will be able to describe

1 how to develop work programmes which meet the requirements of customer and/or main contractor work programmes
   a the importance of being able to identify points within the systems pipework installation programme where attendance of other trades may be necessary

Outcome 4
Plan the Work Activities to be carried out

The candidate will be able to describe

1 the system types and their intended functions: - system components and layouts
   a the Systems Pipework types and sizes to be considered within the planning activity
   b the systems other than gas eg water supply, heating, electrical supply or earth continuity systems that need to be considered when planning for systems pipework installations
   c the functions of the systems pipework that need to be taken account of by the planning activity
   d the layout of systems pipework installations that need to be taken account of by the planning activity
   e how to access records and reports of systems pipework installations to obtain details of the layout of systems

2 the regulations governing system design, installation and operation
   a how to access information on the operation of systems pipework

3 the main construction features of buildings into which the systems are installed
   a the provisions within the building structure that are intended to accommodate systems pipework

4 the sources of information on the design of specific systems – plans and drawings – specifications
   a the sources of information on the installation of systems pipework that are the focus of the planning activity, including plans and drawings, technical information
   b the sources of information on construction activities that will have to be considered during the planning for the installation of systems pipework

5 the installation requirements for systems – installation sequences and routine liaison with others in the overall construction programme
   a the typical systems pipework installation procedures and work sequences
   b the other persons including the customer, householder with whom it would be necessary to liaise during the systems pipework installation process
   c the points within the systems pipework installation process at which liaison with others would be necessary
   d how to ensure that the systems pipework installation work fitted into ongoing construction operations

Outcome 5

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the criteria for carrying out risk assessment on electrical systems
   a the types of electrical system for which risk assessment may need to be carried out
   b how to access the job specification to obtain the information required for the risk assessment
   c how to assess the levels of risk
   d how to present the information in the risk assessment

Outcome 6

Establish Service and Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
   a the range of diagnostic data including charts, and wiring diagrams
   b the importance of ensuring that all diagnostic data is available before job commencement
   how to interpret specifications for the rectification of systems pipework

2 the tools and equipment required for routine maintenance operations.
   a the importance of ensuring that diagnostic equipment is available and of a suitable standard
   b how to use diagnostic tools and equipment
   c the complex diagnostic instrumentation for use on gas, electrical systems and flues

Outcome 7

Establish Maintenance Requirements for Systems and Components

The candidate will be able to describe

1 how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
   a how to set systems pipework controls to ensure appliance/systems efficiency

2 the service and maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine service and maintenance activities
   a how to inspect systems pipework to ensure compliance with industry requirements
   b how to inspect systems pipework and earth continuity wiring

Outcome 8

Diagnose the Cause and Rectify Faults in Systems and Components

The candidate will be able to describe

1 how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
   a how to locate gas and operational faults on systems pipework

2 the work action and sequences required to rectify faults in systems and components
   a how and when to replace systems pipework
   b the work actions, and sequences for rectification of faults on systems pipework

City & Guilds Level 3 Certificate in Emergency Service Operations

Units 501-504

City & Guilds Level 3 Certificate in Emergency Service Operations

Unit 501 Install complex gas systems and components

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 501 Install complex gas systems and components.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:

Knowledge items common to the complex gas activities for the installation of:

- Cookers and laundry appliances
- Central heating and water heating appliances
- Meters
- Systems pipework

Unit 501 contains the following **2 outcomes**
The candidate will be able to:

1 prepare work locations for the installation of systems and components
2 carry out the installation of systems and components

Connection with other awards

This gas certificate unit-501 is linked to the NVQ scheme 6012-04 (ESO) Level 3 Gas Service Installation and Maintenance and the following unit:

Unit 014 Install Complex Natural Gas Systems and Components

Unit 501 Outcome	NVQ Element	NVQ PCs	NVQ Range
1	014.1	014.1.1-1.4, 1.6, 1.9	1, 3, 4, 7-9
2	014.2	014.2.3-2.5	2-41-4

Assessment

The outcomes from this Gas certificate unit 501 will be assessed by multiple choice question papers covering the two outcomes

Outcome 1

Prepare Work Locations for the Installation of Systems and Components

The candidate will be able to describe

1 the sources of information on the preparatory work necessary for the system or component installation
   a interpret complex electrical data, drawings, plans, manufacturers' instructions
   b identify any potential problems with the proposed location of components

2 the criteria for carrying out risk assessment on electrical systems
   a the types of electrical system for which risk assessment may need to be carried out
   b how to access the job specification to obtain the information required for the risk assessment
   c how to assess the levels of risk
   d how to present the information in the risk assessment

3 regulations, recommendations governing safety in the workplace, general responsibilities of the operative for his/her own safety and that of others
   a how to identify the types of asbestos product that may be found in work locations
   b the immediate actions to take if asbestos is found or suspected in the work locations

4 how to protect customer's property or the building fabric prior to the work commencing
   a the importance of reporting details of existing damage to customers' property and keeping records of reports
   b the importance of reporting and recording any building fabric faults or constraints which could impede job progress

5 the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
   a rectify and report as appropriate any damage to tools and equipment

6 how to ensure that the customer is fully briefed on all aspects of the installation programme
   a circumstances in which it would be appropriate to amend specifications
   b how to obtain agreement of the appropriate persons to any variations in the specifications
   c the possible outcomes of the system installation not complying with regulations, recommendations or the requirements of good practice

Outcome 2

Carry out the Installation of Systems and Components

The candidate will be able to describe

1 the positioning and fixing requirements for system components to conform to the system design and intended functions
   a positioning of appliances to conform to legislative requirements and recommendations
   b the positioning of appliances to conform to industry standards and system design requirements
   c how to fix appliances to conform to industry standards and system design requirements, including the fixing of pipework, and controls
   d the methods of making fixings to the range of structural materials

2 the procedures required for connecting to input services or connecting pipework into existing systems
   a how to connect appliances to supply systems using methods that conform to industry requirements, including positioning of control valves
   b how to connect appliances to existing systems pipework using methods that conform to industry requirements
   c how to connect appliances to flues
   d the jointing methods and materials approved for use on connections

City & Guilds Level 3 Certificate in Emergency Service Operations

Unit 502 Contribute to the control, rectification and monitoring of gas emergencies

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 402 Contribute to the control, rectification and monitoring of gas emergencies.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:

Domestic Natural Gas - Internal and external systems which may be in a commissioned or un-commissioned condition, including:

- Cookers and laundry appliances
- Central heating and water heating appliances
- Meters
- Systems pipework
- Internal and external gas supply systems

Unit 502 contains the following **3 outcomes**
The candidate will be able to:

1 respond to reported gas emergencies
2 locate access and secure gas escapes
3 determine and monitor gas escapes

Connection with other awards

This gas certificate unit-502 is linked to the NVQ scheme 6012-04 (ESO) Level 3 Gas Service Installation and Maintenance and the following unit:

Unit 011 Contribute to the control, rectification and monitoring of gas emergencies

Unit 502	NVQ Element	NVQ PCs	NVQ Range
Outcome			
1	011.1	011.1.1-1.3	1-3
2	011.2	0112.1-2.4	1, 2, 4
3	011.3	0113.1-3.4	1-3

Assessment

The outcomes from this Gas certificate unit 402 will be assessed by multiple choice question papers covering the three outcomes

Outcome 1
Respond to reported gas emergencies

The candidate will be able to describe

1 the actions required for forced entries into buildings
   - a typical circumstances when forced entry into a building may be necessary
   - b the importance of warning others in the vicinity of a reported gas escape
   - c the actions to take when a forced entry into a building must be made
   - d advising other appropriate persons that a forced entry is to be made
   - e ensuring that other persons are on standby when a forced entry is proposed
   - f the importance of ensuring the external isolation of gas supplies before making forced entry
   - g the importance of obtaining the relevant information on the type of system and location of gas controls within the building before making forced entry
   - h the importance of evaluating the potential hazards that may arise from forced entry

2 the criteria for forced entries into buildings
   - a the sources of information on the criteria for making forced entry to buildings where gas escape has been reported
   - b the main criteria for making forced entry to buildings
   - c the legal implications of making forced entry to buildings

3 the criteria for evacuation of properties
   - a the sources of information on the criteria for making evacuation of buildings where gas escape has been reported
   - b the main criteria for the evacuation of buildings

4 the actions required for the evacuation of properties
   - a the importance of ensuring that a nominal role or list of building occupants is available
   - b the importance of ensuring that buildings are evacuated by means of designated evacuation routes
   - c the importance of ensuring that persons evacuated assembly at a designated assembly point
   - d the importance of ensuring that the presence of building occupants, at the assembly point, is checked by a responsible person

5 the actions required when attending reports of fires
   - a the sources of information on the actions to take when attending fires
   - b the importance of confirming details of the address/location of the fire
   - c the importance of obtaining relevant information on the system type within the building
   - d the importance of assessing potential hazards and advising appropriate persons
   - e the importance of locating external controls and isolating systems

6 the actions required when attending reports of explosions
   - a the sources of information on the actions to take when attending reported explosions
   - b the importance of confirming details of the address/location of the explosion
   - c the importance of obtaining relevant information on the system type within the building
   - d the importance of reporting to persons in authority as soon as arrival at the site
   - e the importance of assessing potential hazards and advising appropriate persons
   - f the importance of locating external controls and isolating systems

7 the criteria for isolation of electrical appliances switches and main supply
   a the sources of information on the criteria for isolating electrical systems and components
   b the main criteria for isolating electrical systems and components
   c the importance of complying with health and safety legislation when isolating electrical systems and components
   d the importance of ensuring that others comply with health and safety legislation when isolating electrical systems and components

Outcome 2
Locate access and secure gas escapes

The candidate will be able to describe

1 effective methods of leakage detection and use of leakage detection equipment
- a the range of leak detection tools and equipment, and its maintenance requirements
- b the range of personal protective equipment, its correct use and maintenance requirements
- c the importance of reporting any defects or damage to safety equipment
- d the how to visually inspect systems for leaks
- e how to take and interpret gas concentration readings
- f the appropriate locations in which to take gas concentration readings

2 actions to be taken on the site of an incident
- a the importance of correctly identifying the system type, and the location of its components
- b the importance of evaluating any information on the reported gas escape presented by persons in the location
- c the appropriate techniques and procedures for diagnosing the nature or source of the fault
- d the appropriate locations in which to take gas concentration readings
- e how to prioritise actions in accordance with the outcomes of fault diagnosis

3 how to deal effectively with the media
- a circumstances in which there may be interest in gas escapes from the news media
- b methods of responding to media enquiries regarding gas escapes
- c circumstances in which it would be appropriate to refer media enquiries to an authorised representative
- d the advantages of providing a written statement for the media

4 the effects of gas pressure and large volume escapes. Procedures and actions required
- a the procedures to follow and actions to take in the case of large volume escapes
- b the effect of large volume escapes on gas supplies to adjoining premises

5 the procedures and actions for dealing with supply pressure problems
- a the sources of information on procedures and actions for dealing with supply pressure problems
- b the actions to take where there is a supply pressure problem
- c the importance of advising system users when there is a supply pressure problem and of keeping customers advised on progress on the resolution of the problem

Outcome 3
Determine and monitor gas escapes

The candidate will be able to describe

1 the criteria for re-occupation of buildings and site following evacuation
   a the sources of information on the criteria for re-occupation of buildings/sites after evacuation
   b the importance of labelling any systems components or control that have been taken out of service
   c the re-occupation procedures when a gas escape has been found and rectified
   d the re-occupation procedures when a gas escape has not been found

2 the procedures and actions for transfer of responsibilities
   a circumstances in which it may be necessary to monitor a site
   b procedures for monitoring a site
   c the actions to take in respect of the monitoring of adjacent properties
   d the importance of delegating responsibility to an appropriate responsible person
   e the importance of advising building users of the monitoring actions
   f the importance of recording the outcomes of monitoring actions

3 how to prioritise escapes and reports
   a how to evaluate information and reports from site to decide appropriate site actions
   b the priority of site actions for typical gas escape circumstances
   c the site actions priority when a gas escape is found
   d the site actions priority when a gas escape is found
   e the importance of recording findings and actions taken
   f circumstances in which it would be appropriate to refer decisions to higher management

4 procedures for dealing with escapes of gas within industrial and commercial premises
   a the actions to take when a gas escape is reported within industrial or commercial premises
   b the action priority for gas escapes within industrial or commercial premises
   c the importance of liaising with the persons responsible for personnel within industrial or commercial premises

City & Guilds Level 3 Certificate in Emergency Service Operations

Unit 503 Commercial natural gas changeover for gas emergency operations

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 503 Commercial natural gas changeover for gas emergency operations.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:

Commercial Natural Gas - Internal and external commercial natural gas systems

Unit 503 contains the following **3 outcomes**

The candidate will be able to:

1 prepare work locations, materials and tools for the installation of systems and components
2 install systems/components
3 commission system components

Connection with other awards

This gas certificate unit-503 is linked to the NVQ scheme 6012-04 (ESO) Level 3 Gas Service Installation and Maintenance and the following unit:

Unit 013 Commercial natural gas changeover for gas emergency service operations

Unit 503	NVQ Element	NVQ PCs	NVQ Range
Outcome			
1	013.1	013.1.2, 0131.3	2-4
2	013.2	013.2.1	1, 5
3	013.3	013.3.1, 3.5, 3.6	1-3

Assessment

The outcomes from this Gas certificate unit 503 will be assessed by multiple choice question papers covering the three outcomes

Outcome 1

Prepare work locations, materials and tools for the installation of systems and components

The candidate will be able to describe

1 the input services or supplies required for new commercial systems or commercial components, or for extending commercial systems or adding components to existing commercial systems:- how to confirm that input services are adequate
   a methods of identifying the supply requirements of commercial systems or components
   b methods of confirming that the incoming or existing supply meets the requirements of the commercial system or components
   c how to read pressure gauges

2 the methods of installing commercial systems and components to comply with industry requirements
   a how to check that commercial systems materials and components comply with the specification or industry requirements
   b how to check that commercial systems materials and components are correctly fixed to the building fabric
   c how to check that commercial systems components are correctly connected to

Outcome 2
Install systems/components

The candidate will be able to describe

1 the positioning and fixing requirements for commercial system components to conform to the system design and intended functions
   - a layouts of commercial system to conform to legislative requirements and recommendations
   - b the positioning of commercial components to conform to industry standards and system design requirements
   - c how to fix commercial components to conform to industry standards and system design requirements
   - d the methods of making fixings to the range of structural materials
   - e the requirements for locating a vent outlet for direct purging to outside

2 procedures for purging internally into well ventilated areas
   - a the maximum volume of pipework excluding a diaphragm meter that can be purged internally
   - b the minimum size of an internal area into which the purge is to be vented
   - c ventilation requirements
   - d the minimum distance of potential ignition sources to the purge point
   - e requirements for the purge control valve
   - f the concentration of gas permissible in the internal purge area during the purge period

Outcome 3
Commission system components

The candidate will be able to describe

1 the procedures, equipment and legislative requirements for applying soundness tests to commercial systems
   a the industry procedures for applying soundness tests to commercial systems
   b the sequences of actions for carrying out soundness tests on commercial systems
   c the tests and checks to be carried out before testing of commercial systems
   d the equipment required to carry out soundness tests on commercial systems
   e requirements of current legislation on soundness testing of commercial systems
   f how to read gas detection instruments

2 the methods of establishing that input services adequately supply all components within the system
   a how to check that input supply to commercial systems components meet the requirements of the system component or system specification
   b how to check that pressures within commercial systems are correctly set
   c how to check that input supply connections meet the system component or system specification
   d requirements for testing and purging commercial meters only

3 the procedures for establishing correct system or component performance and checking against the design specification
   a the procedures for checking and making adjustments to commercial systems or system component controls to establish correct system performance
   b the procedures for measuring pressure/flow/discharge rates at taps and valves, or at inputs to commercial components

City & Guilds Level 3 Certificate in Emergency Service Operations

Unit 504 Liquefied petroleum gas changeover for gas emergency operations

Introductory notes

This Gas Certificate unit has been designed to assess knowledge competences which are detailed in the Domestic Natural Gas Installation and Maintenance NVQ Standards and linked to Scheme 6012 NVQs in gas.

The assessment content of each Gas Certificate unit is expressed as a number of knowledge outcomes derived from the NVQ Standards, which are cross referenced to the appropriate NVQ unit and element titles, PCs and range.

These knowledge outcomes in this document provide the basis for the assessment specification for this Gas Certificate Unit 404 Liquefied petroleum gas changeover for gas emergency operations.

Rationale and unit content:

This unit covers the following knowledge and understanding areas

The knowledge areas in which the Candidate has to demonstrate competence are:

Commercial Natural Gas - Internal and external commercial natural gas systems

Unit 504 contains the following **2 outcomes**
The candidate will be able to:

1 carry out checks and tests on systems and components
2 commission systems

Connection with other awards

This gas certificate unit-504 is linked to the NVQ scheme 6012-04 (ESO) Level 3 Gas Service Installation and Maintenance and the following unit:

Unit 012 Liquefied petroleum gas changeover for gas emergency service operations

Unit 504	NVQ Element	NVQ PCs	NVQ Range
Outcome			
1	012.1	012.1.1-1.6	1-5
2	012.2	012.2.1	1

Assessment

The outcomes from this Gas certificate unit 504 will be assessed by multiple choice question papers covering the two outcomes

Outcome 1
Carry out checks and tests on systems and components

The candidate will be able to describe

1 correct reading of pressure gauges
   a types of pressure gauge
   b accuracy of readings

2 procedures for locating escapes
   a tests for gas in air concentrations
   b test procedures for locating the sources of leaks in appliances and pipework
   c how to check that commercial systems components are correctly connected to

3 procedures for dealing with a pressure regulator that is letting by
   a reasons for pressure let by
   b procedures to rectify pressure let by

4 types of liquefied petroleum gas (propane, butane)
   a properties/classifications of propane
   b properties/classifications of butane

5 specific gravity of LPG vapour and its effect in relation to air and natural gas
   a relative density of propane
   b relative density of butane
   c effects of leaks in confined spaces

6 vaporisation of LPG liquid and take-off – effects of temperature
   a vaporisation of propane
   b vaporisation of butane
   c effects of a rise/drop in temperature on vaporisation point

7 calorific value of liquefied petroleum gas and its relationship to natural gas
   a calorific value of propane
   b calorific value of butane
   c relationship of calorific values compared with natural gas

8 limits of flammability and its relationship to natural gas
   a limits of flammability of propane
   b limits of flammability of butane
   c relationship of flammability levels to that of natural gas

Outcome 2
Commission systems

The candidate will be able to describe

1 the action to deal with gas leakage with fire
   a depending on the cylinder location
   b safety/fire precautions to be observed with cylinders and gas storage vessels

2 the action to take to deal with gas leakage without fire
   a safe operation of electrical switches and other electrical components in flammable atmosphere
   b specific gravity and its effect in relation to air eg search techniques
   c other hazardous ignition sources and their elimination
   d effective methods of preventing/reducing dangerous concentrations of gas in atmosphere
   e effective methods of preventing/reducing dangerous concentrations of gas at low level

3 identifying and operating emergency controls and gas storage vessel shut off valves
   a (To be added)

4 advice to occupants
   b (To be added)

5 the gas safety (installation and use) regulations
   a HSC approved codes of practice and guidance