

# Level 3 Diploma in Air Conditioning Energy Assessment (6361-[06]) and Level 4 Diploma in Air Conditioning Energy Assessment (6361-[07])

July 2013 Version 1.2



## Qualification at a glance

<b>Subject area</b>	<b>Energy Assessment</b>
<b>City &amp; Guilds number</b>	6361
<b>Age group approved</b>	18+
<b>Assessment</b>	Evolve multiple choice online test and portfolio of evidence
<b>Fast track</b>	Available
<b>Support materials</b>	Centre handbook Candidate logbook
<b>Registration and certification</b>	Consult the Walled Garden/Online Catalogue for last dates

<b>Title and level</b>	<b>City &amp; Guilds number</b>	<b>Accreditation number</b>
Level 3 Diploma in Air Conditioning Energy Assessment	6361-06	600/7008/0
Level 4 Diploma in Air Conditioning Energy Assessment	6361-07	600/6879/6

<b>Version and date</b>	<b>Change detail</b>	<b>Section</b>
Version 1.1 June 2013	Amended approval to remove fast track approval paragraph	Approval Section 2
	Updated requirements for Assessors and IQA's	Assessment Section 3
Version 1.2 July 2013	Amended age group approved to 18+	Qualification at a glance and Age restrictions under Section 2



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# 1 Introduction

This document tells you what you need to do to deliver the qualifications:

<b>Area</b>	<b>Description</b>
Who are the qualifications for?	Candidates who wish to become qualified and accredited Air-Conditioning Inspector.
What do the qualifications cover?	The skills and knowledge required to undertake inspections of air-conditioning systems, including the relevant software skills to produce the inspection report. Knowledge is learnt in the classroom, and the course also contains site work.
Are the qualifications part of a framework or initiative?	<p>The inspection and maintenance of air-conditioning systems is a statutory obligation for building owners and managers, under the Energy Performance of Buildings Directive.</p> <p>The qualifications are not currently part of an apprenticeship framework.</p>
What opportunities for progression are there?	<p>Learners may wish to progress from the Level 3 to the Level 4 Air-Conditioning Energy Assessment. Candidates may wish to consider various Refrigeration and Air-Conditioning qualifications, such as:</p> <ul style="list-style-type: none"> <li>• Level 2 NVQ Diploma in Installing and Maintaining Refrigeration Systems</li> <li>• Level 2 NVQ Diploma in Installing, Testing and Maintaining Air Conditioning and Heat Pump Systems</li> <li>• Level 3 NVQ Certificate in Installing and Commissioning Air Conditioning and Heat Pump Systems</li> <li>• Level 3 NVQ Certificate in Servicing and Maintaining Air Conditioning and Heat Pump Systems</li> <li>• Level 3 NVQ Certificate in Installing and Commissioning Refrigeration Systems</li> <li>• Level 3 NVQ Diploma in Servicing and Maintaining Refrigeration Systems.</li> </ul>

## Structure

To achieve the **Level 3 Diploma in Air Conditioning Energy Assessment 6361-06**, learners must achieve **37** credits from the mandatory units.

To achieve the **Level 4 Diploma in Air Conditioning Energy Assessment 6361-07**, learners must achieve **73** credits from the mandatory units.

<b>Level 3 Diploma in Air Conditioning Energy Assessment</b>			
<b>Unit accreditation number</b>	<b>City &amp; Guilds unit number</b>	<b>Unit title</b>	<b>Credit value</b>
<b>Mandatory</b>			
R/601/5969	315	Prepare for energy assessments of air conditioning systems	6
H/601/5975	316	Demonstrate understanding of simple/ packaged air conditioning system inspections	8
T/601/5978	317	Inspect simple/ packaged air conditioning systems	10
F/601/5997	318	Provide a report on the energy performance of simple/packaged air conditioning systems	7
H/503/8162	331	Conduct energy assessments in a safe, effective and professional manner	6

<b>Level 4 Diploma in Air Conditioning Energy Assessment</b>			
<b>Unit accreditation number</b>	<b>City &amp; Guilds unit number</b>	<b>Unit title</b>	<b>Credit value</b>
<b>Mandatory</b>			
R/601/5969	315	Prepare for energy assessments of air conditioning systems	6
H/503/8162	331	Conduct energy assessments in a safe, effective and professional manner	6
T/601/6001	407	Provide a report on the energy performance of simple/package and complex/central air conditioning systems	10
R/502/9232	408	Demonstrate understanding of simple/package and complex/central air conditioning system inspections	23
Y/502/9233	409	Inspect simple/package and complex/central air conditioning systems	28



## 2 Centre requirements

### Approval

Centres not yet approved by City & Guilds to offer qualifications are required to complete both the Centre Approval Process and the Qualification Approval Process.

Please refer to our *Centre Manual - Supporting Customer Excellence* documents for further information, and for guidance on administration and quality assurance.

### Resource requirements

#### Physical resources and site agreements

Learners are required to be trained in using appropriate and recognised inspection software. Centres are required to provide access to this software, and as such may have to enter into an agreement with an Accrediting Body.

Centres may also wish to work with local businesses to provide learners access to air-conditioning systems for the practical elements of the course.

#### Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be technically competent in the area for which they are delivering training and/or have experience of providing training. This knowledge must be at least to the same level as the training being delivered.
- be occupationally knowledgeable in the area for which they are delivering training, including up-to-date knowledge of the energy assessment industry, its settings, legislative and regulatory requirements, codes of practice and guidance.

Centre staff may undertake more than one role, eg a tutor and assessor or internal quality assurer, but they must never internally quality assure their own assessments.

#### Assessors and Internal Quality Assurer

Centre staff should hold, or be working towards, the relevant Assessor/Internal Quality Assurer TAQA qualifications for their role in delivering, assessing and verifying these qualifications, or meet the relevant experience requirements outlined above.

Assessors should have appropriate occupational expertise relevant to property inspection and the production of EPCs. It is recommended that assessors:

- hold the relevant Diploma in Air Conditioning Energy Assessment, or an equivalent qualification, or APEL option as recognised by relevant industry Accrediting Body
- be able to demonstrate Continuing Professional Development in the area of Air-Conditioning Energy Assessment.

### **Continuing professional development (CPD)**

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

### **Candidate entry requirements**

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

### **Age restrictions**

City & Guilds cannot accept any registrations for candidates under 18 as these qualifications are not approved for under 18s.





## 3 Delivering the qualification

### Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs
- support and guidance they may need when working towards their qualifications
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualifications, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

### Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, **Learning Assistant**, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: [www.cityandguilds.com/eportfolios](http://www.cityandguilds.com/eportfolios).



## 4 Assessment

### **Assessment of the qualification**

For the Level 3 Certificate in Air Conditioning Energy Assessment (6361-06) candidates must:

- successfully complete the online multiple choice test for units 316.
- have a completed portfolio of evidence for units 315, 317, 318 and 331.

For the Level 4 Diploma in Air Conditioning Energy Assessment (6361-07) candidates must:

- successfully complete the online multiple choice test for units 408.
- have a completed portfolio of evidence for units 315, 331, 407 and 409.

City & Guilds has written the following assessments to use with this qualification:

- online multiple choice tests, using e-volve.

## Level 3 Diploma in Air Conditioning Energy Assessment

Unit Number	Unit Title	Assessment method	Where to obtain assessment materials
315	Prepare for energy assessments of air conditioning systems (Level 3) (6)	Portfolio	<p>The logbook for this unit is available to download from the City &amp; Guilds website <b><a href="http://www.cityandguilds.com">www.cityandguilds.com</a></b></p> <p>Please navigate to the 6361 general website page where this logbook can be found under centre documents.</p>
316	Demonstrate understanding of simple/package air conditioning system inspections (Level 3) (8)	Evolve test	City & Guilds Evolve test system
317	Inspect simple/package air conditioning systems (Level 3) (10)	Portfolio	<p>The logbook for this unit is available to download from the City &amp; Guilds website <b><a href="http://www.cityandguilds.com">www.cityandguilds.com</a></b></p> <p>Please navigate to the 6361 general website page where this logbook can be found under centre documents.</p>
318	Provide a report on the energy performance of simple/package air conditioning systems (Level 3) (7)	Portfolio	<p>The logbook for this unit is available to download from the City &amp; Guilds website <b><a href="http://www.cityandguilds.com">www.cityandguilds.com</a></b></p> <p>Please navigate to the 6361 general website page where this logbook can be found under centre documents.</p>

331	Conduct energy assessments in a safe, effective and professional manner (Level 3) (6)	Portfolio	The logbook for this unit is available to download from the City & Guilds website <b>www.cityandguilds.com</b>  Please navigate to the 6361 general website page where this logbook can be found under centre documents.
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<b>Level 4 Diploma in Air Conditioning Energy Assessment</b>			
<b>Unit Number</b>	<b>Unit Title</b>	<b>Assessment method</b>	<b>Where to obtain assessment materials</b>
315	Prepare for energy assessments of air conditioning systems (Level 3) (6)	Portfolio	The logbook for this unit is available to download from the City & Guilds website <b>www.cityandguilds.com</b>  Please navigate to the 6361 general website page where this logbook can be found under centre documents.
331	Conduct energy assessments in a safe, effective and professional manner (Level 3) (6)	Portfolio	The logbook for this unit is available to download from the City & Guilds website <b>www.cityandguilds.com</b>  Please navigate to the 6361 general website page where this logbook can be found under centre documents.
407	Provide a report on the energy performance of simple/package and complex/central air conditioning systems (Level 4) (10)	Portfolio	The logbook for this unit is available to download from the City & Guilds website <b>www.cityandguilds.com</b>  Please navigate to the 6361 general website page where this logbook can be found under centre documents.

408	Demonstrate understanding of simple/packageged and complex/central air conditioning system inspections (Level 4) (23)	Evolve test	City & Guilds Evolve test system
409	Inspect simple/packageged and complex/central air conditioning systems (Level 4) (28)	Portfolio	The logbook for this unit is available to download from the City & Guilds website <b>www.cityandguilds.com</b>  Please navigate to the 6361 general website page where this logbook can be found under centre documents.

### Test specifications

The way the knowledge is covered by each test is laid out in the tables below:

**Test 1:** Unit 316 Level 3 Demonstrate understanding of simple/packageged air conditioning system inspections

**Duration:** 1 hour

Unit	Outcome	Number of questions	%
316	1 Know the operations and features of simple/packageged air conditioning systems	22	55
	2 Know the relevant information relating to the energy performance of simple/packageged air conditioning systems	10	25
	3 Know the methods, techniques and equipment required for the inspection of simple/packageged air conditioning systems	8	20
<b>Total</b>		<b>40</b>	<b>100</b>

**Test 2:** Unit 408 Level 4 Demonstrate understanding of simple/package and complex/central air conditioning system inspections

**Duration:** 90 minutes

<b>Unit</b>	<b>Outcome</b>	<b>Number of questions</b>	<b>%</b>
408	1 Know the operations and features of complex/central air conditioning systems	22	55
	2 Know the relevant information relating to the energy performance of complex/central air conditioning systems	10	25
	3 Know the methods, techniques and equipment required for the inspection of complex/central air conditioning systems	8	20
	<b>Total</b>	<b>40</b>	<b>100</b>



## 5 Units

### Availability of units

The following units can also be obtained from The Register of Regulated Qualifications: <http://register.ofqual.gov.uk/Unit>

### Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number
- title
- level
- credit value
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

## Unit 315

## Prepare for energy assessments of air conditioning systems

<b>UAN:</b>	R/601/5969
<b>Level:</b>	Level 3
<b>Credit value:</b>	6
<b>GLH:</b>	25
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. know the information and techniques required to prepare an energy assessment.
<b>Assessment criteria</b>
The learner can: 1.1 describe the relevant records kept on air conditioning systems 1.2 explain current guidance relating to <ul style="list-style-type: none"><li>• building log books</li><li>• operations and maintenance manuals</li><li>• health and safety files</li><li>• relevant statutory compliant records</li></ul> 1.3 identify the techniques and methods required for the energy assessment 1.4 describe the health and safety procedures relating to air conditioning 1.5 describe site specific operating procedures.



**Learning outcome**

The learner will:

2. clarify the requirements for an energy assessment.

**Assessment criteria**

The learner can:

- 2.1 explain to the client the purpose of an energy assessment and the processes involved
- 2.2 explain to the client what the outcomes of the energy assessment will be and the purpose and structure of the report provided
- 2.3 obtain the relevant and appropriate information required prior to conducting an inspection
- 2.4 determine whether the system to be inspected is a simple/package or complex/central system.

**Learning outcome**

The learner will:

3. develop and agree a method for the inspection with the client.

**Assessment criteria**

The learner can:

- 3.1 identify the air conditioning system/s to be inspected and the requirements for appropriate sampling
- 3.2 clarify the observations to be conducted and gain approval from the client
- 3.3 estimate how long the inspection will take
- 3.4 develop a risk assessment based on documentation and research of the site and surrounding areas
- 3.5 provide the client with a detailed method statement for the inspection.

**Learning outcome**

The learner will:

4. prepare and agree a clear and comprehensive scope of works with the client.

**Assessment criteria**

The learner can:

- 4.1 explain to the client the purpose and format of a scope of works including proposed budgetary arrangements
- 4.2 confirm the date, time and location of the on-site inspection and any specific arrangements that apply to the energy assessment including
  - gaining access
  - system specific safety and operating procedures
  - non-invasive and non-hazardous techniques
- 4.3 agree communication channels for the on-site inspection including who to contact in the event of queries
- 4.4 explain the techniques that will be used to conduct the inspection
- 4.5 identify any circumstances that prevent a full energy assessment taking place including
  - systems beyond level of competence
  - difficulty in gaining access
  - conflicts of interest
  - health and safety issues
- 4.6 explain to the client clearly and politely any reasons why the inspection cannot take place
- 4.7 explain to the client any circumstances where assumptions may be made that are not supported by evidence.

## Unit 316

## Demonstrate understanding of simple/package air conditioning system inspections

<b>UAN:</b>	H/601/5975
<b>Level:</b>	Level 3
<b>Credit value:</b>	8
<b>GLH:</b>	30
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. know the operations and features of simple/package air conditioning systems.
<b>Assessment criteria</b>
The learner can: 1.1 explain the regulations, standards, and guidance that apply to the assessment of air conditioning systems 1.2 explain the key principles and theory of how a simple/package air condition system works 1.3 explain the components and controls of air conditioning systems and their interrelationship 1.4 describe the impact of changes in building usage over time 1.5 explain how to identify the type, features and location of air conditioning systems 1.6 describe the design and operation of different types and sizes of simple/package air conditioning systems 1.7 explain the system set points and how to check if they are within manufacturers limits and design intent 1.8 explain the factors that may affect air conditioning systems and their efficiency 1.9 explain the potential impact of phasing out ozone depleting refrigerants.

<b>Learning outcome</b>
The learner will: 2. know the relevant information relating to the energy performance of simple/package air conditioning systems.
<b>Assessment criteria</b>
The learner can: 2.1 describe the types of information available relating to the air conditioning system installed 2.2 explain which information is relevant to the pre-inspection review and to the energy performance of the air conditioning system 2.3 interpret building drawings to understand the configuration of the system and the impact of any variations to it on energy performance 2.4 identify from information factors which may affect the energy assessment 2.5 explain how to assess the frequency and scope of maintenance to the system and equipment 2.6 describe how to collate the information required for the assessment 2.7 describe the information and advice to give clients about the energy performance of systems 2.8 clarify the appropriate action when information is not forthcoming, is incomplete or inaccurate.

<b>Learning outcome</b>
The learner will: 3. know the methods, techniques and equipment required for the inspection of simple/package air conditioning systems.
<b>Assessment criteria</b>
The learner can: 3.1 describe how to identify refrigerant leakage and the importance of notifying the relevant persons immediately 3.2 explain how to record findings resulting from the inspection 3.3 describe the equipment and resources needed for the inspection 3.4 define non-invasive and non-hazardous techniques and associated safety precautions 3.5 explain how to carry out the specific non-invasive and non-hazardous techniques included in the scope of works 3.6 describe the further investigations that can be made to address inconsistencies with existing evidence and expected findings 3.7 describe the potential conflicts of interest that may arise during an inspection.

## Unit 317

## Inspect simple/package air conditioning systems

<b>UAN:</b>	T/601/5978
<b>Level:</b>	Level 3
<b>Credit value:</b>	10
<b>GLH:</b>	35
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. conduct the inspection following current best practice.
<b>Assessment criteria</b>
The learner can: 1.1 make contact with people present at the property before starting the inspection 1.2 describe the equipment and resources needed for the inspection and make sure these are to hand 1.3 use test equipment in line with manufacturers' instructions 1.4 explain to the client circumstances that prevent the inspection from continuing 1.5 record all evidence supporting the assumptions and decisions made during the inspection 1.6 carry out the specific, non-invasive and non-hazardous techniques included in the scope of works 1.7 make observations and measurements to provide data for the assessment of the energy performance of the system where applicable 1.8 use appropriate methods and techniques to identify faults in the system 1.9 make further investigations to address inconsistencies with existing evidence and expected findings 1.10 provide advice and refer clients to sources of information on energy performance 1.11 explain to the client instances of inadequate maintenance or neglect which may have implications for health and safety, including <ul style="list-style-type: none"><li>• legionella</li><li>• refrigerant leakage</li></ul> 1.12 deal with potential conflicts of interest that may arise during the inspection.

<b>Learning outcome</b>
The learner will: 2. obtain information relating to the energy performance of simple/package air conditioning systems.
<b>Assessment criteria</b>
The learner can: 2.1 interpret building drawings, documents and records and evaluate their impact on energy performance 2.2 identify the installed equipment, controls, and characteristics of the building 2.3 record evidence of regular inspection and maintenance 2.4 assess the frequency and scope of maintenance to the system and equipment 2.5 make comparisons between cooling loads and installed cooling capacity in accordance with relevant good practice and guidance 2.6 explain to the client problems arising from investigations that prevent assessment of the energy performance of the system 2.7 advise the client when investigations reveal routine servicing and maintenance is not being undertaken.

<b>Learning outcome</b>
The learner will: 3. locate and inspect outdoor units.
<b>Assessment criteria</b>
The learner can: 3.1 record the general state of the equipment and the space immediately around it 3.2 examine the heat exchanger surfaces to ensure they are free from debris 3.3 perform checks to ensure there is adequate airflow to and from the equipment.

<b>Learning outcome</b>
The learner will: 4. locate and inspect indoor units within treated areas.
<b>Assessment criteria</b>
The learner can: 4.1 examine heat exchangers for damage and blockages 4.2 perform checks on air filters for compliance with manufacturers' requirements 4.3 check facilities manager's complaints log for evidence of complaints linked to ventilation problems 4.4 perform checks on the fan coil unit to ensure it complies with design conditions.

**Learning outcome**

The learner will:

5. locate and examine cooling unit and heating system controls and temperature sensors.

**Assessment criteria**

The learner can:

- 5.1 assess the appropriateness of cooling sensor positioning
- 5.2 examine control timers and whether they can be manually overridden
- 5.3 make accurate records of:
  - date and time settings
  - on and off periods
  - the set temperatures for heating and cooling in each zone
  - the means of inhibiting the simultaneous operation of the heating and cooling equipment in the same location
  - control arrangements for cooling units installed in spaces with opening windows
- 5.4 assess the suitability of control timers and the set periods in use
- 5.5 assess the suitability of set temperatures
- 5.6 determine the type and age of the cooling units
- 5.7 assess the indoor and outdoor units for the likely efficiency of the system compared to current good practice.

## Unit 318

## Provide a report on the energy performance of simple/package air conditioning systems

<b>UAN:</b>	F/601/5997
<b>Level:</b>	Level 3
<b>Credit value:</b>	7
<b>GLH:</b>	25
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. prepare the structure and content of the report.
<b>Assessment criteria</b>
The learner can: 1.1 identify the required format and content of the report as defined in current guidance 1.2 collate information from the onsite inspection and other relevant and reliable sources including <ul style="list-style-type: none"><li>• details of the location and the property owner/manager</li><li>• inspector's name, affiliation and status and date of the inspection</li><li>• details of systems inspected</li><li>• inventory of equipment inspected</li><li>• details of the results of the inspection.</li></ul>



<b>Learning outcome</b>
The learner will: 2. develop recommendations for the report.
<b>Assessment criteria</b>
The learner can: 2.1 explain the importance of providing clear, concise and easy to understand recommendations to clients 2.2 identify information from the inspection which is relevant for the recommendations 2.3 create recommendations that improve the performance of simple/package air conditioning systems including <ul style="list-style-type: none"> <li>• alternative solutions for improving efficiency</li> <li>• alternative cooling techniques</li> </ul> 2.4 provide recommendations in a clear, concise and easy to understand way.

<b>Learning outcome</b>
The learner will: 3. develop the report.
<b>Assessment criteria</b>
The learner can: 3.1 develop a summary of findings 3.2 review the recommendations and insert into the report 3.3 provide advice on sources of good practice publications and funding to support further investigations and improvements in efficiency 3.4 check the report is clear, complete and easy to understand 3.5 check the report meets the relevant codes of practice and standards.

<b>Learning outcome</b>
The learner will: 4. issue the report and clarify any areas as required by the client.
<b>Assessment criteria</b>
The learner can: 4.1 issue the report to the client and explain the recommendations and their implications 4.2 respond to queries about the report within their limits of authority.

## Unit 331

## Conduct energy assessments in a safe, effective and professional manner

<b>UAN:</b>	H/503/8162
<b>Level:</b>	Level 3
<b>Credit value:</b>	6
<b>GLH:</b>	30
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. understand the health and safety requirements when undertaking energy assessments.
<b>Assessment criteria</b>
The learner can: 1.1 explain the relevant legal duties for health, safety and security in the workplace 1.2 identify the health, safety and security risks that could exist in different locations, and the action to take to minimise or mitigate risks 1.3 identify the risks to self which are associated with lone working 1.4 explain why it is important to remain alert to the presence of risks in the workplace 1.5 explain the importance of personal conduct in maintaining the health, safety and security of yourself or others 1.6 explain how to make use of relevant suppliers and manufacturers' instructions for the safe use of equipment, materials and products 1.7 explain who should be informed of any conflicts between different health, safety and security requirements 1.8 describe the procedures for different types of emergency 1.9 identify the types of suggestions for improving health, safety and security at work that could be made and who should be given them 1.10 identify the actions that may be taken to protect customers' property.

<b>Learning outcome</b>
The learner will: 2. understand the legislation, codes of conduct and compliance requirements in relation to energy assessment.
<b>Assessment criteria</b>
The learner can: 2.1 explain why it is important to promote goodwill and trust when working with others and ways in which this can be achieved 2.2 explain how to identify the information you require and the potential sources of such information 2.3 describe how to respond to enquiries from others and how to clarify their information needs 2.4 explain how to respond to enquiries which are outside your authority, beyond your area of knowledge or expertise or where the information requested is confidential 2.5 define the extent and limits for your own competence and expertise and the importance of not working beyond these limits 2.6 describe the ways in which disputes or differences of opinion should be handled and resolved to minimise offence and maintain respect 2.7 describe the formal complaints procedure that covers your work in terms of: <ul style="list-style-type: none"> <li>• any specific organisational requirements with regard to complaints</li> <li>• your own responsibility to deal with complaints and attempt to resolve them before escalating to the Accreditation Body, or the equivalent in the Devolved Administrations</li> </ul> 2.8 identify the range of potential conflicts of interest that you may encounter and the action required to manage these 2.9 explain why it is important to present a positive personal and professional image when dealing with people and how this can be achieved 2.10 describe the ways in which you may develop yourself within your role to cover your development needs 2.11 define the level of service expected by customers, their expectations as to the outcomes of the energy assessment or advice process and how to deliver an appropriate level of customer service 2.12 explain the need for prompt responses to enquiries.

<b>Learning outcome</b>
The learner will: 3. understand the legislation, codes of conduct and compliance requirements in relation to energy assessment.
<b>Assessment criteria</b>
The learner can: 3.1 describe the relevant policies and legislation on combating climate change and the reduction of carbon emissions from buildings 3.2 Describe the relevant legislation covering: <ul style="list-style-type: none"> <li>· the energy performance of buildings</li> <li>· compliance with safe working practices</li> <li>· the relevant regulations in the Devolved Administrations</li> <li>· where appropriate relevant legislation on the use of refrigerants</li> </ul> 3.3 describe the relevant official guidance and conventions relating to the assessment of energy performance 3.4 describe your specific responsibilities under prescribed codes of conduct and ethical standards 3.5 describe why it is important to comply with mandatory and advisory codes of practice 3.6 describe the specific auditing or monitoring requirements that relate to your registration with your accreditation organisation(s), or the equivalent in the Devolved Administrations and your responsibilities in complying with these 3.7 describe the framework under which Accreditation Bodies, or the equivalent in the Devolved Administrations, are required to operate, including their Scheme Operating Requirements or equivalent in the Devolved Administrations 3.8 explain the importance of obtaining and maintaining appropriate professional indemnity insurance (PII) cover, either through your own business or your employer and the extent and limitations of this type of cover.

<b>Learning outcome</b>
The learner will: 4. be able to comply with organisational and legal requirements at all times.
<b>Assessment criteria</b>
The learner can: 4.1 carry out work in accordance with the relevant legal requirements, legislation and advisory and mandatory codes of practice 4.2 carry out work in accordance with the auditing and monitoring requirements of the relevant accreditation or certification organisation/s 4.3 record customer contact information in accordance with organisational and legal requirements such as the Data Protection legislation 4.4 identify and maintain appropriate evidence to record to support your decisions and assumptions made when carrying out energy assessments 4.5 identify the evidence requirements defined in Scheme Operating Requirements, or their equivalent in the Devolved Administrations.

<b>Learning outcome</b>
The learner will: 5. be able to maintain health, safety and security at work.
<b>Assessment criteria</b>
The learner can: 5.1 take action to mitigate health, safety and security risks 5.2 ensure personal conduct does not endanger the health, safety and security of self and other people 5.3 take action to ensure the protection of client's property and buildings 5.4 adhere to workplace policies and suppliers' or manufacturers' instructions for the safe use of equipment, personal protective equipment (PPE), materials and products 5.5 identify procedures for different types of emergency and implement them 5.6 make recommendations for improving health, safety and security in the workplace to the relevant person/s.

<b>Learning outcome</b>
The learner will: 6. be able to develop and maintain effective working relationships with colleagues, professionals, clients and others.
<b>Assessment criteria</b>
The learner can: 6.1 develop and maintain productive working relationships with others 6.2 request information from colleagues,  professionals, clients and others in a polite, clear and professional manner 6.3 identify and make use of further sources of information/help 6.4 deal with enquiries from colleagues, professionals,  clients and others and seek clarification where necessary 6.5 Handle enquiries which: <ul style="list-style-type: none"> <li>· are outside own authority</li> <li>· are beyond own area of knowledge or expertise</li> <li>· involve confidential information</li> </ul> 6.6 handle and resolve disputes and/or differences of opinion 6.7 adhere to the formal complaints procedure when dealing with a complaint.

<b>Learning outcome</b>
The learner will: 7. be able to conduct energy assessments in a professional manner.
<b>Assessment criteria</b>
The learner can: 7.1 deal with colleagues, professionals, clients and others in a tactful, courteous and equitable manner 7.2 carry out work in accordance with prescribed codes of conduct, ethical standards and recognised good practice 7.3 record all evidence supporting the assumptions and decisions made during the assessment 7.4 demonstrate effective management of work activities and personal and professional development 7.5 respond appropriately to pressure from any person/s which may affect own judgment 7.6 demonstrate delivery of the appropriate level of customer service 7.7 assess customer expectations as to the outcomes of the energy assessment or advice process.

## Unit 407

## Provide a report on the energy performance of simple/packaged and complex/central air conditioning systems

<b>UAN:</b>	T/601/6001
<b>Level:</b>	Level 4
<b>Credit value:</b>	10
<b>GLH:</b>	35
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. prepare the structure and content of the report.
<b>Assessment criteria</b>
The learner can: 1.1 clarify the required format and content of the report as defined in current guidance 1.2 collate information from the onsite inspection and other relevant and reliable sources including <ul style="list-style-type: none"><li>· details of the location and the property owner/manager</li><li>· inspector's name, affiliation and status and date of the inspection</li><li>· details of systems inspected</li><li>· inventory of equipment inspected</li><li>· details of the results of the inspection.</li></ul>

<b>Learning outcome</b>
The learner will: 2. develop recommendations for the report.
<b>Assessment criteria</b>
The learner can: 2.1 summarise the importance of providing clear, concise and easy to understand recommendations to clients 2.2 demonstrate how to report complex information in a clear, concise and easy to understand way 2.3 differentiate between simple/package and complex/central air conditioning systems in the report 2.4 analyse information from the inspection which is relevant for the recommendations 2.5 synthesise inspection information for recommendations that improve the performance of simple/package and complex/central air conditioning systems, including <ul style="list-style-type: none"> <li>• alternative solutions for improving efficiency</li> <li>• alternative cooling techniques</li> </ul> 2.6 provide recommendations in a clear, concise and easy to understand way.

<b>Learning outcome</b>
The learner will: 3. develop the report.
<b>Assessment criteria</b>
The learner can: 3.1 develop a summary of findings 3.2 evaluate the recommendations and insert into the report 3.3 provide advice on sources of good practice publications and funding to support further investigations and improvements in efficiency 3.4 check the report is clear, complete and easy to understand 3.5 check complex information included in the report is clear, concise and easy to understand 3.6 check the report meets the relevant codes of practice and standards.

<b>Learning outcome</b>
The learner will: 4. issue the report and clarify any areas as required by the client.
<b>Assessment criteria</b>
The learner can: 4.1 issue the report to the client and summarise the recommendations and their implications 4.2 respond to queries about the report within their limits of authority.



# Unit 408 Demonstrate understanding of simple/package and complex/central air conditioning system inspections

<b>UAN:</b>	R/502/9232
<b>Level:</b>	Level 4
<b>Credit value:</b>	23
<b>GLH:</b>	60
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. know the operations and features of complex/central air conditioning systems.
<b>Assessment criteria</b>
The learner can: 1.1 summarise the regulations, standards and guidance that apply to the assessment of air conditioning systems 1.2 summarise the key principles and theory of how a complex/central air conditioning system works 1.3 explain the components and controls of air conditioning systems and their interrelationship 1.4 evaluate the impact of changes in building usage over time 1.5 summarise how to identify the type, features and location of air conditioning systems 1.6 summarise the design and operation of different types of complex/central air conditioning systems 1.7 clarify the system set points and how to check if they are within manufacturer's limits and design intent 1.8 analyse the factors that may affect air conditioning systems and their efficiency 1.9 evaluate the potential impact of phasing out ozone depleting refrigerants.

<b>Learning outcome</b>
The learner will: 2. know the relevant information relating to the energy performance of complex/central air conditioning systems.
<b>Assessment criteria</b>
The learner can: 2.1 clarify the types of information available relating to the air conditioning system installed 2.2 evaluate which information is relevant <ul style="list-style-type: none"> <li>· to the pre-inspection review</li> <li>· to the energy performance of the air conditioning system</li> </ul> 2.3 interpret building drawings to understand the configuration of the system and the impact of any variations to it on energy performance 2.4 analyse information for factors which may affect the energy assessment 2.5 explain how to assess the frequency and scope of maintenance to the system and equipment 2.6 summarise how to collate the information required for the assessment 2.7 evaluate the information and advice to give to clients about the energy performance of systems 2.8 clarify the appropriate action when information is not forthcoming, is incomplete or inaccurate.

<b>Learning outcome</b>
The learner will: 3. know the methods, techniques and equipment required for the inspection of complex/central air conditioning systems.
<b>Assessment criteria</b>
The learner can: 3.1 summarise how to identify refrigerant leakage and the importance of notifying the relevant person/s immediately 3.2 summarise how to record findings resulting from the inspection 3.3 clarify the equipment and resources needed for the inspection 3.4 define non-invasive and non-hazardous techniques and associated safety precautions 3.5 explain how to carry out the specific non-invasive and non-hazardous techniques included in the scope of works 3.6 evaluate the further investigations that can be made to address inconsistencies with existing evidence and expected findings 3.7 clarify the potential conflicts of interest that may arise during an inspection.

## Unit 409

## Inspect simple/package and complex/central air conditioning systems

<b>UAN:</b>	Y/502/9233
<b>Level:</b>	Level 4
<b>Credit value:</b>	28
<b>GLH:</b>	70
<b>Endorsement by a sector or regulatory body:</b>	This unit is endorsed by Asset Skills

<b>Learning outcome</b>
The learner will: 1. conduct the inspection following current best practice.
<b>Assessment criteria</b>
The learner can: 1.1 make contact with people present at the property before starting the inspection 1.2 clarify the equipment and resources needed for the inspection and make sure these are to hand 1.3 use test equipment in line with manufacturers' instructions 1.4 clarify with the client circumstances that prevent the inspection from continuing 1.5 record all evidence supporting the assumptions and decisions made during the inspection 1.6 perform the specific, non-invasive and non-hazardous techniques included in the scope of works 1.7 make observations and measurements to provide data for the assessment of the energy performance of the system where applicable 1.8 perform appropriate methods and techniques to identify faults in the system 1.9 evaluate the need for further investigations if observations are inconsistent with existing evidence and expected findings 1.10 provide advice and refer clients to sources of information on energy performance 1.11 explain to the client instances of inadequate maintenance or neglect which may have implications for health and safety, including <ul style="list-style-type: none"><li>• legionella</li><li>• refrigerant leakage</li></ul> 1.12 manage potential conflicts of interest that may arise during the inspection.

<b>Learning outcome</b>
The learner will: 2. obtain information relating to the energy performance of complex/central air conditioning systems.
<b>Assessment criteria</b>
The learner can: 2.1 analyse building drawings, documents and records and evaluate their impact on energy performance 2.2 identify the installed equipment, controls, and characteristics of the building 2.3 make accurate recordings of <ul style="list-style-type: none"> <li>• evidence of regular inspection and maintenance</li> <li>• the frequency and scope of maintenance to the system and equipment</li> </ul> 2.4 make critical comparisons between cooling loads and installed cooling capacity in accordance with relevant good practice and guidance 2.5 clarify with the client problems arising from investigations that prevent assessment of the energy performance of the system 2.6 estimate the fan power of air movement systems 2.7 advise the client when investigations reveal routine servicing and maintenance is not being undertaken.

<b>Learning outcome</b>
The learner will: 3. locate and inspect refrigeration equipment.
<b>Assessment criteria</b>
The learner can: 3.1 locate refrigerant compressors and confirm if they can be operated 3.2 make accurate recordings of <ul style="list-style-type: none"> <li>• the state of the refrigerant equipment and the space immediately around it</li> <li>• state of refrigerant and symptoms of plant problems</li> </ul> 3.3 perform checks for <ul style="list-style-type: none"> <li>• condenser blockage to ensure adequate water flow rates through the condensers and evaporators</li> <li>• water pressure drops across the condensers and evaporators.</li> </ul>

<b>Learning outcome</b>
The learner will: 4. locate and inspect heat rejection equipment.
<b>Assessment criteria</b>
The learner can: 4.1 perform relevant checks <ul style="list-style-type: none"> <li>• on the enclosures around heat rejection equipment</li> <li>• to confirm heat exchanger surfaces are free from debris and undamaged</li> <li>• to investigate instances of air short circuiting</li> <li>• for signs of leakage on direct expansion heat exchanger surface</li> <li>• on the operation of heat rejection fans</li> <li>• on water distribution and water flow and the route and condition of cooling water systems.</li> </ul>

<b>Learning outcome</b>
The learner will: 5. locate and inspect waterborne cooling systems in treated areas.
<b>Assessment criteria</b>
The learner can: 5.1 perform relevant checks <ul style="list-style-type: none"> <li>• on the route, condition and controls of cooling or chilled water systems</li> <li>• on the condition and operation of local heat exchange units</li> <li>• to confirm heat exchanger surfaces are free from debris and undamaged</li> <li>• to ensure the condition of intake filters is in line with manufacturers' requirements</li> <li>• on the operation of local heat pump unit compressors</li> </ul> 5.2 perform checks to ensure <ul style="list-style-type: none"> <li>• inlet and outlet grilles are not obstructed</li> <li>• rotation and control of heat exchange fans is correct</li> <li>• controls on fan coils are set correctly</li> <li>• signs of leakage of refrigerant are identified</li> </ul> 5.3 report any signs of leakage to the relevant person/s.

<b>Learning outcome</b>
The learner will: 6. locate and inspect airborne cooling and air conditioning systems in treated spaces.
<b>Assessment criteria</b>
The learner can: 6.1 analyse the condition of air delivery and extract openings, ducts and dampers, grilles and diffusers 6.2 analyse facilities manager's complaints log for evidence of complaints linked to ventilation problems 6.3 evaluate whether building modifications, partitioning or fitted furniture have affected system performance 6.4 perform checks to ensure <ul style="list-style-type: none"> <li>• airflow is apparent through identified openings</li> <li>• individual temperature and volume controls are functioning appropriately.</li> </ul>

<b>Learning outcome</b>
The learner will: 7. locate and inspect airborne cooling and air conditioning systems and outdoor air inlets.
<b>Assessment criteria</b>
The learner can: 7.1 plan for air handling fans and air distribution systems to be switched on or off before the inspection 7.2 make accurate recordings of <ul style="list-style-type: none"> <li>• the state and frequency of filter changing, cleanliness, and any blockages and damage</li> <li>• the fan type, method of control and setting and operation of dampers</li> <li>• any obstructions and blockages to air inlet grilles, screens and pre-filters</li> <li>• instances where air inlets may be affected by local sources of heat or air exhausts</li> <li>• the condition, fit and sealing of the filter</li> </ul> 7.3 measure filter resistance and air path resistance 7.4 perform relevant checks <ul style="list-style-type: none"> <li>• on heat exchangers for damage, blockage and debris and signs of refrigerant leakage</li> <li>• on the operation of energy conservation facilities and the air handling plant.</li> </ul>

<b>Learning outcome</b>
The learner will: 8. locate and examine air conditioning and heating system controls and temperature sensors.
<b>Assessment criteria</b>
The learner can: 8.1 assess the individual control zones for heating and cooling and assess the appropriateness of zoning 8.2 examine control timers and record date and time settings, on and off periods and whether they have been manually over-ridden 8.3 analyse the suitability of control timers and the set periods in use 8.4 make accurate recordings of <ul style="list-style-type: none"> <li>· the location of zone heating and cooling emitters</li> <li>· the set temperatures for heating and cooling in each zone and their suitability</li> </ul> 8.5 evaluate the appropriateness of the type and location of sensors being used 8.6 synthesise documentation to demonstrate the current values of the timers and temperatures 8.7 determine the type and age of the refrigeration compressor and the method of refrigeration capacity control 8.8 analyse the indoor and outdoor units for the likely efficiency of the system compared to current good practice 8.9 assess the method used to set, modulate or control airflow rate 8.10 record hours run and number of starts to determine control of compressors.



## Appendix 1 Relationships to other qualifications

### Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

These qualifications have connections to the:

- 6361-01 Level 3 Certificate in Domestic Energy Assessment
- 6361-02 Level 3 Certificate in Non-Domestic Energy Assessment.

### Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see [www.cityandguilds.com/functionalskills](http://www.cityandguilds.com/functionalskills)
- Essential Skills (Northern Ireland) – see [www.cityandguilds.com/essentialskillsni](http://www.cityandguilds.com/essentialskillsni)
- Essential Skills Wales – see [www.cityandguilds.com/esw](http://www.cityandguilds.com/esw)





## Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on [www.cityandguilds.com](http://www.cityandguilds.com).

***Centre Manual - Supporting Customer Excellence*** contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

***Our Quality Assurance Requirements*** encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

**Access to Assessment & Qualifications** provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Qualifications and Credit Framework (QCF):** general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

## Useful contacts

<b>UK learners</b> <b>General qualification information</b>	<b>T: +44 (0)844 543 0033</b> <b>E: learnersupport@cityandguilds.com</b>
<b>International learners</b> General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: <b>intcg@cityandguilds.com</b>
<b>Centres</b> Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: <b>centresupport@cityandguilds.com</b>
<b>Single subject qualifications</b> Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: <b>singlesubjects@cityandguilds.com</b>
<b>International awards</b> Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: <b>intops@cityandguilds.com</b>
<b>Walled Garden</b> Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: <b>walledgarden@cityandguilds.com</b>
<b>Employer</b> Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: <b>business@cityandguilds.com</b>
<b>Publications</b> Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

## City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Licence to Practice (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

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