



Level 4 Diploma in

Air Conditioning Energy Assessment

Qualification Specification

Qualification Recognition Number: 600/1399/0

ABBE Qualification Code: DipACEAL411

April 2019

Why this document is being revised

This document has been revised by ABBE in December 2017. A summary of the changes made to this document is, as follows:

- New address added to 1.4

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1. ABBE

1.1 Introduction

ABBE, the Awarding Body for Building Education is a forward thinking organisation that offers a range of apprenticeships, qualifications, benefits and support.

ABBE is regulated by Ofqual for the delivery of a range of qualifications. Our qualifications are nationally recognised helping learners to achieve their full potential and ambitions.

The full range of qualifications can be found on our website <http://www.abbega.co.uk>

1.2 Mission Statement

Our Values - Quality through Standards: Our aim is to provide a high quality experience by building a strong community of mutual support and trust. We can use our collective talents to build meaningful partnerships to help us all to achieve our goals. ABBE is a recognised Awarding Organisation with strong professional integrity.

Our Vision: Is that every learner is confident, successful and has the opportunity to achieve their full potential.

Our Mission: ABBE Educates, inspires and empowers learners.

1.3 Qualification Specification

The aim of this specification is to provide learners and centres with information about the content of this qualification. This specification is a live document and, as such, will be updated when required. Additional qualification details are available for ABBE approved centres in the ABBE qualification handbook.

1.4 Enquiries

Any enquiries relating to this qualification should be addressed to:

ABBE
Birmingham City University
University House
15 Bartholomew Row
Birmingham
B5 5JU

Telephone: 0121 331 5174
Email: abbeenquiries@bcu.ac.uk
Website: www.abbega.co.uk



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2. Qualification Information

2.1 Qualification Purpose

The need for the ABBE Level 4 Diploma in Air Conditioning Energy Assessment has been brought about by the Governments implementation of the Energy Performance of Buildings Directive in England and Wales.

This qualification provides learners with the appropriate industry recognised qualification to be able to undertake Air Conditioning Energy Assessments on air conditioning systems with an effective related output of more than 12kw. The qualification confirms occupational competence of those undertaking air conditioning assessments.

Air Conditioning Energy Performance Certificates will be produced by qualified and accredited Air Conditioning Energy Assessors who hold a licence to practice. This status will be achieved through this qualification and by being accepted by a government-approved Accreditation Scheme operator.

2.2 Who could take this Qualification?

The ABBE Level 4 Diploma in Air Conditioning Energy Assessment is available to both experienced practitioners who might be eligible to qualify through one of the Application of Prior Experiential Learning (APEL) schemes. It is also available to those who have little or no previous background knowledge or experience of air-conditioning systems.

2.3 Qualification Number

ABBE Level 4 Diploma in Air Conditioning Energy Assessment: 600/1399/0

2.4 Qualification Level

This qualification has been listed on the Regulated Qualifications Framework (RQF) at: Level 4

2.5 Total Qualification Time

This qualification is allocated Total Qualification Time (TQT) this includes Guided Learning (GL) expressed in hours, which indicates the number of hours of supervised or directed study time and assessment. Credit has also be allocated to this qualification.

- The Total Qualification Time (TQT) for this qualification is: 720
- Guided Learning (GL) for this qualification is: 215
- Credit Value: 72 credits

2.6 Progression

This qualification has been designed to encourage participation in education and training in other related areas by:

- enabling current practitioners in Energy Assessment to expand their portfolio of services offered to their customers by encompassing energy assessment of air conditioning systems
- encouraging those with expertise in other building services areas to qualify as an energy assessor of air conditioning systems



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2.7 Age ranges

Pre 16	No
16-18	No
18+	Yes
19+	Yes

2.8 Structure of the Qualification

To achieve the ABBE Level 4 Diploma in Air Conditioning Energy Assessment learners must achieve the five mandatory units.

Mandatory Units			
URN	Unit Name	Credit Value	Level
T/601/5964	Conduct energy assessments in a safe, effective and professional manner	5	3
R/601/5969	Prepare for energy assessments of air conditioning systems	6	3
R/502/9232	Demonstrate understanding of simple/package and complex/central air conditioning system inspections	23	4
Y/502/9233	Inspect simple/package and complex/central air conditioning systems	28	4
T/601/6001	Provide a report on the energy performance of simple/package and complex/central air conditioning systems	10	4

2.9 Barred Units

Units with the same title at different levels or units with the same content cannot be combined in the same qualification.

2.10 Language

ABBE qualifications and assessment materials will be provided through the medium of English.

2.11 Grading

This qualification is: Pass/Fail

2.12 Pre-course Procedures

This qualification is available to anyone who is capable of reaching the required standards. They have been developed free from any barriers that unfairly restrict access or progression thereby promoting equal opportunities.

There are no pre-entry requirements for this qualification.

2.13 Qualification Review Boards

Qualification Review Boards (QRBs) are set up for each qualification. The Boards are drawn from employers, centres, Higher Educational Institutes (HEIs) and others with a vested interest in the sector in which the qualification is used. The purpose of the QRB is to ensure that the content of



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the qualification and the proposed assessment methodology are fit for purpose and are appropriate to meet the requirements of the sector.

QRBs are ongoing and will be scheduled for specific points within the qualification lifetime; at the notional mid-point and again towards the review date of the qualification. During this process, the QRB will consider any feedback received on the performance of the qualification and will consider if the content, structure, purpose and assessment methodology remain appropriate to the needs of the sector. This will help to improve both our qualification and the specification.



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3. Qualification Unit(s)

Unit 1: Conduct energy assessments in a safe, effective and professional manner

Unit Reference Number: T/601/5964

Level: 3

Credit: 5

Unit Summary

To develop knowledge, understanding and skills to contribute to the health, safety and security of the workplace, develop effective working relationships with others, and conduct energy assessments in a professional and ethical manner, complying with organisational and legal requirements at all times.

Assessment Guidance

This unit be assessed using the following method(s):

- Portfolio of evidence
- Exam

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Comply with organisational and legal requirements at all times	1.1 Explain legal requirements and responsibilities for health, safety and security in the workplace
	1.2 Carry out work in accordance with the relevant legal requirements, legislation and advisory and mandatory codes of practice
	1.3 Carry out work in accordance with the auditing and monitoring requirements of the relevant accreditation or certification organisation/s
	1.4 Identify the relevant guidance related to the assessment of energy performance
	1.5 Record customer contact information in accordance with organisational and legal requirements such as the Data Protection legislation
2. Maintain health, safety and security at work	2.1 Identify health, safety and security risks which may exist in different workplace locations
	2.2 Take action to mitigate health, safety and security risks
	2.3 Ensure personal conduct does not endanger the health, safety and security of self and other people



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	2.4 Take action to ensure the protection of client's property and buildings
	2.5 Adhere to workplace policies and suppliers' or manufacturers' instructions for the safe use of equipment, personal protective equipment (PPE), materials and products
	2.6 Identify procedures for different types of emergency and implement them
	2.7 Make recommendations for improving health, safety and security in the workplace to the relevant person/s
3. Develop and maintain effective working relationships with colleagues, professionals, clients and others	3.1 Develop and maintain productive working relationships with others
	3.2 Request information from colleagues, professionals, clients and others in a polite, clear and professional manner
	3.3 Identify further sources of information/help
	3.4 Use further sources of information and help for the tasks at hand
	3.5 Deal promptly with enquiries from colleagues, professionals, clients and others and seek clarification where necessary
	3.6 Handle enquiries which: <ul style="list-style-type: none"> • are outside own authority • are beyond own area of knowledge or expertise • involve confidential information
	3.7 Handle and resolve disputes and/or differences of opinion
	3.8 Adhere to the formal complaints procedure when dealing with a complaint
4. Conduct energy assessments in a professional manner	4.1 Deal with colleagues, professionals, clients and others in a tactful, courteous and equitable manner
	4.2 Carry out work in accordance with prescribed codes of conduct, ethical standards and recognised good practice
	4.3 Record all evidence supporting the assumptions and decisions made during the assessment
	4.4 Demonstrate effective management of work activities and personal and professional development
	4.5 Explain the extent and limits of own competence and the importance of not working beyond them
	4.6 Respond appropriately to pressure from any person/s which may affect own judgement



Unit 2: Prepare for energy assessments of air conditioning systems

Unit Reference Number: R/601/5969

Level: 3

Credit: 6

Unit Summary

To clarify and explain to the client the purpose and outcomes of an energy assessment, and to develop and agree a detailed plan for how the works will be carried out. This includes a method statement covering the systems to be inspected the type of information a client can expect to receive as a result of the inspection.

Assessment Guidance

This unit can be assessed using the following method(s):

- Portfolio of evidence
- Exam

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Know the information and techniques required to prepare an energy assessment	1.1 Know the information and techniques required to prepare an energy assessment
	1.2 Clarify the requirements for an energy assessment
	1.3 Develop and agree a method for the inspection with the client
	1.4 Prepare and agree a clear and comprehensive scope of works with the client
	1.5 Describe site specific operating procedures 1, 2 and 4
2. Clarify the requirements for an energy assessment	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
3. Develop and agree a method for the inspection with the client	3.1 Identify the air conditioning system/s to be inspected and the requirements for appropriate sampling



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	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
4. Prepare and agree a clear and comprehensive scope of works with the client	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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • systems beyond level of competence • difficulty in gaining access • conflicts of interest • health and safety issues 2, 3, 4
	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 3: Demonstrate understanding of simple/package and complex/central air conditioning system inspections

Unit Reference Number: R/502/9232

Level: 4

Credit: 23

Unit Summary

To develop a knowledge and understanding of domestic building construction techniques, thermal properties of building elements and heat loss mechanisms

Assessment Guidance

This unit can be assessed using the following method(s):

- Portfolio of evidence
- Exam

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Know the operations and features of complex/central air conditioning systems	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 manufacturers 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
2. Know the relevant information relating to the energy performance of complex/central air conditioning systems	2.1 Clarify the types of information available relating to the air conditioning system installed



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	2.2 Evaluate which information is relevant: <ul style="list-style-type: none"> to the pre-inspection review 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 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
	3. Know the methods, techniques and equipment required for the inspection of complex/central air conditioning systems
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 4: Inspect simple/package and complex/central air conditioning systems

Unit Reference Number: Y/502/9233

Level: 4

Credit: 28

Unit Summary

To ensure learners can competently inspect simple/package and complex/central air conditioning systems. This includes how to obtain the information relating to energy performance, how to locate and inspect indoor and outdoor units and system controls and how to follow best practice when conducting the inspection.

Assessment Guidance

This unit can be assessed using the following method(s):

- Portfolio of evidence
- Exam

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Conduct the inspection following current best practice	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">• legionella• refrigerant leakage



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	1.12 Manage potential conflicts of interest that may arise during the inspection
2. Obtain information relating to the energy performance of complex/central air conditioning systems	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"> evidence of regular inspection and maintenance the frequency and scope of maintenance to the system and equipment
	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
3. Locate and inspect refrigeration equipment	3.1 Locate refrigerant compressors and confirm if they can be operated
	3.2 Make accurate recordings of: <ul style="list-style-type: none"> the state of the refrigerant equipment and the space immediately around it state of refrigerant and symptoms of plant problems
	3.3 Perform checks for: <ul style="list-style-type: none"> condenser blockage to ensure adequate water flow rates through the condensers and evaporators water pressure drops across the condensers and evaporators
4. Locate and inspect heat rejection equipment	4.1 Perform relevant checks: <ul style="list-style-type: none"> on the enclosures around heat rejection equipment to confirm heat exchanger surfaces are free from debris and undamaged to investigate instances of air short circuiting for signs of leakage on direct expansion heat exchanger surface on the operation of heat rejection fans on water distribution and water flow and the route and condition of cooling water systems



5. Locate and inspect waterborne cooling systems in treated areas	5.1 Perform relevant checks: <ul style="list-style-type: none"> • on the route, condition and controls of cooling or chilled water systems • on the condition and operation of local heat exchange units • to confirm heat exchanger surfaces are free from debris and undamaged • to ensure the condition of intake filters is in line with manufacturers' requirements • on the operation of local heat pump unit compressors
	5.2 Perform checks to ensure: <ul style="list-style-type: none"> • inlet and outlet grilles are not obstructed • rotation and control of heat exchange fans is correct • controls on fan coils are set correctly • signs of leakage of refrigerant are identified
	5.3 Report any signs of leakage to the relevant person/s
6. Locate and inspect airborne cooling and air conditioning systems in treated spaces	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"> • airflow is apparent through identified openings • individual temperature and volume controls are functioning appropriately
7. Locate and inspect airborne cooling and air conditioning systems and outdoor air inlets	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"> • the state and frequency of filter changing, cleanliness, and any blockages and damage • the fan type, method of control and setting and operation of dampers • any obstructions and blockages to air inlet grilles, screens and pre-filters • instances where air inlets may be affected by local sources of heat or air exhausts • the condition, fit and sealing of the filter
	7.3 Measure filter resistance and air path resistance
	7.4 Perform relevant checks: <ul style="list-style-type: none"> • on heat exchangers for damage, blockage and debris and signs of refrigerant leakage • on the operation of energy conservation facilities and the air handling plant



8. Locate and examine air conditioning and heating system controls and temperature sensors	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 overridden
	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"> • the location of zone heating and cooling emitters • the set temperatures for heating and cooling in each zone and their suitability
	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



Unit 5: Provide a report on the energy performance of simple/package and complex/central air conditioning systems

Unit Reference Number: T/601/6001

Level: 4

Credit: 10

Unit Summary

To cover the activities undertaken when an inspection is complete and the subsequent reporting requirements, for both simple/package and complex central systems. It includes preparing the format of a report and collating the relevant information, analysing complex inspection information and synthesising recommendations in a clear and easy to understand way for the client. It also includes issuing the report to the client with detailed recommendations for future action.

Assessment Guidance

This unit can be assessed using the following method(s):

- Portfolio of evidence
- Exam

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Prepare the structure and content of the report	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">• details of the location and the property owner/manager• inspectors name, affiliation and status and date of the inspection• details of systems inspected• inventory of equipment inspected• details of the results of the inspection
2. Develop recommendations for the report	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



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	<p>2.5 Synthesise inspection information for recommendations that improve the performance of simple/package and complex/central air conditioning systems, including:</p> <ul style="list-style-type: none"> • alternative solutions for improving efficiency • alternative cooling techniques
	2.6 Provide recommendations in a clear, concise and easy to understand way
3. Develop the report	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
4. Issue the report and clarify any areas as required by the client	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



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