



Level 4 Award in

U-value Calculation

Qualification Specification

Qualification Recognition Number: 601/3782/4

ABBE Qualification Code: AwardUVCL414

April 2019

Why this document is being revised

This document has been revised by ABBE in April 2019. 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 Our values, vision and mission

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

This is the ABBE Qualification Specification for the ABBE Level 4 Award in U-value Calculation. 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 this qualification has arisen from approaches by software providers of programmes designed to aid the calculation of U-values. Practitioners using the software should be able to calculate U-values by hand as well as using software, so that they have a thorough understanding of the concepts related to U-value.

Knowledge and practice relating to U-value generally forms a very small part of existing qualifications in the surveying, building design and construction sectors, yet the need to deal with various aspects of U-value, as energy efficiency levels in new construction and refurbishment are driven upwards by the building regulations, has increased.

This qualification is seen as a way of accrediting the knowledge of U-value calculation for practicing individuals in the surveying, building design and construction sectors and thus helping to improve practice in this area.

The qualification confirms occupational competence.

2.2 Who could take this Qualification?

This qualification is seen as accredited CPD for the surveying, building design and construction sectors and a way of improving knowledge of U-value matters so that difficulties and disputes in this area can be minimised in the future. It is consequently aimed at existing qualified professionals, but there is no reason why the two unit knowledge award could not be offered at a training stage.

2.3 Qualification Number

ABBE Level 4 Award in U-value Calculation: 601/3782/4

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: 30
- Guided Learning (GL) for this qualification is: 18
- Credit Value: 3 credits



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2.6 Progression

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

- Enabling existing professionals in the surveying, building design and construction sectors to demonstrate their understanding of U-value calculation
- Encouraging those with expertise in other surveying, building design and construction areas to become aware of the requirements of U-value calculation

2.7 Age ranges

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

2.8 Structure of the Qualification

To achieve the ABBE Level 4 Award in U-value Calculation learners must achieve the two mandatory units.

Mandatory Units			
URN	Unit Name	Credit Value	Level
M/506/5297	The basics of U-value concepts and calculations	1	4
A/506/5299	Advanced U-value applications and calculations	2	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.



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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 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: The basics of U-value concepts and calculations

Unit Reference Number: M/506/5297

Level: 4

Credit: 1

Unit Summary

To develop a knowledge and understanding of the basic concepts related to U-values in construction materials and to enable calculations to be made of real U-values for simple construction elements in new buildings.

Assessment Guidance

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

- Portfolio of evidence

Learning Outcome The learner will:	Assessment Criterion The learner can:
1. Understand the mechanisms by which heat is transferred through building elements	1.1 Differentiate between the principles of heat transfer by conduction, convection and radiation
	1.2 Apply heat transfer mechanisms to demonstrate how they operate in the fabric of a building
	1.3 Summarise how the rate of heat transfer can be measured/calculated
2. Understand the thermal performance of materials in terms of their thermal conductivity and thermal resistance	2.1 Differentiate between the thermal conductivity of different building components
	2.2 Differentiate between the thermal resistance of different building components, air layers and internal/external surfaces of elements
	2.3 Apply multiple resistances to demonstrate how the total resistance for more than one layer is derived
	2.4 Calculate U-values or elements consisting of homogeneous layers
3. Understand the combined method for calculating U-values by hand	3.1 Differentiate between the upper limit resistance and lower limit resistance in different building components
	3.2 Categorise the limitations on the calculation methodology of the combined method



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	3.3 Calculate the U-value of building elements
4. Understand the effect of thermal bridging on U-value calculation	4.1 Distinguish between what is and what is not thermal bridging
	4.2 Calculate the fractional area of thermal bridge for different constructions
	4.3 Calculate the effect of complex bridging situations on U-value
5. Understand how to calculate U-values using a U-value calculation programme	5.1 Analyse different characteristics of a building element to determine the key characteristic
	5.2 Identify and apply appropriate materials from the data within the programme to add layers
	5.3 Apply information to add and edit layers using data from other sources
	5.4 Quantify the effects of repeating thermal bridges
	5.5 Calculate U-values using a U-value calculation programme



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Unit 2: Advanced U-value applications and calculations

Unit Reference Number: A/506/5299

Level: 4

Credit: 2

Unit Summary

To develop a knowledge and understanding of the more advanced concepts and construction details of buildings and how these affect the U-value calculations needed for new buildings. This unit deals with whole areas of buildings and not just individual components and considers common building types other than conventional brick and block construction.

Assessment Guidance

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

- Portfolio of evidence

Learning Outcome The learner will:	Assessment Criterion The learner can:
1 Understand the thermal performance of air spaces and cavities within buildings	1.1 Identify the main types of air spaces and cavities within buildings
	1.2 Differentiate between the main types of air spaces and cavities within buildings
	1.3 Distinguish default values in commonly occurring air spaces
	1.4 Apply suitable methods to calculate the thermal resistance of air spaces
	1.5 Apply appropriate methods for addressing the effect of ventilation on the thermal performance of cavities
	1.6 Identify and distinguish the effect of low emissivity surfaces on the thermal performance of cavities
	1.7 Identify when and how to add air spaces to U-value calculations
2. Understand the effect of mechanical fasteners, air voids in insulation layers and the presence of unheated space on the outer side of elements	2.1 Identify and distinguish the most appropriate correction factor for a variety of additional heat loss features
	2.2 Distinguish between factors that have a minor and those which have a major effect on correction factors
	2.3 Explain when a correction factor for an element can be ignored



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	2.4 Apply data entries into a U-value calculation programme for additional heat loss features
3. Understand how to calculate U-values for ground floors and basements	3.1 Distinguish between the main elements affecting heat transfer through the three main types of ground floors and basements
	3.2 Apply theory to calculate U-values for the three main types of ground floors
	3.3 Apply theory to calculate U-Values for basement floors and walls
	3.4 Apply data entries into a U-value calculation programme for the three main types of ground floor and basements
4. Understand how to use the special calculation methods for constructions where steel framing, rails or brackets penetrate insulation	4.1 Apply the theory of U-value calculations for the main types of construction where steel framing, rails or brackets penetrate insulation following BRE Digest 465, SCI P312 and BR 443
	4.2 Apply data entries into a U-value calculation programme for light steel framed constructions
	4.3 Apply data entries into a U-value calculation programme for twin-skin metal cladding
	4.4 Apply data entries into a U-value calculation programme for rain screen cladding
5. Understand the components which make up the composite constructions of the main building elements of walls, roofs and floors and how they affect thermal performance	5.1 Distinguish between the thermal performance of different types of insulation within composite constructions of walls, roofs and floors
	5.2 Distinguish between the effects on thermal performance of different types of membranes within composite constructions of walls, roofs and floors
	5.3 Identify the effect of moisture and temperature on the thermal performance of insulation layers within composite constructions
	5.4 Identify the effect of different types of concrete and masonry on the thermal performance of different composite constructions
6. Understand the key points relating to thermal performance for the main building elements	6.1 Apply data entries into a U-value calculation programme to determine the thermal performance of different types of roof
	6.2 Apply data entries into a U-value calculation programme to determine the thermal performance of different types of wall



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	6.3 Apply data entries into a U-value calculation programme to determine the thermal performance of different types of floor
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