City & Guilds Level 3 Certificate for Retrofit Advisors (7618-03)

Version 3.0 (February 2024)

Qualification Handbook

Qualification at a glance

Subject area	Construction
City & Guilds number	7618
Age group approved	16+
Entry requirements	N/A
Assessment	Assignment, Presentation, Interview
Grading	Pass/Fail
Approvals	Fast track approval and Full approval
Support materials	Sample assessments, Smartscreen
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds qualification number	Regulatory reference number	GLH	TQT
City & Guilds Level 3 Certificate for Retrofit Advisors	7618-03	610/2988/9	110	129

Version and date	Change detail	Section
1.0 January 2024	Initial draft	All
2.0 February 2024	Amendment on page 14 to remove JCQ reference and insert the City & Guilds / ILM Quality Assurance Standards: Centre Assessment.	Conditions for conducting written assessment
3.0 February 2024	Amendment to remove reference to invigilated conditions and insert reference to supervised conditions	Conditions for conducting written assessments Test Specifications

Contents

1 Introduction

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

Area	Description
Who is the qualification for?	This qualification is aimed at learners who are interested in becoming a Retrofit Advisor within the Construction industry. It is also aimed at upskilling existing employees within the Construction industry.
What does the qualification cover?	This qualification covers aspects key to a Retrofit Advisor – including sustainability and climate change. Learners will also study the science and process of Retrofit installation, which includes communication and health and safety aspects pertinent to a Retrofit Advisor.
What opportunities for progression are there?	The Retrofit Advisor qualification supports progression for learners looking to progress further into the roles of Retrofit Assessor and Retrofit Coordinator. The skills developed through this qualification are also transferable into other construction areas.
Who did we develop the qualification with?	The qualification was developed in collaboration with industry specialists and established lecturers and assessors. These technical specialists were drawn from suitably representative sizes of organisations and specialisms within the Construction industry across the UK.
Is it part of an apprenticeship framework or initiative?	The City & Guilds Level 3 Certificate for Retrofit Advisors is not an apprenticeship, but it could be taken as a value added off the job training qualification to enable apprentices to learn about the evolving Retrofit industry. It can be embedded into the apprentice's learning journey to support relevance to the current industry climate. This Certificate can be delivered as a standalone qualification or used in an induction programme or integrated within a longer programme of study in a vocational area.

Structure

To achieve the City & Guilds Level 3 Certificate for Retrofit Advisors, learners must achieve the units shown below:

City & Guilds unit number	Unit title	GLH
Mandatory units:		
Learners must achieve a **pass** for all units.		
301	Climate Change, Sustainability and the Science of Retrofit	30
302	Guidance for Retrofit Installations	35
303	Communication for Retrofit Projects	30
304	Health and Safety in Retrofit Projects	15

Total Qualification Time (TQT)

Total Qualification Time (TQT) is the number of notional hours which represents an estimate of the total amount of time that could reasonably be expected for a learner to demonstrate the achievement of the level of attainment necessary for the award of a qualification.

TQT comprises of the following two elements:

1) the number of hours that an awarding organisation has assigned to a qualification for guided learning
2) an estimate of the number of hours a learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by – but, unlike guided learning, not under the immediate guidance or supervision of – a lecturer, supervisor, tutor or other appropriate provider of education or training.

Title and level	GLH	TQT
City & Guilds Level 3 Certificate for Retrofit Advisors	110	129

2 Centre requirements

Approval

Full approval

To offer this qualification, new centres will need to gain both centre and qualification approval.

Please refer to the document **Centre Approval process: Quality Standards** for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Or

Fast-track approval

If your centre is approved to offer any of the qualifications listed in the Retrofit Level 3 Fast Track Qualification List that can be found on the City & Guilds website, then you can apply for fast-track approval for the new 7618-03 using the fast-track approval form. The form is available on the City & Guilds website.

Centres should use the fast-track form if:

- there have been no changes to the way the qualifications are delivered
- they meet all of the approval criteria in the fast-track form guidance notes.

Fast-track approval is available for 12 months from the launch of the qualification. After 12 months, centres will need to go through the standard Qualification Approval Process. The centre is responsible for checking that fast-track approval is still current at the time of application.

Please refer to the document **Centre Approval Process: Quality Assurance Standards** for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Resource requirements

Centre staffing

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

- be occupationally competent or technically knowledgeable in the area(s) for which they are delivering training and/or have experience of providing training (this knowledge must be to the same level as the training being delivered)
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge remains current in the occupational area and of best practice in delivery, mentoring, training, assessment and quality assurance, and that it takes account of any national or legislative developments.

Quality assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance. All external quality assurance processes reflect the minimum requirements for verified and moderated assessments, as detailed in the Centre Assessment Standards Scrutiny (CASS), section H2 of Ofqual's General Conditions. For more information on both CASS and City and Guilds Quality Assurance processes visit: the What is CASS? and Quality Assurance Standards documents on the City & Guilds website.

Standards and rigorous quality assurance are maintained by the use of:

- Internal quality assurance
- City & Guilds external quality assurance.

In order to carry out the quality assurance role, Internal Quality Assurers must:

- have appropriate teaching and vocational knowledge and expertise
- have experience in quality management/internal quality assurance
- hold or be working towards an appropriate teaching/training/assessing qualification
- be familiar with the occupation and technical content covered within the qualification.

External quality assurance for the qualification will be provided by City & Guilds EQA process. EQAs are appointed by City & Guilds to approve centres, and to monitor the assessment and internal quality assurance carried out by centres. External quality assurance is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres.

The role of the EQA is to:

- provide advice and support to centre staff
- ensure the quality and consistency of assessments and marking/grading within and between centres by the use of systematic sampling
- provide feedback to centres and to City & Guilds.

Learner entry requirements

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

Age restrictions

This qualification is approved for learners aged 16 or above.

Access arrangements and reasonable adjustments

Access arrangements are adjustments that allow candidates with disabilities, special educational needs, and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before assessment takes place.

The Equality Act 2010 requires City & Guilds to make reasonable adjustments where a disabled person would be at a substantial disadvantage in undertaking an assessment.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds for more information. Both are available on the City & Guilds website:
http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments

3 Delivering the qualification

Initial assessment and induction

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

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

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

Support materials

The following resources are available for this qualification:

Description	How to access
Assessor instructions Candidate instructions	www.cityandguilds.com
Assessment Guidance materials	www.cityandguilds.com
SmartScreen	www.smartscreen.co.uk

4 Assessment

Assessment of the qualification

Candidates must:

- successfully complete one assignment for Unit 301 and one assignment for Unit 304
- successfully complete one synoptic assignment for Units 302 and 303

Assessment types			
Unit	**Title**	**Assessment method**	**Where to obtain assessment materials**
301	Climate Change, Sustainability and the Science of Retrofit	Assignment Externally set, internally marked, externally verified	**www.cityandguilds.com**
302 and 303	Guidance for Retrofit Installations **and** Communication for Retrofit Projects	Synoptic Assignment containing: 2 Reports, 1 Presentation, and 1 interview Externally set, internally marked, externally verified	**www.cityandguilds.com**
304	Health and Safety in Retrofit Projects	Assignment Externally set, internally marked, externally verified	**www.cityandguilds.com**

Assessment strategy

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

- live assignments that can be downloaded by assessors from the City & Guilds website
- sample tasks and Assessment Guidance that can be downloaded from the City & Guilds website.

The following materials are available for support and delivery of the assessment for this qualification:

Unit 301

- Candidate Pack for Sample Assignment *
- Assessor Pack for Sample Assignment*
- Candidate Pack for Live Assignment (Set A and Set B)
- Assessor Pack for Live Assignment (Set A and Set B)

Units 302 and 303 (One Synoptic Assessment for both units)

- Candidate Guidance document for Synoptic Assessment of Unit 302 and Unit 303
- Candidate Pack for Live Synoptic Assignment:
  - Part 1 Candidate document containing Task A and B (Set A and Set B)
  - Part 2 Candidate document containing Tasks C and D (Set A and Set B)
- Assessor Pack for Live Synoptic Assignment: one assessor document for all Tasks (Set A and Set B)

Unit 304

- Candidate Pack for Sample Assignment *
- Assessor Pack for Sample Assignment*
- Candidate Pack for Live Assignment (Set A and Set B)
- Assessor Pack for Live Assignment (Set A and Set B)

***Sample Assignment packs each contain one task to support learner preparation for the live assessment. They do not cover all the content outcomes for the unit.

Time constraints

The following must be applied to the assessment of this qualification:

- the assessment must be completed within the learner's period of registration.

Conditions for conducting written assessments

All written assessments should be conducted according to the City & Guilds / ILM Quality Assurance Standards: Centre Assessment. This document contains detailed information on the administration of examinations before, during and after.

The assessment for units 301 and 304 must take place under supervised conditions. The assessment of Tasks A and B for the synoptic assignment (units 302 and 303) must also take place under supervised conditions.

Learners must **not** have access to the 7618-03 Qualification Handbook whilst carrying out the assessments as part of their controlled conditions for:
Assessment for unit 301
Assessment for unit 304
Task A, Task B and Task D of the synoptic assessment for unit 302 and 303.

Learners must not take any materials, including notes or course materials, into the interview. (Task D of the synoptic assessment).

Recognition of prior learning (RPL)

Recognition of prior learning means using a person's previous experience or qualifications which have already been achieved to contribute to a new qualification.

RPL is not allowed for this qualification.

Resit arrangements

Learners who fail one or more assessments may be offered the opportunity to re-sit the assessment, following feedback from their assessor. Any feedback provided to the learner must not be overly granular nor prescriptive.

The assessment for this qualification takes the form of 3 assignments. Each assignment is made up of a number of tasks. Learners are required to pass all 3 assignments to achieve a pass on the qualification overall. Should a learner fail one or more of the assignments, they are required to re-take a different version of the assignment they failed.

The assessor must set and communicate a realistic date for the retake. In all instances, a minimum of 1 week is required before a retake can take place. When deciding on the date, the assessor must take into consideration appropriate factors according to individual candidate needs. Any feedback given to the learner in preparation for the retake, must be recorded and the EQA must be able to access the feedback provided.

Prior to retaking any assessment, it is strongly advised that the learner supplements their assessor's feedback by engaging in additional learning or development that will support them in preparing to retake the assessment.

If the learner fails the retake, they will be required to undertake a new version of the assessment, following feedback from their assessor, and after a period of at least 1 week has passed. Should the learner fail the new version of the assessment, the tutor or assessor is advised to contact the City and Guilds Quality Team.

In the event of a learner being unsuccessful in multiple attempts to meet the assessment requirements for the qualification, then the assessor, in consultation with the centre's IQA, must make a professional decision as to whether the learner should continue with the qualification. This decision must be documented, along with supporting evidence for the decision and the information must be available for EQA purposes.

Test specifications

The way the qualification content is covered by each assessment is set out in the table below.

Assessment title: Climate Change, Sustainability and the Science of Retrofit

Assessment type: Externally set Assignment

Assessment conditions: Closed book, supervised conditions

Duration: 3 hours

Graded: Pass/Fail

Pass Mark: The pass mark for this assessment is set at 70%

Assignment	Duration: 3 hours		
Unit	**Outcome**	**Number of marks**	**Percentage %**
301	LO1 Understand global warming and climate change factors that support the need for retrofit	10	20
	LO2 Understand how retrofit and sustainable construction methods benefit the natural environment and wider society	10	20
	LO3 Analyse the benefits to the individuals who use or own a building where a retrofit has taken place	8	16
	LO 4 Understand the impact of heat loss pathways, condensation and ventilation in retrofit upgrades	8	16
	LO5 Understand energy efficiency measures that provide improvement options for buildings	14	28
	Total	50	100%

Assessment title: Guidance for Retrofit Installations **and** Communication for Retrofit Projects

Assessment type: Externally set Assignment, consisting of Reports, Presentation and Interview

Assessment conditions: Closed book, supervised conditions (Task A and B)
Open book, simulated practical observation (Task C)
Closed book, controlled conditions (Task D)

Duration: 6 hours and 30 minutes

Graded: Pass/Fail

Pass Mark: The pass mark for this assessment is set at 70%

Assignment:	**Duration: 6 hours 30 minutes**		
Unit	**Outcome**	**Number of marks**	**Percentage %**
302	LO1 Understand the retrofit process required by current retrofit specifications and additional requirements for other types of buildings	6	6
	LO2 Understand the requirements for the different stages and methods during a retrofit installation	15	15
	LO3 Understand the different materials and types of construction encountered during retrofit	9	9
	LO4 Understand the types of thermal insulation used for the retrofit of buildings and how these insulation methods differ according to the age and type of the building	16	16
	LO5 Understand alternative sources of energy and fuel sources used in buildings	12	12
	LO6 Understand the process of installing renewable energy systems	12	12
303	LO1 Be able to apply effective communication principles which are relevant to retrofit projects	6	6
	LO2 Understand how to effectively communicate with stakeholders involved in retrofit projects	4	4
	LO3 Be able to demonstrate communication skills used in retrofit projects, using both written and verbal communication methods	10	10
	LO4 Be able to demonstrate effective customer care in retrofit projects to encourage positive engagement	10	10
	Total	100	100%

Assessment Title: Health and Safety in Retrofit Projects

Assessment Type: Externally set Assignment

Assessment Conditions: Closed book, supervised conditions

Duration: 3 hours

Graded: Pass/Fail

Pass Mark: The pass mark for this assessment is set at 70%

Assignment:	**Duration: 3 hours**		
Unit	**Outcome**	**Number of marks**	**Percentage %**
304	LO1 Understand the relevant legislation and regulations related to health and safety in retrofit projects	15	25
	LO2 Understand the procedures for managing health and safety in retrofit projects	5	25
	LO3 Understand the methods for promoting a positive health and safety culture in retrofit projects	8	20
	LO4 Be able to evaluate safe working practices and create a risk assessment	12	30
	Total	40	100%

5 Grading

Grading of the qualification

All three assessments are graded Pass/Fail. In order to achieve the qualification, the learner must pass all three assessments.

For full details on how to grade the assessments, assessors should refer to the Assessor Packs for this qualification, available on the 7618-03 qualification page on **www.cityandguilds.com.**

City & Guilds will provide the following assessment materials:

Candidate assignments and Assessor packs, including different versions

The assessment materials are password protected and can be found on the City & Guilds website:

Retrofit qualifications and training courses | City & Guilds (cityandguilds.com)

The password is available to registered centres on the Walled Garden.

6 Units

Structure of the units

These units each have the following:

- City & Guilds reference number
- title
- level
- guided learning hours (GLH)
- unit aim
- assessment type
- learning outcomes, which are comprised of a number of assessment criteria
- range statements
- supporting information

Guidance for delivery of the units

This qualification is comprised of four **units**. A unit describes what is expected of a competent person in particular aspects of their job.

Each **unit** is divided into l**earning outcomes** which describe in further detail the skills and knowledge that a candidate should possess.

Each **learning outcome** has a set of **assessment criteria** (performance and knowledge and understanding) which specify the desired criteria that must be satisfied before an individual can be said to have performed to the agreed standard.

Range statements define the breadth or scope of a learning outcome and its assessment criteria by setting out the various circumstances in which they are to be applied.

Supporting information provides guidance of the evidence requirement for the unit and specific guidance on delivery and range statements. Centres are advised to review this information carefully before delivering the unit.

Unit 301 Climate Change, Sustainability and the Science of Retrofit

Level:	3
Guided Learning Hours (GLH):	30
Assessment type:	Assignment
Aim:	The purpose of this unit is for learners to develop knowledge and understanding of the impact of global warming and climate change and how retrofit can contribute to the reduction of carbon emissions and fossil fuel use. It will also develop learners' understanding of retrofit concepts and activities associated with these environmental and human factors. Learners will consider the benefits provided by retrofit to individuals and communities in contributing to a comfortable, healthy and sustainable living, work or leisure environment.

Learning outcome

The learner will:

LO1 Understand global warming and climate change factors that support the need for retrofit

Assessment criteria

The learner can:

AC1.1 describe the causes of **global warming**

AC1.2 explain **changes to the climate system**

AC1.3 evaluate the **impacts of climate change** on the natural environment and wider human society

Range

AC1.1 causes of **global warming**

- power generation
- deforestation
- transportation
- agriculture
- construction

AC1.2 **changes to the climate system**

- changes to the hydrological cycle
- warmer land and air
- warming oceans
- melting sea ice and glaciers
- rising sea levels
- ocean acidification
- global greening
- changes in ocean currents
- more extreme weather

AC1.3 **impacts of climate change**

- food insecurity and reduction of fertile land
- flooding of coastal regions and islands
- localised flooding
- risks to water supplies
- loss of biodiversity
- damage to marine ecosystems
- reduced fishing yields
- changes in seasonality
- expansion of habitable region of pests
- heat stress
- forest mortality and increased fire risk
- economic and climate migration
- damage to infrastructure

Learning outcome

The learner will:

LO2 Understand how retrofit and sustainable construction methods benefit the natural environment and wider society

Assessment criteria

The learner can:

AC2.1 describe **key aspects of the natural environment** that need to be protected

AC2.2 discuss the **benefits of sustainable construction methods**

AC2.3 justify the **benefits of retrofit to the natural environment and individuals within society**

Range

AC2.1 **key aspects of the natural environment**

- air quality
- water quality
- animal habitats
- biodiversity
- flora and fauna
- ecosystems
- finite natural resources

AC2.2 **benefits of sustainable construction methods**

- use of recycled materials
- use of natural materials
- use of locally sourced materials
- use of alternative energies
- improved insulation standards
- reduction of waste segregation
- minimizing site energy use
- conservation of resources
- correct storage of materials to reduce damage and waste
- methods to reduce contamination of ground water

AC2.3 **benefits of retrofit to the natural environment and individuals within society**

- benefits to the natural environment
    - reduction of energy use
    - reduction of greenhouse gas emissions
    - extending the useful life of a building
- benefits to individuals within society
    - reduction of fuel poverty
    - improved living environment
    - improvements to health and wellbeing
    - linking the benefits of retrofit to the values or priorities of individuals
    - improved building durability
    - protection and enhancement of architectural and cultural heritage
- individuals within society
    - residential building users
    - commercial building users
    - users of community facilities

Learning outcome

The learner will:

LO3 Analyse the benefits to the individuals who use or own a building where a retrofit has taken place

Assessment criteria

The learner can:

AC3.1 explain the benefits for **human comfort and wellbeing**
AC3.2 describe **health factors** that can be mitigated by retrofit
AC3.3 discuss the **economic benefits** of retrofit

Range

AC3.1 **human comfort and wellbeing**

- impact of building use and human activity levels
- comfortable temperatures for different rooms and activities within a building
- differing needs of building users, based on demographic groups
- controlling the environment
- air quality within a building
- ethical contributions to net zero

AC3.2 **health factors**

- health issues associated with cold, damp environments
- health issues associated with mould growth
- health issues associated with airborne spores
- health issues associated with infestation
- health issues associated with defective appliances
- health issues associated with hazardous materials
- historical use of asbestos
- psychological issues associated with living conditions

AC3.3 **economic benefits**

- reduction of energy loss
- lower energy input
- improved heating efficiency
- potential energy bill reduction
- increased property value

Learning outcome

The learner will:

LO4 Understand the impact of heat loss pathways, condensation and ventilation in retrofit upgrades

Assessment criteria

The learner can:

AC4.1 explain the different **pathways of heat loss**
AC4.2 analyse the risk of **surface and interstitial condensation**
AC4.3 discuss the **ventilation considerations in relation to retrofit upgrades**

Range

AC4.1 **pathways of heat loss**

- U- values, the units of heat loss
- losses through the building fabric: walls, floors, roof, windows and doors
- thermal bridging
- air leakage, ingress and egress

AC4.2 **surface and interstitial condensation**

- temperature, humidity and dewpoint
- formation of surface condensation
- temperature gradient through an external wall
- formation of interstitial condensation
- effect of condensation on building fabric
- vapour barriers
- residual moisture in building elements

AC4.3 **ventilation considerations**

- airtightness of buildings
- ventilation to improve internal air quality
- conflict between required and unwanted ventilation
- roof voids
- living areas
- natural and mechanical ventilation
- extraction in areas of high humidity
- air conditioning

Learning outcome

The learner will:

LO5 Understand energy efficiency measures that provide improvement options for buildings

Assessment criteria

The learner can:

AC5.1 explain the **importance of building assessments**
AC5.2 describe **energy efficiency measures to improve thermal performance**
AC5.3 describe **energy efficiency measures to reduce electricity consumption**
AC5.4 describe the use of **modern technology to control heating systems**

Range

AC5.1 **importance of buildings assessments**

- identification of any adaptations needed to improve the resilience of the building to existing risk from climate change
    - EPC (Energy Performance Certificate) Assessment
    - SAP (Standard Assessment Process)
- evaluation of risks arising from potential future climate change

AC5.2 **energy efficiency measures to improve thermal performance**

- improve the insulation of the elements of the building fabric
- reduce thermal bridging
- improve airtightness of the building envelope
- establish a safe dynamic moisture equilibrium through each element of the building fabric
- improve the resilience of the building envelope
- improve the capability of the building envelope to manage variations of temperature
- provide or upgrade ventilation
- minimise the risks associated with vapour or other outputs
- minimise the risks associated with overheating
- provide efficient heating and cooling systems
- provide efficient water heating systems

AC5.3 **energy efficiency measures to reduce electricity consumption**

- provide efficient fixed lighting
- provide efficient appliances and equipment
- minimise internal heat gains from electrical appliances
- provide on-site energy storage
- provide metering and monitoring systems to promote the efficient use of energy

AC5.4 **modern technology to control heating systems**

- responsive controls
- intelligent or “smart” controls
- use of systems that use low or zero carbon (LZC) technologies
- integrity of the building structure
- locating existing services for upgrade
- use of wireless control systems

Unit 301 Climate Change, Sustainability and the Science of Retrofit

Supporting Information

Unit guidance

This unit is suitable for guided independent learning and research.

Learning outcome 1: learners will develop their knowledge and understanding of global warming and climate change for which there is a wealth of web-based information available. Learners could be directed to key areas to research, based on the learning outcome range. They should produce appropriate, detailed notes to assist in their preparation for the assessment, looking especially at the impact on the natural environment and society as a whole.

Learning outcome 2: learners are required to evidence their understanding of how retrofit and sustainable construction can reduce or mitigate the causes of climate change and benefit the natural environment and different types of individuals within society. Learning about the types of retrofit would be best suited to classroom-based teaching, coupled with some guided investigation. Sustainable construction and benefits of retrofit would be suited to independent learning and research.

Learning outcome 3: learners should conduct their own research to gain an insight into the benefits that retrofit brings to individuals. This is well suited to independent learning and research as it is underpinned by 3 related areas: human comfort and wellbeing, health factors and the economic benefits to the individuals.

Learning outcomes 4: learners will gain an understanding of heat loss, condensation and ventilation issues surrounding retrofit upgrades. A mix of traditional classroom teaching and independent learning and investigation is recommended.

Learning outcome 5: learners will gain an understanding into energy efficiency measures used to improve thermal performance and energy consumption, alongside appropriate technology-based control systems. A mix of traditional classroom teaching and independent learning and investigation is recommended.

Suggested learning resources

Websites:

https://www.metoffice.gov.uk/weather/climate

https://www.un.org/en/climatechange/reports

https://climate.nasa.gov/

https://www.gov.uk/guidance/climate-change-explained

https://www.greenbuildingstore.co.uk/a-short-guide-to-radical-retrofit/

Books:

McMullan R - Environmental Science in Building (Palgrave MacMillan (8th Edition) (MacMillan 2017) ISBN 978 1 137 60544 3

Unit 302 Guidance for Retrofit Installations

Level:	3
Guided Learning Hours (GLH):	35
Assessment type:	Written report, Presentation and Interview
Aim:	The aim of this unit is for learners to develop core knowledge and understanding of the retrofit stages used to improve buildings during a retrofit upgrade. Learners will gain an understanding of the process, the stakeholder involvement and the different requirements to be able to communicate this as a Retrofit Advisor. Additionally, learners will consider how different types of construction and the materials used in the building fabric would be appropriate for reducing heat losses through the core structure and the alternative and renewable energy systems that could be installed.

This unit will be synoptically assessed with the content of Unit 303 as learners will be required to communicate key information to stakeholders.

Learning outcome

The learner will:

LO1 Understand the retrofit process required by current retrofit specifications and additional requirements for other types of buildings

Assessment criteria

The learner can:

AC1.1 describe the **stages of the retrofit process** for all types of buildings
AC1.2 explain the role of different **stakeholders** involved in retrofit projects
AC1.3 outline **additional requirements needed for other types of buildings**

Range

AC1.1 **stages of the retrofit process**

- preliminary considerations
- inception
- assessment
- improvement option evaluation
- agreement of intended outcomes

- medium-term improvement plan
- design and specification
- statutory approvals
- installation and quality control
- testing, commissioning and handover
- evaluation

AC1.2 **stakeholders:**

- homeowner
- tenants
- private clients
- contractors
- installers
- advisors
- coordinators
- designers
- energy assessors
- material suppliers
- building control/inspectors

AC1.3 **additional requirements needed for other types of buildings**

- traditional and protected buildings:
    - heritage impact assessments
    - significance assessment
    - additional qualifications
- high rise buildings
    - collated dwelling assessment reports
    - additional qualifications
- system built buildings
    - additional qualifications

Learning outcome

The learner will:

LO2 Understand the requirements for the different stages and methods during a retrofit installation

Assessment criteria

The learner can:

AC2.1 outline **performance considerations and standards** during a retrofit installation
AC2.2 describe the importance of a **fabric first approach**
AC2.3 explain different methods for **medium term improvement plans**

Range

AC2.1 **performance considerations and standards**

- national emission reduction targets
- net zero strategies
- energy performance certificates (EPCs)
- differing targets depending on the age, construction and heritage of buildings

AC2.2 **fabric first approach**

- bring the building fabric into good repair - dealing with defects, water penetration, structural defects, poor pointing of masonry
- implement measures that are low cost and easy to install - energy efficient lighting, basic heating controls, better control settings
- improve the building fabric for insulation and air-tightness
- install efficient heating technology and responsive controls
- use LZC “renewable” energy technologies

AC2.3 **medium term improvement plans**

- staged/phased improvements
- order of completion of improvements
- adaptions for changes in technology and standards
- recording of data from improvements
- focus on building types and economies of scale

Learning outcome

The learner will:

LO3 Understand the different materials and types of construction encountered during retrofit

Assessment criteria

The learner can:

AC3.1 describe the **materials used in buildings**
AC3.2 describe different types of **external wall construction**
AC3.3 describe different types of **roof construction**
AC3.4 describe different types of **floor construction**

Range

AC3.1 **materials used in buildings**

- brick (facings, commons, engineering)
- concrete block (high density, aerated, thermal insulated)
- stone
- timber
- concrete

- slate
- tile
- thatch

AC3.2 **external wall construction**

- rubble wall construction
- solid wall construction
- timber frame construction
- modern insulated cavity walls
- damp proof courses (DPC)

AC3.3 **roof construction**

- traditional rafter and purlin roof
- trussed rafter roof
- attic truss roof
- flat roof warm deck
- flat roof cold deck
- ventilation type

AC3.4 **floor construction**

- stone flooring
- solid flooring
- rafts
- timber suspended floors
- precast concrete beam and block floors

Learning outcome

The learner will:

LO4 Understand the types of thermal insulation used for the retrofit of buildings and how these insulation methods differ according to the age and type of the building

Assessment criteria

The learner can:

AC4.1 describe the different **forms of thermal insulation** used in retrofit

AC4.2 explain factors that will affect the **choice of thermal insulation** for different building types and ages

AC4.3 describe **installation methods for thermal insulation**

AC4.4 explain **extra measures** that may affect installation of thermal insulation for different building types and ages

Range

AC4.1 **forms of thermal insulation**

- cavity wall insulation
- internally applied insulation
- external applied insulation
- spray foam insulation
- loft insulation
- floor insulation
- flat roof insulation

AC4.2 **factors affecting choice of thermal insulation**

- type of building
- age of building
- type of floor, wall and roof construction
- types of windows/doors installed
- significant heat loss location(s) in the external envelope
- local climate
- location of building services
- space availability
- access to interior/exterior of the building
- building regulations

AC4.3 **installation methods for thermal insulation**

- cavity wall insulation:
    - bonded and unbonded polystyrene beads
    - fiberglass
    - spray foam
- Floor insulation:
    - Rolls between floor joists
    - Rigid foam insulation slabs / sheets
    - Mineral wool slabs / sheets
    - Expanded polystyrene sheets
    - Composite insulated flooring panels
    - Warm slab methods
    - Cold slab methods
- Roof insulation:
    - Rigid foam insulation slabs / sheets
    - Mineral wool slabs / sheets
    - Foil backed thermal board
    - Laser cut tapered insulation
    - Warm deck methods
    - Cold deck methods

- internally applied insulation:
    - insulated plasterboard
    - insulated wall panels
- externally applied insulation:
    - insulation and render systems
    - insulation and cladding systems
- spray foam insulation:
    - between rafters
    - between loft floor joists
    - under floors
    - in crawlspaces
- loft insulation:
    - blankets
    - rolls
    - batts
    - loose fill

AC4.4 **extra measures**

- presence and control of hazardous materials
- integrity of the existing building structure
- location of existing services
- approaches for buildings with solid walls
- approaches for buildings constructed from breathable materials
- approaches for buildings with high proportion of glazing in the external envelope

Learning outcome

The learner will:

LO5 Understand alternative sources of energy and fuel sources used in buildings

Assessment criteria

The learner can:

AC5.1 describe **types of renewable heat energy and alternative fuel sources**
AC5.2 describe **types of renewable electrical energy**
AC5.3 describe **methods of storing renewable energy**

Range

AC5.1 **types of renewable heat energy and alternative fuel sources**

- air: air source heat
- ground: ground source heat

- solar: solar thermal water heating
- combined: micro combined heat and power
- chemical: hydrogen

AC5.2 **types of renewable electrical energy**

- solar: photovoltaic system
- wind: micro-wind turbine
- combined: micro combined heat and power
- chemical: hydrogen fuel cells

AC5.3 **methods of storing renewable energy**

- electric batteries
- heat batteries
- thermal stores
- back to grid systems
- shared energy systems
- vehicle storage
- capacitor storage

Learning outcome

The learner will:

LO6 Understand the process of installing renewable energy systems

Assessment criteria

The learner can:

AC6.1 outline **installation methods for renewable heat energy technologies and systems**
AC6.2 outline **installation methods for renewable electrical energy technologies and systems**
AC6.3 outline **installation methods for technologies for storage of renewable energy**

Range

AC6.1 **installation methods for renewable heat energy technologies and systems**

- air source heat pumps
- ground source heat pumps
- solar thermal water heating systems
- micro combined heat and power systems
- hydrogen-ready boilers

AC6.2 **installation methods for renewable electrical energy technologies and systems**

- photovoltaic cells
- micro-wind turbine
- micro combined heat and power

AC6.3 **installation methods for technologies for storage of renewable energy**

- electric battery storage systems
- heat batteries and thermal stores

Unit 302 Guidance for Retrofit Installations

Supporting Information

Unit guidance

The recommendation for this unit is for it to be taught in a traditional classroom-based environment.

Learning outcome 1: learners will develop an overarching understanding of the retrofit process and the involvement of various stakeholders at different stages. They will also develop understanding of specific additional requirements for other types of buildings.

Learning outcome 2: learners will develop their understanding of what is needed for different methods and stages of a retrofit installation by considering the performance and any standards required for the building. Learners will then subsequently consider, and show understanding of, the fabric first approach and medium-term improvement plans when undertaking a retrofit installation project

Learning outcome 3: learners will develop their understanding of materials and types of construction which are integral aspects of knowledge for this qualification. They are required to describe the different types of construction which are important to any retrofit decision.

Learning outcome 4: learners will develop their understanding of thermal insulation i.e. type of insulation, type of building, age of building. Additionally, they will then consider extra measures that affect thermal insulation.

Learning outcome 5: learners will develop their understanding and will describe alternative sources of energy and fuel sources which should be applied to scenario or contextualised learning.

Learning outcome 6: learners will develop their knowledge of the installation methods for insulation and renewable energy system (heat, electrical and methods of storage). They will be required to outline how these are installed and their potential locations.

Suggested learning resource

McMullan R - Environmental Science in Building (Palgrave MacMillan (8th Edition) (MacMillan 2017) ISBN 978 1 137 60544 3

Greeno R & Osbourn D – Mitchell's Introduction to Building (5th Edition) (Routledge 2013) ISBN 978 0 273 73804 6

Chudley R et al – *Construction Technology (5th Edition)* (Pearson 2011)

ISBN 978 0 435 04682 8

Unit 303 Communication for Retrofit Projects

Level:	**3**
Guided Learning Hours (GLH):	**30**
Assessment method:	Presentation
Aim:	The aim of this unit is to enable learners to develop the knowledge and skills required to effectively communicate with a diverse range of stakeholders involved in retrofit projects. The unit supports understanding of effective communication strategies and principles, utilising both written and verbal communication methods to promote positive change and advocate the advantages of retrofitting. Learners will increase their knowledge and understanding of customer service strategies and techniques to ensure that they can provide exceptional service to customers throughout the retrofit process.

This unit will be synoptically assessed with the content of Unit 302.

Learning outcome

The learner will:

LO1 Be able to apply effective communication principles which are relevant to retrofit projects

Assessment criteria

The learner can:

AC1.1 outline **different communication channels** that can be used in retrofit projects

AC1.2 discuss **barriers to effective communication** in retrofit projects

AC1.3 explain potential **areas of conflict or challenge** that may arise during retrofit projects

Range

AC1.1 **different communication channels**

- face to face
- site visits
- phone calls
- emails

- online platforms
- virtual tools, environments and video conferencing
- printed materials
- community engagement events
- market research survey
- interviews

AC1.2 **barriers to effective communication**

- technical jargon
- information overload
- time constraints
- language barriers
- lack of trust
- cultural differences
- literacy level

AC1.3 **areas of conflict or challenge**

- budget
- timeline
- scope of work
- quality of work
- communication
- regulatory compliance
- environmental concerns
- reluctance or resistance to change

Learning outcome

The learner will:

LO2 Understand how to effectively communicate with stakeholders involved in retrofit projects

Assessment criteria

The learner can:

AC2.1 outline **methods to present information** to stakeholders involved in retrofit projects
AC2.2 discuss the appropriate **methods to communicate** with stakeholders involved in retrofit

Range

AC2.1 **methods to present information**

- written reports
- presentations
- infographics
- 3D renderings
- site visits
- online portals
- social media
- newsletters
- representatives
- video and audio recordings
- data analysis

AC2.2 **methods of communication**

- meetings
- emails
- phone calls
- project management software
- social media
- newsletters
- open houses
- community engagement days

Learning outcome

The learner will:

LO3 Be able to demonstrate communication skills used in retrofit projects, using both written and verbal communication methods

Assessment criteria

The learner can:

AC3.1 produce **written communication** appropriate to the audience for a retrofit project
AC3.2 deliver a **verbal presentation to an external stakeholder** involved in retrofit projects
AC3.3 demonstrate the skill of **interacting with an audience** during verbal communication

Range

AC3.1 **written communication**

- clarity
- structure
- language register
- spelling, tone, grammar and punctuation
- formatting
- terminology
- accuracy
- importance of information
- justification

AC3.2 **verbal presentation**

- clarity
- structure
- confidence
- adaptability
- time management
- body language of self
- appropriate language – technical and non-technical of language
- tone

AC3.3 **interacting with an audience**

- active listening
- empathy
- clarification
- collaborative approach
- summarising and questioning
- persuasion techniques

- composure
- empathy
- clarity
- guidance
- cultural awareness
- respect
- adaptability
- value of information
- patience

Learning outcome

The learner will:

LO4 Be able to demonstrate effective customer care in retrofit projects to encourage positive engagement

Assessment criteria

The learner can:

AC4.1 discuss **misconceptions about retrofit**
AC4.2 convey the **potential challenges** and **long-term benefits** in retrofit projects

Range

AC4.1 **misconceptions about retrofit**

- in relation to energy savings
- in relation to property value

AC4.2

challenges

- cost
- disruption to daily life
- complexity
- lack of knowledge
- not an established technology
- financial
- skills shortages
- maintenance
- age of buildings

long-term benefits:

- energy saving
- improved comfort

- health benefits
- property value
- reduce carbon footprint
- job creation
- energy security
- enhanced community resilience

Unit 303 Communication for Retrofit Projects

Supporting Information

Unit guidance

This unit is suitable for simulated role play within the classroom environment and traditional classroom teaching.

Learning outcome 1: learners will develop their understanding of communication principles and their effectiveness in relation to different channels of communication. Learners will be able to plan for and assess the effectiveness of communication as they will discuss barriers and potential areas of conflict or challenge.

Learning outcome 2: learners will study techniques of communication specific to stakeholders involved in retrofit projects; these include different methods to present information and methods that are used to communicate effectively**.**

Learning outcome 3: is a practical-based outcome, where learners will be required to demonstrate their written and verbal skills in communication. They will also show evidence of skills related to audience response. This learning outcome is well suited to practical delivery and use of simulated scenarios.

Learning outcome 4: learners will develop their understanding of customer care within retrofit projects. They will show their understanding of misconceptions, potential challenges and long term benefits and techniques in persuasion.

Unit 304 Health and Safety in Retrofit Projects

Level:	**3**
Guided Learning Hours (GLH):	**15**
Aim:	The aim of this unit is to enable learners to develop the knowledge and skills required to actively engage with the health and safety in retrofit projects. Learners are required to show understanding of the relevant legislation and regulations procedures for managing health and safety, methods to promote a positive health and safety culture and how to evaluate safe working practices in retrofit projects. The unit will equip learners with the skills and knowledge required to conduct their roles and responsibilities as employers, workers, and stakeholders in ensuring safe and healthy working environments in retrofit projects.
Assessment type:	Assignment

Learning outcome

The learner will:

LO1 Understand the relevant legislation and regulations related to health and safety in retrofit projects

Assessment criteria

The learner can:

AC1.1 identify the relevant **health and safety legislation and regulations** in retrofit projects

AC1.2 identify the **key stakeholders** involved in health and safety for retrofit projects

AC1.3 explain **compliance responsibilities** in health and safety for retrofit projects

AC1.4 explain the **impact of non-compliance** in health and safety for retrofit projects

Range

AC1.1 **health and safety legislation and regulations**

- CDM regulations (Construction Design Management)
- COSHH (Control of Substances Hazardous to Health)
- Control of Asbestos Regulations
- Electrical Safety Standards
- Gas Safety Regulations

- HASAWA (Health and Safety at Work etc Act)
- Management of Health and Safety at Work Regulations
- Manual Handling Operations Regulations
- Personal Protective Equipment at Work Regulations
- RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations)
- Working at Heights Regulations

AC1.2 **key stakeholders**

- retrofit professionals
- supervisors
- contractors
- subcontractors
- members of the public
- external visitors
- building occupants

AC1.3 **compliance responsibilities**

- risk assessment
- attend project safety inductions
- toolbox talks
- PPE (personal protective equipment)
- provide safe and maintained work equipment
- provide a safe as practicable working environment
- reporting health and safety hazards and risks
- compliance with site procedures
- compliance with legislation and regulations

AC1.4 **impact of non-compliance**

- health risks
- legal consequences
- financial implications
- reputational damage
- delay to schedule

Learning outcome

The learner will:

LO2 Understand the procedures for managing health and safety in retrofit projects

Assessment criteria

The learner can:

AC2.1 review the use of **control measures** that can be implemented for retrofit projects

AC2.2 identify **monitoring procedures** for health and safety in retrofit projects

Range

AC2.1 **control measures**

- risk assessment
- training needs analysis
- health and safety policy structure
- policy reviewing
- policy sharing/delivery
- monitoring and evaluation

AC2.2 **monitoring procedures**

- hazard reporting
- training
- inspections
- records
- reviewing

Learning outcome

The learner will:

LO3 Understand the methods for promoting a positive health and safety culture in retrofit projects

Assessment criteria

The learner can:

AC3.1 describe the **key elements of a positive health and safety culture**

AC3.2 explain the **benefits of a positive health and safety culture** in retrofit projects

AC3.3 identify **personal contributions towards a positive health and safety culture** in retrofit projects

Range

AC3.1 **key elements of a positive health and safety culture**

- leadership
- communication
- consistent monitoring
- responsibility for own actions
- continuous improvement

AC3.2 **benefits of a positive health and safety culture**

- reduced risk of accidents
- increased productivity
- increased staff morale
- overall cost reduction
- increased legal compliance
- positive reputation
- improved staff wellbeing
- collaborative working and teamwork

AC3.3 **personal contributions towards a positive health and safety culture**

- behaviour
- attitude
- positive communication
- influence

Learning outcome

The learner will:

LO4 Be able to evaluate safe working practices and create a risk assessment

Assessment criteria

The learner can:

AC4.1 identify **potential hazards** associated with working in customer buildings
AC4.2 identify **control measures** to mitigate potential hazards
AC4.3 create a **risk assessment**

Range

AC4.1 **potential hazards**

- general hazards
- hazards from stakeholders
- hazard from tools and equipment
- hazards from worker behaviour

AC4.2 **control measures**

- generic measures
- permits
- PPE
- signage
- fencing/barriers

AC4.3 **risk assessment**

- hazards
- severity of risk
- likelihood of risk
- control measure
- risk severity score
    - initial severity score
    - final severity score
- review of risk assessment

Unit 304 Health and Safety in Retrofit Projects

Supporting Information

Unit guidance

Where the unit content includes legislation or regulations, centres must refer to up-to-date legislation or regulations at the time when teaching and assessment is taking place.

This unit is suitable for traditional classroom based delivery, supported by independent research by learners.

Learning outcome 1: learners will develop the required foundation of understanding in Health and Safety, focusing on the relevant legislation and regulations. They will need to understand the key elements of legislation and regulations and identify how key stakeholders are involved in compliance with health and safety. Additionally, learners will be required to explain the impact of non-compliance for all stakeholders.

Learning outcome 2: learners will develop their knowledge and understanding of the procedures that take place when managing health and safety.

Learning outcome 3: learners will develop their understanding of how to promote a positive health and safety culture in retrofit projects, ensuring they understand the benefits of doing so, and are able to contribute towards the desired culture.

Learning outcome 4: learners will develop an applied understanding for retrofit advisors regarding work carried out during retrofit projects. This learning outcome will provide experience in creating risk assessments and mitigating risks for different situations and scenarios.

Appendix 1 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 **Centre document library** on **www.cityandguilds.com** or click on the links below:

Centre Handbook: Quality Assurance Standards

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on:

- centre quality assurance criteria and monitoring activities
- administration and assessment systems
- centre-facing support teams at City & Guilds/ILM
- centre quality assurance roles and responsibilities.

The Centre Handbook should be used to ensure compliance with the terms and conditions of the centre contract.

Centre Handbook: Quality Assurance Standards

This document sets out the minimum common quality assurance requirements for our regulated and non-regulated qualifications that feature centre-assessed components. Specific guidance will also be included in relevant qualification handbooks and/or assessment documentation.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements or actions that will be taken to align centre marking/assessment to required standards. Additionally, it provides detailed guidance on the secure and valid administration of centre assessments.

Access arrangements: When and how applications need to be made to City & Guilds 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 document library** also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

Please visit the Contact us section of the City & Guilds website, **Contact us.**

City & Guilds

For over 140 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

We partner with our customers to deliver work-based learning programmes that build competency to support better prospects for people, organisations and wider society. We create flexible learning pathways that support lifelong employability because we believe that people deserve the opportunity to (re)train and (re)learn again and again – gaining new skills at every stage of life, regardless of where they start.

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