T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

T Level Technical Qualification in Onsite Construction

Specification

First teaching from January 2025
Version 1.6

City & Guilds | eal

Version and date	Change detail	Section
1.1 Jan 2021	Numbering sequence error in section 4 – revised to 4.7 and 4.8	Onsite Construction core: Section 4 Construction and the Built Environment. Pg. 67
1.1 Feb 2021	Updated age ranges	Qualification at a glance Pg 2
	Assessment dates updated in availability of assessments	Scheme of Assessment – Availability of Assessments Pg 41
	Provider and Technical Qualification approval criteria	Centre requirements Pg 12
	Update qualification title	What is this qualification about Pg 7
	Transfer of attainment added	Delivering the technical qualification Pg 27
1.2 May 2022	How does the technical qualification work within the T Level?	What is this qualification about Pg 7
	Requirements of the T Level	T Level Structure Pg 10
	Approval information	Centre requirements Pg 12
	Update to learner entry requirement wording	Learner Entry Requirements Pg 18
	Definition of threshold competence	Technical qualification grading and result reporting Pg 41
	Sources of general information updated for currency	Appendix 1: Sources of general information Pg 251
	Additional contact details added	Get in Touch Pg 254
1.3 Jul 2023	Alignment of text in relation to ESP Assessment Objective (AO3) with assessment materials	Core component scheme of assessment Pg 28
	Centre staffing requirement wording	Resource requirements - Centre staffing Pg 13
	Transfer of attainment section updated	Delivering the technical qualification Pg 17
	Permitted assessment materials for Core exams added	Core component scheme of assessment Pg 26
	Updated assessment overview to correctly align with the content sections	
	Amendments to terminology in assessment availability table	Availability of assessments Pg 36
	Additional range added	Unit 300, criteria 5.9, 11.6
	Additional guidance added	Unit 300, criteria 1.2 (What do learners need to learn)

	Front page image, footers and copyright statement updated	Front and back page
	Core grading table inserted	Core grading Pg 32
	T Level grading table updated	T Level grading Pg 41
1.4 Jul 2023	List of physical resources expanded	Physical Resources Pg 16
1.5 May 2024	Core content amplification	Onsite construction core Pg 51
1.6 January 2025	Grammatical error update	Onsite construction core Pg 51

Qualification at a glance

T Level route	Construction
T Level pathway	Onsite Construction
City & Guilds number	8711
Age group approved	16-19
Entry requirements	Formal entry requirements are not set by City & Guilds. However, we would expect that Learners have the appropriate attainment at Level 2 before commencing their studies.
Assessment	Core – knowledge tests are externally assessed Core – employer-set project is externally assessed Occupational specialisms are externally moderated
First registration	September 2021

Title and level	City & Guilds number	Qualification number (QN)
T Level Technical Qualification in Onsite Construction	8711	603/6917/6

We would like to take this opportunity to thank all of the employers, trade associations, professional bodies, providers, subject matter experts and consultants who have worked tirelessly alongside us on the development of the TQ. A special thank you to our Employer Industry Board who have dedicated time to review and validate the specifications and TQ documentation. This collaborative work is to ensure that a student studying the T level has the best opportunities available to them as they progress through their career with a solid base as a starting point.

- A.C. King Construction Ltd
- Ann Cook Associates
- Bagnalls
- Barnet Council
- Carney Consultancy
- Guinness Property
- H and H Joiners and Builders Ltd
- Hadrian Architectural Glazing Systems Ltd
- Kings Rock Joinery
- KS Construction Solutions
- Lee Marley Brickwork
- Matthew Reid Joinery
- NAWIC – National Association of Women in Construction
- Painting and Decorating Association
- Persimmon Homes
- R and L Construction
- Rose Builders Ltd
- Rowe and Martin Ltd
- Saint Gobain
- SS Carpentry & Joinery
- TEC Construction
- Timbrell Decorators
- UK Construction Ltd

The Outline Content for the T Level Technical Qualification in Onsite Construction has been produced by T Level panels of employers, professional bodies based on the same standards as those used for Apprenticeships. The outline content can be found on the institute website: **https://www.instituteforapprenticeships.org/t-levels/approved-t-level-technical-qualifications-and-final-outline-content/**

City & Guilds has amplified the Outline Content to create the Technical Qualification specifications.

Contents

1 Introduction

What is this qualification about?

The following purpose statement relates to the **T Level Technical Qualification in Onsite Construction**

Area	Description
OVERVIEW	
What is a T Level?	T Levels are new courses which will follow GCSEs and will be equivalent to three A Levels. These two-year courses have been developed in collaboration with employers and businesses so that the content meets the needs of industry and prepares learners for work. T Levels are one of three post-16 options for young people: • A Levels • Apprenticeships • T Levels
How does the technical qualification work within the T Level?	This technical qualification specification contains all the information needed to deliver the T Level in Construction: Onsite The technical qualification forms a significant part of the T Level in Onsite Construction. City & Guilds is responsible for the development and ongoing operational delivery of this technical qualification. All other parts of the T Level as listed below will need to be achieved by learners for the Department for Education to award the successful completion of this T Level. It is important to note that City & Guilds does not have responsibility for delivery of the other parts of the T Level but will continue to support centres where they can on all aspects of T Level delivery. Additional mandatory parts of the T Level that need to be achieved: • a 315-hour minimum industry placement.

Who is this qualification for?	This qualification is for 16–19-year-old learners who wish to work within the onsite construction industry. It has been designed to deliver a high level of knowledge about the onsite industry as well as the occupational skills required to enter the industry (known as 'threshold competence'). A learner who completes this qualification is well placed to develop to full occupational competence with the correct support and training
What does this qualification cover?	The qualification will help learners gain an understanding of the onsite industry and the sector, and learners will cover topics such as health and safety, construction science principles and sustainability in the construction industry. A learner will choose one occupational specialism from the list below: • Bricklaying • Carpentry and Joinery • Painting and Decorating • Plastering Centres and providers work with local employers who will contribute to the knowledge and delivery of training. Employers will provide demonstrations and talks on the industry, and where possible work placements will also be provided by the employers.

WHAT COULD THIS QUALIFICATION LEAD TO?	
Will the qualification lead to employment, and if so, in which job role and at what level?	This technical qualification focuses on the development of knowledge and skills needed for working in the onsite industry, which will prepare learners to enter the industry through employment or as an apprentice. Furthermore, the completion of this qualification gives learners the opportunity to progress to higher education courses and training.
Why choose this qualification?	This qualification will suit learners who are not yet employed or who are looking to enter the industry post-mainstream education. The structure of the qualification is designed to give learners breadth of knowledge and understanding across the onsite industry but also to equip them with necessary occupational and core skills to enter the industry. This qualification is designed to support fair access and enables learners to manage and improve their own performance.
WHO SUPPORTS THIS QUALIFICATION?	
Employer route panels	The content of this qualification is outlined by a representative panel of employers from across the industry sector. It therefore prescribes the minimum knowledge and skills required to enter the industry. The content in this specification is approved by the Institute for Apprenticeships and Technical Education.

Key information

Below is a summary of the key information provided to centres to support delivery of this technical qualification.

Guided learning hours (GLH) value

Values for GLH are calculated by considering the duration needed for the activities that a typical learner would need to complete to be able to demonstrate the knowledge and skills across the qualification content. This includes contact with tutors, trainers or facilitators as part of the learning process, and includes formal learning such as classes, training sessions, coaching, seminars and tutorials. This value also includes the time taken to prepare for, and complete, the assessments for the TQ qualification.

Centres should be aware that when planning programmes of study around the GLH that the GLH is based on a typical learner for this qualification. However, learners progress and develop at a different pace that is unique to the individual learner, and learners will have different qualification relevant experience. To accommodate this, centres must be aware that some learners will not need the full GLH to develop and demonstrate the required knowledge and skills and some learners will need slightly longer than the proposed GLH to develop and demonstrate the knowledge and skills required. Therefore, centres should plan the flexibility within their programmes of study to reflect and support the needs of all learners.

Total Qualification Time (TQT) value

This is the total amount of time, in hours, expected to be spent by a learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study, and assessment.

Criteria

This section of the specification outlines the subject or topic that needs to be delivered and assessed. Criteria are often supported by **'range'** which provides the detail of the information required to be delivered as part of that topic. For example, with Health & Safety legislation as the topic, the range would list the legislation that would need to be covered in delivery and assessment.

What do learners need to learn?

The primary purpose of these sections is to support the delivery of the content in the criteria. These sections provide context in relation to the depth and breadth to which a subject or topic needs to be taught.

Skills

This section provides a mapping reference to the core, maths, English and digital skills that are embedded within the technical qualification content.

Example

3.3 Role of different **disciplines** involved in design.

Range:

Disciplines - Contractors and all operatives, architects and all professional occupations, planners and building inspectors, manufacturers

What do learners need to learn?

A basic knowledge of key job roles within construction design including the responsibilities and reporting lines/lines of escalation within roles. The key activities aligned to the disciplines with an appreciation of potential career progression routes.

T Level Structure

To achieve the T Level learners must meet all requirements of the T Level framework of which the technical qualification is one part. Learners have to successfully complete an industry placement and any other requirements set by the Institute for Apprenticeships and Technical Education (IFATE) such as licence to practice qualifications.

Technical Qualification Structure

The technical qualification is made up of two components, both of which need to be successfully achieved to attain the T Level Technical Qualification in Onsite Construction.

The Core Component:
The core content is designed to offer sufficient breadth of knowledge and skills for the learner to apply in a variety of contexts related to the industry and those occupational specialisms linked to this T Level.

The core content is the building blocks of knowledge and skills that will give a learner a broad understanding of the industry and job roles. At the same time, it will develop the core skills they will need to apply when working within the industry.

Occupational Specialisms:
Occupational specialisms develop the knowledge, skills and behaviours necessary to achieve threshold competence in an occupation. Threshold competence is defined as when a learner's attainment against the knowledge, skills and behaviours is of a standard for them to enter the occupation and industry. They must also demonstrate the ability to achieve occupational competence over time with the correct support and training.

To achieve the **T Level Technical Qualification in Onsite Construction** learners must achieve the two components of the Technical qualification. These are known as the core component and the occupational specialism:

- Onsite Construction component (300)
- plus, **one** occupational specialism components (305 – 308)
- Learners must be registered on the mandatory POS and one other POS covering the occupational specialisms.

T Level Technical Qualification in Onsite Construction					
Programme of study (POS)	**City & Guilds component number**	**Component title**	**Component level**	**GLH**	**TQT**
Mandatory					
8711-30	300	Onsite Construction core	Level 3	400	520
Choose one occupational specialism (one must be chosen)					
8711-35	305	Bricklaying	Level 3	600	700
8711-36	306	Carpentry and Joinery	Level 3	600	700
8711-37	307	Painting and Decorating	Level 3	600	700
8711-38	308	Plastering	Level 3	600	700

2 Centre requirements

Approval

All eligible providers must obtain Full Provider Approval with City & Guilds prior to delivering any T Level Technical Qualification (TQ).

Provider approval is not equivalent to centre approval; any provider which is already an existing City & Guilds approved centre must still obtain Full Provider Approval in the first instance. There is no fast-track approval for these qualifications.

Once successfully approved, providers can apply for additional TQs or apply to add additional occupational specialisms (OS) during each approval window.

The approval application consists of a comprehensive set of approval criteria agreed with the Institute to ensure an eligible provider is fit and ready to deliver T Level Technical Qualifications.

These criteria seek to ensure the integrity of the qualifications for both City & Guilds and the Institute. They must be adhered to throughout the delivery of the TQ and will be reviewed at the annual self-assessment.

Criteria A Management Systems
Criteria B Industry placement
Criteria C Resources
Criteria D Delivery
Criteria E Assessment and standardisation plan
Criteria F Secure live assessment and administration
Criteria G Conflicts of Interest (COI)

Please refer to our published provider approval and quality assurance information document available on our website **here**. This document includes information around the approval process, criteria for approval and the timeline for the relevant academic year.

Resource requirements

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

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 learning or training needs
- support and guidance they may need when working towards their qualification
- the appropriate type and level of qualification

We recommend that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre.

Centre staffing

Staff delivering and assessing these qualifications must be able to demonstrate that they meet the following requirements

- be occupationally competent and qualified at or above the level they are delivering
- have maths and English at Level 2 or be working towards this level of qualification
- be able to deliver across the breadth and depth of the content of the qualification being taught
- have recent relevant teaching and assessment experience in the specific area they will be teaching, or be working towards this
- demonstrate continuing CPD
- have experience or training in the following to support the delivery of this technical qualification:
    - delivering project-based qualifications
    - preparation for exam-based assessments.

Onsite Core

Staff who are familiar with L3 Construction qualifications will be able to teach the core subjects.

Occupational specialisms specific requirements

Bricklaying

Must hold an NVQ Level 3 Diploma in Bricklaying or craft/advanced craft equivalent including relevant CPD that demonstrates the qualification standards and requirements.

Carpentry and Joinery

Must hold an NVQ Level 3 Diploma in Carpentry and Joinery or NVQ Level 3 Diploma in Site Carpentry and NVQ Level 3 Diploma in Bench Joinery or craft/advanced craft equivalent including relevant CPD that demonstrates the qualification standards and requirements.

Painting and Decorating

Must hold an NVQ Level 3 Diploma in Painting and Decorating or craft/advanced craft equivalent including relevant CPD that demonstrates the qualification standards and requirements.

Plastering

Must hold an NVQ Level 3 Diploma in Plastering or craft/advanced craft equivalent including relevant CPD that demonstrates the qualification standards and requirements.

Staff assessing these qualifications must meet the above requirements as well as hold or be working towards a relevant recognised assessor qualification such as a Level 3 Certificate in Assessing Vocational Achievement and continue to practice to that standard. Assessors who hold earlier qualifications (D32 or D33 or TQFE/TQSE) should have CPD evidence to the most current standards. Assessors must also hold a relevant trade qualification and/or having registration with a relevant trade organisation as 'Approved tradesperson' status or 'Eng-Tech' status.

Physical resources

Centres must be able to demonstrate that they have access to the equipment and technical resources required to deliver this qualification and its assessment.

Bricklaying

- **Workspace:** Suitable ventilation, water access, suitable power supply, areas for washing tools and equipment, an appropriate method for safe waste separation and disposal
- A range of brick and block materials will be required to produce solid walls, cavity walls, decorative features and different bonding methods
- A range of timber construction frames and steel and concrete lintels
- Manufacturer's instructions
- **PPE:** safety footwear, safety glasses, ear defenders, gloves, protective clothing
- **Access equipment:** hop up
- **Protective coverings:** dust sheets, plastic sheeting
- **Measurement and setting out equipment:** Tape measures, compasses, dividers, trammel heads, set squares, builders square, profiles, chalk line, pinch rods, sliding bevel, laser level, dumpy/optical level, surveying staff, spirit level, boat level, water tube, line, pins and corner blocks
- **Drawing equipment:** drawing board, scale rule, compass, protractor, set squares, pencils, drawing pens, drawing paper, graph paper, tracing paper
- Calculator
- **Appropriate tools for bricklaying tasks:** Brick trowel, pointing trowel, half round and recess jointer, gauge rod, pointing hawk, lump/club hammer, bolster, brick hammer, scutch hammer, lines, pins and corner blocks, wire brush, hand brush, carborundum stone, plugging/jointing chisel, 110 V drill, transformer and extension lead, mechanical cutting machinery, grinder, hand saw, storey rod, block splitter, trammel rod, sanding block, rasp/file, tin snips, ranging poles, sweeping brushes, wheelbarrows, templates or trammel to construct horizontal and radial brickwork, batter boards
- Materials to construct temporary supports – props and wedges
- **Shoring equipment:** adjustable steep props, strong boys, isolated brick/block piers, sole plates
- **Mixing equipment:** shovels, buckets, 110 V mortar mixer, diesel mixer (optional), pan mixer
- Access to suitable materials for taught and assessed components

Carpentry and Joinery

- Manufacturer's instructions
- **PPE:** hearing protection, safety glasses, dust mask, gloves
- Access equipment: step ladder, hop up
- Access to suitable materials for taught and assessed components
- **Measurement equipment:** steel rules, tape measures, 1 m and 1.8 m spirit levels, straight edge, steel/roofing square
- **Setting out and drawing equipment for the geometry requirements:** protractor, trammel heads and beam, compass, dividers, T square, carpenters/combination square, set squares, drawing boards, scale rules, 2H pencil

- **Marking out equipment:** Try-square, sliding bevel, combination marking gauge, marking knife, box square, string/chalk line, marking cramps
- **Carpentry hand tools:** hand saw, panel saw, pad saw, coping saw, smoothing plane, jack plane, range of bevel edged and mortice chisels, hammer, punches, bradawl, range of auger and twist bits, pincers, pliers, screwdrivers
- **Additional joinery hand tools and equipment:** tenon saw, pull saw, dovetail saw, rebate plane, block plane, shoulder plane, G, F and sash cramps, bench bearers, draw pins, squaring rod, fence for steel square, spokeshaves (convex and flat), mallet, hand tool sharpening equipment
- **Power tools:** handheld/portable circular saw, router with a range of cutters and associated templates (stair, worktop and lock jig), drill/driver with range of screwdriver bits, planer, jigsaw, multicutter, orbital sander, belt sander
- **Machines:** planer/thicknesser, saws (circular, band), spindle/industrial router table, hollow chisel morticer
- Safety aids for machines: push sticks, push blocks, saddles, jigs, additional support
- **Workspace:** joiner's bench with vice, adequate ventilation and LEV/extraction, appropriate waste disposal, equipment to tidy/clean any work surface/work area debris
- Access to suitable materials for taught and assessed components, including a range of fixings for the candidates to select from

Painting and Decorating

- **Working surfaces and area:**
    - Staircase
    - Ceiling
    - Walls that include the following features: internal and external corners, panelled door, chimney breast, fireplace surround with backboard, alcoves, dummy electrical points, skirting boards, architrave radiator
    - Access to appropriate waste disposal
    - Suitable ventilation
    - Mixing area with access to water
    - Paint preparation benches
- **Preparation:**
    - Manufacturer's instructions
    - PPE: overalls, respirators, safety glasses, gloves, ear defenders
    - Access equipment: stair scaffold, hop up, light weight staging
    - Protective coverings: dust sheets, masking tape, plastic sheets
    - Drawing equipment: drawing board, scale rule, compass, protractor, set squares, pencils, drawing pens, scissors, glue, drawing paper, graph paper, tracing paper
    - Calculators
    - Materials available to create colour decorative designs including access to BS4800 colour charts and colour schemes
    - Warning signs: wet paint
    - Measurement equipment: rulers, tape measures, plumb lines, chalk lines, spirit levels, laser levels
- **General tools and equipment:** various sizes of paint brushes, dusting brush, flat wall brush, roller, roller pole, frame and scuttle, scraper, filling knife and board, sanding block, paint kettle, buckets, sponge, craft knife, caulking gun, shave hook, hot

air gun, steam stripper, palette knife and board, paint stirrers, dustpan and brush, sweeping brush

- **Application of surface coatings:**
    - Decorating tools and equipment for the preparation of surfaces, application of paints by brush, roller and HVLP spray. This should include both solvent-based and water-based applications
    - Water borne and solvent borne coatings:
        - A range of coloured paints including a variety of paint finish types, i.e. matt, semi-gloss, gloss, etc
        - Masking machine
        - Trowel and texturing tools
        - Paint thickness gauge
    - Spray equipment:
        - HVLP
        - Airless spray
        - Ford cup / viscometer
    - Specialist technique equipment:
        - Broken colour effects – sponges, chamois leather, cotton cloths, block and edge stipplers, combs
        - Stencilling: stencil brushes, stencil cutting equipment, mylar, card/mountboard, cutting mat
        - Marbling: fitches, softener, natural sponge, feathers
        - Graining: fitches, softener, dragger, combs, cutter, mottler, check roller
        - Gilding: gilders knife, cushion, tip and mop, burnisher
- **Application of wall coverings:**
    - Decorating tools and equipment for the preparation of surfaces, application of wallcoverings:
        - Shears
        - Trimming knives
        - Fabric-backed vinyl joint cutter
        - Plastic protective strip
        - Folding rule
        - Straight edge
        - Tape measure
        - Smoothing brush
        - Cutting board
        - Trimming knives
        - Seam roller
        - Vinyl wallcovering hanging equipment
        - A range of wallcoverings: preparatory, patterned and non-patterned, relief textured

Plastering

- Manufacturer's instructions, specifications and manufacturer's samples/designs/materials
- **PPE:** dust respirator, gloves, hi-vis, overalls, ear plugs, safety glasses
- **Access equipment:** hop up

- Protective coverings including dust sheets, timber sheeting, plastic sheeting, netting, dust sheets
- **Drawing equipment:** set squares, graph paper, protractor, compasses, scale rulers
- Teaching resources for delivering internal and external solid and fibrous plasterwork
- **Internal plastering and dry lining tools and resources:** hawk and trowel, tape measure, utility knife, snips, bucket trowel, shovels, hammer, sweeping brushes, floor scraper, spot board and stand, straight edge, mechanical breaker (optional), lump hammer and bolster, various application and cleaning brushes, comb scratcher, devil float, darby, dry wall drill, rasp, pad saw, level, laser level (optional), board lifter, box rule, corner tool, stapler, jointer/scrapper, claw hammer, lath hammer, setting out square
- **External rendering tools and resources:** polyurethane float, polycarbonate float, sponge float, scape texture tool, ashlar cutting tool, dashing paddle, segregated rule and i-bar
- **Fibrous casting tools and resources:** casting benches (19approx. measurements 2.4 m x 1.2 m), suitable vice, hand and power tools, aviation snips curved and straight, nibblers, files (straight, half round, round), suitable cordless drill, chalk line, timber running rule, various application brushes, small tool, busks, joint rule, casting brush, rubber bowls, gauging trowel, marking out (level, tape measure, mitre box, square), punch, saws (hacksaw, coping, panel), scissors
- **Mixing equipment:** buckets, drum mixer, drill and whisk, mixing bowls/bucket
- Each bay must contain:
    - Wall surfaces: plain walls, walls with returns, walls with openings, wall containing a pier and a timber stud partition and ceiling
    - Access to appropriate waste disposal
    - Cutting area for plasterboard
    - Suitable mixing area with water, 110 V power supply and adequate ventilation
    - Appropriate access equipment

Internal quality assurance

Internal quality assurance is key to ensuring accuracy and consistency of tutors and markers. Internal quality assurers (IQAs) monitor the work of all tutors involved with a qualification to ensure they are applying standards consistently throughout assessment activities. IQAs must have, and maintain, an appropriate level of technical competence and be qualified to make both marking and quality assurance decisions through a teaching qualification or recent, relevant experience.

Learner entry requirements

Centres must ensure that all learners have the opportunity to gain the qualification through appropriate study and training, and that any prerequisites stated in the **What is this qualification about?** Section are met when registering for this qualification.

Formal entry requirements are not set by City & Guilds, but it is expected that learners will have qualifications at Level 2 or equivalent. This may include:

- Level 2 vocational qualification or equivalent in a related subject, e.g. construction and the built environment

3 Delivering the technical 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
- the appropriate type and level of qualification.

City & Guilds recommends that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as learners, and the responsibilities of the centre. This information can be recorded on a learning contract.

Programme delivery

The technical qualification should be delivered through approaches that meet the needs of learners. City & Guilds recommends using a variety of delivery methods, including in classrooms and real work environments. Learners may benefit from both direct instruction in more formal learning environments and taking part in investigative projects, e-learning and their own study and learning through indirect approaches to delivery.

Transfer of attainment

We fully expect some students to switch between T Levels, particularly in the early weeks, as happens currently with many post-16 courses. Some providers may co-teach some T Level groups for some classes where these are within the same route and where much of the core content is the same. This may well result in students switching to a different T Level, as they discover more about the content, including the range of occupational specialisms. Depending on the point at which a student switches, they may need some additional support to catch up any other pathway-specific learning they have missed. During Year 1, providers should consider the degree of overlap between two T Levels, and the remaining time pre-assessment, to determine which transfers should be permitted. For funding purposes, it is important that students have made a decision about their T Level and registered for their occupational specialism by the end of the first year. However, once an assessment has been taken, switching may become more difficult. T Level core assessments will vary in terms of content coverage, duration, and method, and therefore attainment from one T Level cannot count towards another.

4. Competency frameworks

The technical qualification has been developed to include competency frameworks for T Levels, which demonstrate an array of competencies across maths, English and digital skills as well as four key core skills that have been mapped on to the core content. This can be seen in the skills section for each criterion.

Core skills

In the design, delivery and assessment of the technical qualification the following core skills are fundamental in the development of the required knowledge, skills and behaviours that learners will need to use when they progress onwards from completing their T Level. These core skills have been mapped on to the design of the qualification content and developed in consultation with the industry and providers. The mapping identifies opportunities where these core skills can be developed and embedded into teaching and learning. It is not expected that all criteria will develop core skills, but where these skills exist in the core content it has been referenced to support centres.

- **Core skill A (CSA)** Applying a logical approach to solving problems, identifying issues, and proposing solutions e.g. through setting criteria for successful implementation of a system, using cost/benefit analysis of the introduction of new procedures or equipment.

    - Complying with the requirements of risk assessments and method statements.
    - Ensuring allocated tasks are completed on time, to the required standard.
    - Ensuring the planning and design of a project meets the needs of the client's brief.
    - Assessing the problems associated with building on brown field or reclaimed land.
    - Identifying health and safety issues which may have been the product of poor design.
    - Improving communication networks within construction projects.
    - Ensuring construction projects maximise their opportunity to make a profit.
    - Ensuring all building work meets the required planning and control considerations.
    - Considering all environmental obligations at design, and throughout the construction period.
    - Designing considerations must consider inclusivity versatility, access to, and use of building.
    - Producing risk assessments, method statements and safe system of works
    - The key stages of the design process
    - The different types of sustainable solutions listed in the range and how they are used to inform the building process
    - The use of both manufacturer instructions and technical guidance to solve problems
    - Complying with data storage requirements in relation to security and protection
    - The use of technology connected to the internet of things and its role in the construction industry to assist in just in time and asset management. BIM Building information Modelling.

- The use of digital engineering techniques in the construction industry and where to apply them. Total stations in surveying.
- Utilising benchmarking, KPI's and target setting when measuring business success.
- Ensuring the key requirements of Building Regulations and approved documents are implemented within projects

- **Core skill B (CSB)** Primary research e.g. obtaining measurements related to a design and/or customer requirements.

    - Collecting information on the HSE web site.
    - Researching the various components relating to various sections of the Building Regulations.
    - Researching health and safety requirements to produce risk assessments, method statements and safe systems of work.
    - Researching construction materials to ascertain their properties and suitability
    - Researching construction design job roles.
    - Researching construction technical and professional roles to ascertain own function on projects and those of other operatives in the collaborative process
    - The structure of the construction industry, including business types, large, medium, and small.
    - Researching the type of work undertaken within the construction industry and how it may change depending on company size.
    - The role and importance of CPD and how it affects the work of the construction operatives.
    - Sustainable construction solutions.
    - Researching the techniques aimed at maximising value and minimising waste within.
    - Researching the requirements of current UK Building Regulations to ensure compliance.
    - The procedures and processes for penetrating building structure as detailed in the Building regulations.
    - Standards regulation and guidance used to maintain good practice within the construction industry.
    - Researching corporate social responsibility principles for a range of organisations.
    - Using current UK and international standards (BSEN).

- **Core skill C (CSC)** Communication e.g., providing information and advice to customers and/or wider stakeholders on the potential risks of a delay in the project owing to inclement weather.

    - Presenting a short-term programme to the site manager.
    - Presenting risk assessments, method statements and toolbox talk to enable safe working.
    - Communicating with the client when a change or alteration is required due to unforeseen circumstances
    - Communicating the potential implications of poor design to the different parties affected in the construction chain.

- Explaining the benefits to contractors, the client/customer, to profitability and project success detailing the Implications of not having accurate measurements
- Communicating Information and data sources for construction projects
- Communicating using BIM and workflow software packages
- Promoting good customer service providing information and advice to customers
- Implementing change requests from various parties, including clients
- Communicating using technology connected to the internet of things and their role in the construction industry to assist in just in time and asset management.
- Setting clear project goals and objectives, defining roles, setting realistic milestones and constraints on cost and time.
- Preparing a short power point presentation on a chosen material i.e., concrete, brick, timber etc and present this to the group.
- Producing sketch designs for a house and then produce a 3D model by hand and/or on sketch up.
- You have seen a dangerous situation on site. Produce a written report for your supervisor.

- **Core skill D (CSD)** Working collaboratively with other team members and stakeholders e.g. to develop content to bid for a construction project.

  - Taking part in group discussions and presentations in collating information in response to a specification or client brief.
  - Following the correct procedures for reporting an incident or near miss in the workplace.
  - Reporting lines of escalation within construction roles.
  - Integration of all partners of the supply chain.
  - Building information modelling and the effect they have on real time project delivery in a collaborative way.
  - Working collaboratively with the different types of stakeholders e.g. client, team, and end user.
  - Collaborative approach to project delivery and reporting, and how this is applied in practice with the use of BIM and workflow software packages.
  - Working with a range of individuals applying equality and diversity legislation.
  - The use of conflict management techniques.
  - Behaving in an ethical way towards other team members and stakeholders.
  - Fundamental business values and commitment to customers and collaborative working with others.
  - Working collaboratively to ensure quality management systems are completed.
  - Ensuring team members and stakeholders know the key requirements of Building Regulations and approved documents.
  - Give each group a drawing and specification for a kitchen extension. They have to work as a team to work out the quantities of materials, and price the job, produce a method statement and programme, then present their finding to the client.

Maths, English and digital skills

Maths, English and digital skills have been mapped across the core content and each of the occupational specialisms. The lists below identify the core competencies which can be found in the skills sections of each performance criteria.

General English competencies

The general English competencies outline a framework of six general digital competencies, with no prioritisation or interpretation of order intended:

EC1 – Convey technical information to different audiences
EC2 – Present information and ideas
EC3 – Create texts for different purposes and audiences
EC4 – Summarise information/ideas
EC5 – Synthesise information
EC6 – Take part in/lead discussions

General Mathematical Competencies

The general mathematical competencies outline a framework of ten general mathematical competencies, with no prioritisation or interpretation of order intended:

MC1 – Measuring with precision
MC2 – Estimating, calculating and error spotting
MC3 – Working with proportion
MC4 – Using rules and formulae
MC5 – Processing data
MC6 – Understanding data and risk
MC7 – Interpreting and representing with mathematical diagrams
MC8 – Communicating using mathematics
MC9 – Costing a project
MC10 – Optimising work processes

General Digital Competencies

The following outlines a framework of six general digital competencies, with no prioritisation or interpretation of order intended:

DC1 – Use digital technology and media effectively
DC2 – Design, create and edit documents and digital media
DC3 – Communicate and collaborate
DC4 – Process and analyse numerical data
DC5 – Be safe and responsible online
DC6 – Controlling digital functions

5 Scheme of Assessment

Assessment methods

Learners must complete:

two externally set exams covering knowledge from the onsite construction core content (component 300)

The exams provide sufficient sampling of the content and consisting of a mixture of short answer questions (SAQ), some of which will be structured, and extended response. The balance of questions in assessing across assessment objectives (Aos) 1, 2 and 3 will allow for the appropriate differentiation of learners to support in the reliable setting of boundaries.

one employer-set project covering knowledge and skills from the Onsite construction core (component 300)

The employer-set project will be made up of well defined, real, industry-style brief. The brief will be complex and non-routine and require the use of relevant maths, English and digital skills. The brief will provide a valid context for the Level 3 candidate to demonstrate their knowledge and understanding of the core content and their core skills to solve occupationally relevant situations and/or problems.

And

one occupational specialism practical assignment made up of several tasks covering the knowledge and skills from the chosen occupational specialisms (components 305-308).

These assessments will feature a considerable practical element and are composed of a series of holistic practical tasks relating to the specialism at hand. They will take place over a period of time, scheduled at the provider's preference within an approximate three-month assessment window. By nature of the considerable practical elements, the tasks will generate significant ephemeral evidence and be heavily reliant on Internal Assessor observation notes and records for validation.

Grading and marking

The Onsite construction core (component 300) is graded overall A* - E plus ungraded (U)

The occupational specialisms (components 305 – 308) are graded overall Distinction, Merit, Pass and Ungraded. Each occupational specialism achieved will receive a grade.

Technical Qualification Scheme of Assessment overview

Core Component – Learners must complete **all** assessment components

Assessment component (number)	Method	Duration	Marks	Weighting	Marking	Grading
Exam paper 1 (031)	Externally set exam	2 hours	90	35%	Externally marked	This component will be awarded on the grade scale A* - E
Exam paper 2 (032)	Externally set exam	2 hours	90	35%	Externally marked	
Employer set project (033)	Externally set project	17 hours	100	30%	Externally marked	

Occupational Specialism Component – Learners must complete **one** assessment component

Assessment component (number)	Method	Duration	Marks	Weighting	Marking	Grading
Bricklaying (305)	Externally set assignment	24 hours	90	100%	Externally moderated	All occupational specialism components will be awarded on the grade scale P, M, D
Carpentry and Joinery (306)	Externally set assignment	27 hours	90	100%	Externally moderated	
Painting and Decorating (307)	Externally set assignment	27 hours	90	100%	Externally moderated	
Plastering (308)	Externally set assignment	26 hours	90	100%	Externally moderated	

Core component scheme of assessment

The assessments for this component consist of two core exams and an employer-set project, which are set against a set of assessment objectives (Aos) used to promote consistency among qualifications of a similar purpose. They are designed to allow judgement of the learner to be made across a number of different categories of performance.

Each assessment for this component has been allocated a set number of marks against these Aos based on weightings recommended by stakeholders of the qualification. This mark allocation remains the same for all versions of the assessments, ensuring consistency across assessment versions and over time.

AO weightings for the assessment components related to the core components are detailed below.

Core exam

Assessment objective	Description	Weighting
AO1 a Demonstrate knowledge	All Aos require the ability to recall knowledge. AO1a) refers to instances where the learner is simply required to demonstrate basic recall. In the test, this helps to give confidence in sufficiency of coverage of the content, and recognises that not all knowledge requires further understanding e.g. terminology, number facts etc.	10%
AO1 b Demonstrate understanding	The ability to explain principles and concepts beyond recall of definitions in order to be able to transfer these principles and concepts between contexts. Learners have built connections between related pieces of knowledge. AO1b) focuses on the ability of the learners to show understanding by summarising or explaining concepts in their own words, exemplifying, or comparing and making inferences in general terms that show e.g. cause and effect.	25%
AO2 Apply knowledge and understanding to different situations and context	Using and applying knowledge and understanding, of processes, procedures, generalisations principles and theories to specified, concrete situations. AO2 is about being able to take the understanding of generalities (AO1b) and apply them to specific novel situations. It is more granular than the more extended synthesis/creation that may respond to an analysis (AO3a) of a more holistic complex situation/brief.	45%
AO3 Analyse and evaluate information and issues	Learners will be provided with information e.g. in the form of a detailed scenario requiring the Learners to analyse the interrelated issues arising and evaluate, for example, the strengths and weaknesses or advantages and disadvantages of approaches they may take to achieve a good outcome. Marks will be given for the quality of analysis and evaluation and the range of considerations considered.	20%

Component	Assessment method	Description and conditions
Core exam	Externally marked tests	These tests are **externally set and externally marked** and will be sat through question papers provided by City & Guilds. These tests are designed to assess learners' depth and breadth of understanding across the core component in the qualification at the end of the period of learning and will be sat under invigilated examination conditions. See JCQ requirements for details: **http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations** Learners who fail either one or both exams in the core component will need to retake both exams and must do so in the same assessment window. Any retake must be completed within two years after the completion of the learner's T level programme.

Component	Assessment method	Assessment overview	Permitted assessment materials
Paper 1	Externally marked tests	These exams will be made up of different question types that include short answer questions, structured questions, and extended response questions. The exam paper will consist of part A and part B. The level of difficulty will increase through the paper with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper. Content overview: • Health and safety in construction • Construction design principles • Construction and the built environment industry • Construction sustainability principles • Building technology principles	Pen with blue or black ink Non-programmable calculator

Component	Assessment method	Assessment overview	Permitted assessment materials
Paper 2	Externally marked tests	These exams will be made up of different question types that include short answer questions, structured questions, and extended response questions. The exam paper will consist of part A and part B. The level of difficulty will increase through the paper with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper. Content overview: • Construction science principles • Construction measurement principles • Construction information and data principles • Relationship management in construction • Digital technology in construction • Construction commercial/business principles	Pen with blue or black ink Non-programmable calculator

Both core exams will follow the same structure but each core exams covers different technical content. Each exam paper is made up of two parts:

- Part A (70%)

and

- Part B (30%)

Employer-set project

Assessment objective	Typical evidence	Approximate weighting
AO1 Planning skills and strategies	Clearly structured response to brief, cohesive response with ordered sections, logical approach to referencing, research and sources, response completed to deadline and meeting required parameters, sources used effectively and integrated into response (not just an afterthought), effective use of time allocation available for presentations.	14%
AO2 Apply knowledge and skills to the context of the project	Relevant core knowledge applied to respond to brief, references relevant legislation, building controls materials, concepts, waste disposal and site access considerations.	54%
AO3 Select relevant techniques and resources to meet the brief	Selection of techniques and resources in order to support a response to the brief; consideration of the techniques and resources that are most effective and appropriate to use, and accurate and informed use of these.	10%
AO4 Use Maths, English and Digital skills	Use of correct terminology, abbreviations, units of measurement in context, consideration of audience of brief response (technical vs non-technical wording), use of calculations / graphs etc. appropriately, consideration of the use of ICT and digital methods both in brief response and in presentation.	16%
AO5 Carry out tasks and evaluate for fitness for purpose	Considered analysis and evaluation of project outcome, what went well and what could be improved, response conclusion or evaluation section, identification of solutions in response to brief problem with evidence of evaluation of other options and reasons for rejection of other options where not appropriate.	6%

Component	Assessment method	Description and conditions
Employer-set project	Externally marked project	This project is **externally set and externally marked** by City & Guilds and is designed to require the learner to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories and knowledge from across the whole of the BSE core content. Projects will be released to centre staff in advance of any of the assessment windows for each task. City & Guilds will provide centres with assessment windows for centres to timetable assessment sessions within, in accordance with the assessment times prescribed in the employer-set project centre guidance. Centres will be required to maintain the security of all live assessment materials until assessment windows are open. Projects will therefore be password-protected and released to centres through a secure method. Guidance on equipment, resources and duration will be released as appropriate to ensure centres can plan for delivery of the project in advance. The marking grid for the project will be available to centres from the start of the learning programme. Learners who fail the employer-set project on first submission can retake in any assessment window. Any retake must be completed within two years after the completion of the learner's T level programme.

Component	Assessment Method	Assessment overview
Employer-set project	Externally marked project	**Content Overview:** The employer-set project samples knowledge drawn from across the core content in relation to the specific project version context – however, due to their importance **all** versions of the employer-set project will cover content from the following core underpinning knowledge outcomes: • Health and safety in construction • Construction design principles • Construction sustainability principles **Assessment overview:** The employer-set project is an assessment made up of several tasks that will take place within controlled conditions, assessing the knowledge and skills learned as part of the core element of the T Level. Each project will be developed together with employers in the industry to reflect realistic types of developments, activities and challenges. The project is made up of a number of tasks which all relate to the same employer-set project brief and tender specification. 1.1 – Research 1.2 – Report 1.3 – Project plan 1.4 – Presentation 2.1 – Collaborative problem-solving 2.2 – Evaluation The project only draws on the content from the common core knowledge that sits across all specialisms for onsite (specific knowledge and skills for each specialism will be assessed in the practical assignments) The project is linked to the core skills. • Problem solving • Research • Communication • Working collaboratively with others

Core grading

The T Levels Technical Qualification (TQ) in Onsite Construction core is made up of the below sub-components (and weightings).

- Exam (70%)
- Employer-Set Project (30%)

Uniform Mark Scale (UMS) grade boundaries

The table below shows the UMS (Uniform Mark Scale) values available for grades in the sub-components. It also shows the UMS values required to achieve each grade for the overall Core. This table will not vary across the series, the values are fixed for this TQ.

Grade boundary	Exam sub-component	ESP sub-component	Overall Core
A*	252 – 280	108 – 120	360 – 400
A	224 – 251	96 – 107	320 – 359
B	196 – 223	84 – 95	280 – 319
C	168 – 195	72 – 83	240 – 279
D	140 – 167	60 – 71	200 – 239
E	112 – 139	48 – 59	160 – 199
Unclassified (U)	0 – 111	0 – 47	0 – 159

Scheduling of the Employer-set project assessments

The employer-set project assessment window will occur from March to May annually. Specific dates will be released annually through the key date schedule for the following academic year

Task	Scheduling	Task Duration
1.1	City & Guilds sets the assessment window for the centre to timetable	3 hours
1.2	City & Guilds sets the assessment window for the centre to timetable	6 hours
1.3	City & Guilds sets the assessment window for the centre to timetable	3 hours
1.4	City & Guilds sets the assessment window for the centre to timetable	2.5 hours
2.1	City & Guilds sets the assessment window for the centre to timetable	1.5 hours
2.2	City & Guilds sets the assessment window for the centre to timetable	1 hour

Occupational specialism component scheme of assessment

What is the occupational specialism component?

The occupational specialism assignment consists of a project brief presented as client requirements or a specification of work that is realistic to the occupational specialism rather than detailed instructions on what to do, to allow the learner to demonstrate that they have the knowledge required to implement the brief. There will be several high-level tasks in every version of the assessment, and these will take the form of planning, installing, and service and maintenance. Within each high-level task there will be several sub-tasks that learners will need to complete as directed within the assessment documents. The sub-tasks will reflect the project brief for that version of the assignment

How is the occupational specialism component marked?

Occupational specialism assessments will be set and marked at task level. Once learner evidence has been marked, Internal Assessors will make a holistic judgement on performance by applying the knowledge and skills that have been demonstrated to assessment themes within the marking grid.

Each learner will receive a total mark for each assessment theme. The total for each assessment theme is accumulated, giving a total mark for the assessment. Assessment themes will be common across every version of the assessment and will assess a similar range of evidence across assessment versions, ensuring comparability of demand between every version of the assessment.

Although evidence from across all tasks can be used to demonstrate performance against an assessment theme, internal markers will be directed to specific task evidence that must be used to support judgements on performance against the assessment theme. The assessment themes will be broad enough to ensure that all the performance criteria across the specialism are assessed, supporting reliability of the assessment.

In order to ensure reliability, and consistent and accurate judgements on performance, assessment themes may consist of sub-assessment themes due to the potentially wide content coverage and to ensure that the performance outcome is assessed to the appropriate depth and breadth. This still allows for the appropriate base mark to be applied to the assessment theme, but also ensures that the distribution of marks within and across bands is more manageable and increases the reliability of judgements made and marks awarded. Internal assessors will give an appropriate mark in relation to the learner's performance for each individual sub-assessment theme, but this will contribute to the overall mark for that assessment theme. Internal assessors will then need to evidence the decision for the mark awarded for each assessment theme on the Candidate Record Form (CRF).

Component	Assessment method	Description and conditions
Occupational specialism assignment	Externally set, externally moderated	This assignment is **externally set, internally marked and externally moderated**, and is designed to require the learner to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories and knowledge from across the occupational area. Assignments will be released to centre staff towards the end of the learners' programme, usually the week before Easter each year. Centres will be required to maintain the security of all live assessment materials until assessment windows are open. Assignments will therefore be password-protected and released to centres through a secure method. Guidance on equipment, resources and duration will be released as appropriate to ensure centres can plan for delivery of practical assignments in advance. The marking grid for the assignment will be available to centres from the start of the learning programme. Learners who fail the occupational specialism following the first submission can retake in any assessment window. Any retake must be completed within two years after the completion of the learner's T level programme. Please note that for externally set assignments City & Guilds provides guidance and support to centres on the marking process and associated marking grid in the assessment pack for the qualification, and guidance on the use of marking grids.
Bricklaying	Externally set, externally moderated	**Content overview** Learners will be able to: • Prepare for the construction of complex masonry structures • Construct complex masonry structures • Renovate masonry structures **Assessment overview** Learners will be assessed against the following assessment themes: • Health and safety • Design and planning • Presentation • Construct masonry structures • Repair masonry structures

Carpentry & Joinery	Externally set, externally moderated	**Content overview** Learners will be able to: • Prepare for the production of complex timber-based building products and structures • Produce complex timber-based products and components • Assemble complex timber-based products • Install complex timber-based products into complex structures **Assessment overview** Learners will be assessed against the following assessment themes: • Health and Safety • Design and planning • Produce complex timber-based structures • Fix and assemble components • Installation • Inspect/Quality check
Painting and Decorating	Externally set, externally moderated	**Content overview** Learners will be able to: • Prepare for the application of surface coatings and wallcoverings • Apply specialist surface coatings in complex environments • Apply specialist wallcoverings in complex environments **Assessment overview** Learners will be assessed against the following assessment themes: • Health and safety • Design and planning • Presentation • Preparation of surfaces and work area for applying specialist surface coatings • Application of specialist surface coatings • Inspect, finish and rectify for specialist surface coatings • Preparation of surfaces and work area for applying specialist wallcoverings • Application of specialist wallcoverings • Inspect, finish and rectify for specialist wallcoverings

Plastering	Externally set, externally moderated	**Content overview** Learners will be able to: • Prepare backgrounds for plastering • Apply plastering systems • Fix plaster casted from moulds • Repair plastering systems **Assessment overview** Learners will be assessed against the following assessment themes: • Health and safety • Design and planning • Presentation • Internal plastering systems • External rendering systems • Produce and fix mouldings • Repair to damaged surfaces

Availability of assessments

The table below sets out the scheduled assessment windows annually for the T Level in Construction: Onsite. Exact key dates for assessment that are externally marked (core exams and the employer-set project) will be communicated to approved providers annually through the key date schedule.

Component	Series	Exam type	Calendar Month/s	Assessment window/set date
Core exam Paper 1	Summer series	Written exam	June	Set date/time
	*Autumn series	Written exam	November	Set date/time
Core exam Paper 2	Summer series	Written exam	June	Set date/time
	*Autumn series	Written exam	November	Set date/time
Employer-set project	Summer series	Project	April -May	Assessment window
	*Autumn series	Project	October – November	Assessment window
Occupational specialism	One series annually	Project	February – May (first assessment 2023)	Assessment window

*Please note that the autumn series is not only restricted to retakes.

6 Technical qualification grading and result reporting

Awarding the technical qualification grade

The technical qualification components are awarded as shown below:

Component	Grading
Core	A* - E
Occupational specialism	Pass, Merit and Distinction

Core component

Calculating the grade of the core component uses the aggregation of points from across all assessment components in the core to calculate the overall grade for the core component.

Core component grade descriptors

Component	Grade	Descriptor
Core	A	To achieve an 'A' grade a candidate will: Show clear ability to demonstrate a comprehensive understanding of the full range of principles that influence construction processes and procedures in routine contexts and allow successful implementation to non-routine contexts. Make links between relevant knowledge and understanding when responding to problems in a logical and methodical format. Legitimate and justified approaches are provided in response to complex construction industry briefs and problems. Demonstrate the ability to comprehensively identify and interpret a full range of considerations in analysing complex briefs or problems. Including the impacts their decisions have on the wider industry and not solely on individual trades. There is a meticulous approach in the selection of tools, materials and methods when planning approaches or responses to construction industry briefs or problems. Use a range of communication strategies and an ability to adapt their style and format to respond well to audience and stakeholder needs in presenting approaches to solving problems. Demonstrate a high degree of accuracy in knowledge and skills from across the core content and critically evaluate their own performance in meeting a brief or problem to improve.

Component	Grade	Descriptor
Core	E	To achieve an 'E' grade a candidate will: Demonstrate a limited understanding some of the key principles and how they influence construction process and procedures in routine contexts. Make general links in knowledge and understanding that can sometimes be superficial and are supported by partial reasoning and not evidenced based that relates to routine problems or industry briefs. Respond to briefs or problems with little awareness of the impact in relation to the wider construction industry context. There is some understanding in selection of tools, materials and methods to meet the requirements of routine construction industry briefs or problems. Demonstrate a small range of communication strategies that are sometimes not suitable in language and format for audiences and stakeholders with inaccuracies in technical references. Provide an evaluation of performance and how requirements have been met is brief with no reference on how to improve. Candidates need to complete all components to be awarded the Technical Qualification. Any performance determined as not meeting the standard by City & Guilds will receive an unclassified (U) result

Occupational specialism component

Calculation of the grade for the occupational specialism is based on setting grade boundaries for Pass and Distinction. The setting of grade boundaries is based on judgemental evidence, against the grade descriptors for the occupational specialisms, review of the Guide Standard Exemplification Materials (Grade Standard Exemplification Materials after the first award) and review of statistical evidence.

Pass and Distinction grade descriptors can be found in both learner and centre occupational assessment materials.

To successfully achieve an occupational specialism the learner needs to be recognised at threshold competence (Pass).

Threshold competence refers to a level of competence that:

- signifies that a student is well placed to develop full occupational competence, with further support and development, once in employment
- is as close to full occupational competence as can be reasonably expected of a student studying the TQ in a classroom-based setting (for example, in the classroom, workshops, simulated working and (where appropriate) supervised working environments)
- signifies that a student has achieved at least a pass in relation to the relevant occupational specialism component.

If a learner does not meet the minimum standards as determined by City & Guilds for either/both the core component and occupational specialism they will be issued with an unclassified (U) grade.

T Level Grading

To be awarded an overall T Level grade, a student must pass both components of their TQ, successfully, complete an industry placement and meet any other requirements set by the T Level panel within the Institute. T Levels will vary in size, largely dependent on the size of the TQ.

In meeting the above requirements, the learner will be eligible to be awarded an overall qualification grade for the T Level in Onsite Construction. The overall qualification grade will be based on performance in the core component and occupational specialism, as set out below.

Calculation of the T Level Qualification Grade				
	Occupational specialism Grade			
Core component grade	**Grade**	**Distinction**	**Merit**	**Pass**
	A*	Distinction*	Distinction	Distinction
	A	Distinction	Distinction	Merit
	B	Distinction	Merit	Merit
	C	Distinction	Merit	Pass
	D	Merit	Merit	Pass
	E	Merit	Pass	Pass

7 Administration

Lost candidate work

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Customer Services of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

Malpractice

Please refer to the City & Guilds guidance notes *Managing cases of suspected malpractice in examinations and assessments*. This document sets out the procedures to be followed in identifying and reporting malpractice by candidates and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of candidate and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of candidate malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another candidate (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (e.g. disqualification from the assessment) will be applied.

Where suspected malpractice is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. Please refer to the form in the document *Managing cases of suspected malpractice in examinations and assessments*.

Accessibility

In the design of the Technical Qualification and its assessments the following principles have been applied:

- In the development of content, tasks and assessments **all** learners are considered
- Well-designed materials that do not create barriers to attainment. This will include content being presented logically and uncluttered
- No particular characteristic or group of learners are disadvantaged by features of a qualification
- Language is appropriate including carrier language which is presented in its simplest for fair access to all learners
- In the design of content and assessments the impact on learners social, behavioural and emotional well-being will be considered
- Physical and sensory needs of learners in accessing content and assessments.

Access arrangements

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.

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**

Special consideration

We can give special consideration to candidates who have had a temporary illness, injury, or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is 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**

Informing candidate of pre-moderated marks

Centres are required to inform candidates of their marks **before** external moderation. It is important that candidates are informed of their pre-moderated marks are provisional and allow sufficient time for them to appeal if felt necessary while still allowing their agreed centre marked work to be available for external moderation on time.

Centres must also provide candidates with a copy of their marked work and the centre's internal appeals procedures on request.

Internal appeals procedure

For internally marked assessments, all centres must have an internal appeals procedure for candidates, which gives them the opportunity to appeal the centre mark for their work, before moderation takes place. The procedure must ensure:

- the person completing the appeal is competent and did not mark the work originally
- that any marking errors are identified and corrected
- the candidate is informed of the outcome, reason and any change in mark.

The City & Guilds appeals process also covers access arrangements, special consideration and malpractice. Applications are not accepted directly from candidates, but the centre can apply on a candidate's behalf. Where relevant, centres must tell candidates how to request this. The centre can refuse to make the application to City & Guilds, but the candidate must be given the opportunity to appeal this decision. This information must be included in the centre's internal appeals procedure.

Centres must provide candidates and City & Guilds with a copy of their internal appeals procedure, on request.

Results reporting

Institute for Apprenticeships and Technical Education (IFATE) will certificate students who have successfully completed all elements of the T Level in Construction: Onsite.

T Level results will be released on the Level 3 results day in August

Post-result services

The services available include a review of marking and review of moderation. Requests must be submitted within the specified period after the publication of results for individual assessments.

For further details of enquiries about results services, please visit the City & Guilds website at **www.cityandguilds.com.**

8 Components

Content of components

The components in this qualification are written in a standard format and comprise the following:

- City & Guilds reference number
- Title
- Level
- Guided learning hours (provisional)
- Assessment method
- Introduction section
- Underpinning knowledge outcome – including range and depth sections
- What learners need to learn
- Links to maths, English and digital skills
- Guidance for delivery
- Suggested learning resources
- Scheme of Assessment*

*Occupational specialisms only

300 Onsite construction core

Level:	3
GLH:	400
Assessment method:	Two Knowledge tests Employer-set project

What is the component about?

This component focuses on the learner's knowledge and understanding of contexts, concepts, theories and principles relevant to onsite construction. The component is designed to raise learners' awareness of the industries and develop knowledge and understanding of:

- Fundamental Health & Safety practices associated with carrying out construction work
- Scientific principles related to construction activities
- The construction industry and careers within it
- Principles of sustainability and design, relevant to construction projects
- Information, data and principles of measurements
- Tools, equipment and materials used in construction work
- Legislation, regulations and approved standards that apply to the construction industry

Learners may prepare by asking themselves questions such as:

- How are teams of different specialists co-ordinated to work together on construction projects?
- What are different career pathways and destinations within the construction industry?
- What factors influence whether construction projects are profitable?
- What kind of tasks do Onsite trades perform?
- What tools and equipment Onsite trades use as part of their role?

Underpinning knowledge outcomes

On completion of this Onsite Core, learners will understand:

1. Health and safety in construction
2. Construction science principles
3. Construction design principles
4. Construction & the built environment industry
5. Construction sustainability principles
6. Construction measurement principles
7. Building technology principles
8. Construction information and data principles
9. Relationship management in construction
10. Digital technology in construction
11. Construction commercial/business principles

Completion of the onsite construction core will give learners the opportunity to develop their maths, English and digital skills. Details are presented in the skills section of each criterion.

Onsite Core Content

1. Health and safety

Criteria

1.1 Construction legislation and regulations

Range:
Legislation and regulations – Health and Safety at Work Act (HASAWA), Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), Control of Substances Hazardous to Health (COSHH), Construction (Design and Management) (CDM) Regulations, Provision and Use of Work Equipment Regulations (PUWER), Manual Handling Operations Regulations, Personal Protective Equipment (PPE) at Work Regulations, Work at Height Regulations, Control of Noise at Work Regulations.

Governmental bodies – Health and Safety Executive (HSE) and Local Authority

What do learners need to learn?	**Skills**
The role of health and safety legislation and regulations in the construction industry, including an understanding of the role of the Health and Safety Executive (HSE) and the powers of Health and Safety Inspectors. How current legislation impacts employer, employee, and construction projects within a domestic and commercial setting. The bodies responsible for maintaining and updating legislation and regulations. How to obtain legislation and regulations and the importance of ensuring the information is current. To include regulations relating to provisions of welfare facilities during construction work (toilets, washing facilities, drinking water, minimum working temperatures, changing rooms and lockers, rest facilities), first aid provision (first aid box, designated first aider, first aid area) and access to information related to welfare responsibilities onsite. The implications of not adhering to the legislation on the public, client, business and employers and employees including enforcements, penalties, and imprisonment. The difference between statutory legislation and approved codes of practice (ACOPS), where each legislation, regulation and ACOP is applicable in terms of construction activities.	CSB EC5

1.2 Public liability insurance and employers liability insurance

What do learners need to learn?	Skills
What liability insurance is and what the current requirements are relating to public and employer liability insurance for construction employees and employers. Areas covered by public liability such as, injury, illness/death, legal action and compensation. Areas covered by employers liability such as employee and public injury, accidents, compensation, medical costs, legal costs and loss of income.	EC5

1.3 Approved Codes Of Practice (ACOPs)

What do learners need to learn?	Skills
Where to obtain approved codes of practice through the HSE L (legal) series publications. Their use, purpose, and legal status and how these are applied in the construction industry.	EC5

1.4 Implications of poor health and safety performance

Range:
Implications – penalties, improvement notice, prohibition notice, powers of prosecution.

What do learners need to learn?	Skills
Potential implications of poor health and safety performance in the construction industry including environmental, financial, legal. How poor health and safety impacts individuals, including death, disease, illness and injuries when working onsite (with the presence of asbestos, silica dust, wood dust, lead/lead based products, wood preservatives, solvents, liquid fuels, working at heights, working with electricity, and working with onsite plant, working in a noisy environment and vibrating equipment). How it impacts at different levels (the employee, employer/ client/customer/public). How health and safety is addressed, i.e. through control methods (risk assessments, method statement/RAMS, legislation) and the benefits of addressing poor health and safety, including reduced injury, death, improved reputation.	EC3 EC5

1.5 Development of safe systems of work

Range:
Safe systems of work – company management systems, risk assessments and method statements (RAMs), permits to work, safety notices and Construction Skills Certification Scheme (CSCS) cards.

What do learners need to learn?	Skills
Types of safe systems of work and safety conscious procedures used in construction projects, to include, employ specialised trade personnel, site induction, toolbox talks, good housekeeping (working systematically, keeping areas clean and clear), team briefings, training and development updates including CSCS, asbestos awareness, safety updates, machine operations. RAMs, personnel at risk, hazards, existing and future control measures, severity & likelihood injury, detailed sequence of safe methods of work and regular review points. Permits to work – hot works, confined spaces designated hours, limited exposure times Roles and responsibilities of health and safety officer/ designated person, recording and reviewing, updating documents, investigating incidents and providing feedback into health and safety documentation.	EC1 EC3 EC4 EC5

1.6 Safety conscious procedures

Range:
Safety conscious procedures - safe systems of work, reporting of potential hazards, site inductions, training, toolbox talks, good housekeeping (working systematically, keeping areas clean and clear).

What do learners need to learn?	Skills
Procedures that aim to promote and support safety consciousness within construction sites/environments/workshop areas. The benefits of having these procedures in place (fewer accidents and incidents) and the potential consequences of not adhering to them – (injury/death, damage to work and equipment, loss of business, fines, increased costs, project timescales slipping). Procedures that must be followed when hazards cannot be eliminated completely. Reporting of potential hazards following the company's reporting procedure and RIDDOR. Construction site inductions for all new visitors and workers including identification of risks and hazards and the control measures used to mitigate them. On and off the job health and safety training and related qualifications.	EC1 EC3 EC4

Toolbox talks which involve information briefing sessions at a place of work to discuss health and safety issues and inform personnel about new hazards that may have recently arisen. Good housekeeping including systematic ways of working and, keeping areas clean and clear. Construction Skills certification scheme (CSCS) (SMSTS) (SSSTS) • Types of card • Card requirements and application	

1.7 Safety inspection of a work environment

Range:
Safety inspection – visual inspections, recording documents.

What do learners need to learn?	**Skills**
The safety inspection methods used to ensure the workplace is safe: • Health & Safety Audit • Equipment checks • Safety surveys • Incident inspections. review of area/site/workshop by employee and employer, the use of guidance and documentation to record visual inspections completed in the construction industry. Types of safety inspection recording documentation: • access equipment documentation: Scaffolding tag (scafftag) and scaffolding register • work equipment documentation: service manual, record of schedule and checklists • Inhouse and external inspections – formal reports and action plans.	CSA CSC EC3 EC5

1.8 Recording and reporting of safety incidents and near misses

Range:
Recording and reporting – accident book, reporting procedure, accident and incident reporting policy, RIDDOR reportable incidents.

What do learners need to learn?	**Skills**
The correct process to undertake and follow when reporting an incident or near miss in the workplace.	CSA CSD EC3

The purpose and recording of safety incidents and near miss online forms and the information contained within these online forms.	

1.9 Emergency procedures for unsafe situations

Range:
Emergency procedures – Raising the alarm and evacuations.

Unsafe situations – Fire, gas leaks, terrorist threats, water leak, carbon monoxide, chemical spillage and potential electric shock.

What do learners need to learn?	**Skills**
The correct procedures to follow if unsafe situations occur in the workplace including, how to raise the alarm, contact emergency services, designated evacuation routes, assembly points, register and roll call.	CSC EC5
Use of spill kits and gas and carbon monoxide devices. Actions to be taken when dealing with fire situations if safe to do so.	
Identification and use of different types of fire extinguishers and uses against classes of fire: • Red – water – class A • Cream – foam – class A, class B • Blue – dry powder – class A, class B, class C, class D, electrical • Black – CO2 – class B, electrical • Yellow – wet chemical – class A, class F.	

1.10 Types of PPE.

Range:
Types of PPE – Head protection (safety hat, bump cap), eye protection (goggles, safety glasses, full face visor), ear protection (ear defenders, ear plugs), full body protection (specialist overalls, elbow pads), hand protection (gloves, gauntlets), knee protection (knee pads, kneeling mat), foot protection (safety shoes, safety boots, safety trainers), vibration protection, harnesses, high visibility jacket.

Respiratory Protective Equipment RPE – face fitting, dust masks, full face visor, respirators.

What do learners need to learn?
The purpose, selection and correct use of appropriate PPE and RPE to mitigate risks including the body parts they are intended to protect.

1.11 First aid facilities

What do learners need to learn?

The first aid provision that must be available in the work area in accordance with Health and Safety (first aid) Regulations.

The requirement for employers to:

- carry out a workplace-specific first-aid assessment
- provide first-aid kits
- appoint a person to take charge of their first-aid arrangements and to call the emergency services when necessary
- appoint a trained first-aider
- provide staff training, information and instruction.

1.12 Safety signs

What do learners need to learn?

The categories, characteristics and meanings of safety signs, including mandatory, warning, prohibition and safe condition.
The meaning of each of the nine pictogram in the Classification, Labelling and Packaging (CLP) Regulation and where they would be encountered:

- Explosive
- Flammable
- Oxidising
- Corrosive
- Acute toxicity
- Hazardous to the environment
- Health hazard/hazardous to the ozone
- Serious health hazard
- Gas under pressure

1.13 Safe practices and procedures for the use of access equipment and manual handling

Range:
Access equipment - ladders, mobile scaffold towers, platforms, trestles, steps, podiums, staging, mobile elevated work platform (MEWP), cherry picker, and scissor lifts.

Manual handling – single, two-person lift, mechanical lifting aids.

What do learners need to learn?	**Skills**
The different types of access equipment. The safety checks to be carried out on access equipment; visual, tagging, fit for purpose, secure level ground, operative's competency for use of equipment. Safe erection methods for access equipment calculating suitable ratios and heights. Factors that influence the choice of equipment for carrying out work at height based on the work being carried out, duration at work, action points for heights. Fall arrest systems including crash deck, lanyards, harnesses, handrails, safety nets, inflatable fall protection bags. Ratios and advantage of pulleys and other lifting aids. The procedure for manual handling operations: • assessment of a safe load • calculation of a mass and weight for loads • safe kinetic lifting technique • use of lifting aids, eg wheelbarrows, sack barrow and pallet trucks.	EC5 MC4

1.14 Safe practices and procedures for working in excavations and confined spaces

What do learners need to learn?	**Skills**
Safe working in excavations. The safety measures when working in excavations: • safety barriers • signs • safe means of entry and egress • PPE • permit to work. The dangers associated with excavations:	EC5

- flooding
- obstruction of an escape route
- gas
- explosion
- collapse
- buried services.

Safe working in confined spaces:

- safe means of escape,
- adequate ventilation/air supply,
- RPE.

The dangers associated with confined spaces are:

- inadequate ventilation
- inadequate lighting
- flooding
- obstruction of an escape route
- explosion.

2. Construction science principles

Criteria

2.1 Materials science principles

Range:
Materials - ferrous and nonferrous metals, plastic (thermosetting and thermoplastic), fireclays/ceramics, bricks, concrete, mortar, plasterboard, timber, timber and fibre-based sheet material, paint, solvents, adhesives, sand, lime, additives.

Principles - material properties, chemical composition, degradation, failure, effects of environmental conditions, ductility, malleability, conductivity, tensile strength, compressive strength, durability.

What do learners need to learn?	**Skills**
The principles of material science in construction design and how buildings will perform in terms of durability and stability. Properties of materials, their uses, and the reasons that they are suitable for application including: • why different mortar mixes are used and what the different mixes are, to include lime, cement, and sand mixing ratios • tests for sand: cleanliness (silt test) • why different concrete mixes are used and what the different mixes are and how these are measured C10 to C40 • concrete: cement, fine aggregate, and coarse aggregate mixing ratios • tests for concrete: slump test, compaction factor test, soundness • setting times for mixed materials, plasters, concrete and adhesives (to include, woodwork adhesives, wood filler, tile adhesive, bonding adhesive, dot and dab/cove adhesive) • measuring quantities for practical application, gauging by weight or by volume • methods of mixing concrete, by hand or by mechanical mixer • methods of mixing mortar, by hand or by mechanical mixer • brick classification, frost resistance, salt content, using technical information data sheets • brick tests, crushing strength water absorption • ferrous metals, cast iron, stainless steel, mild steel • non-ferrous metals, copper, zinc, aluminium, brass, bronze • corrosion and degradation (metal fatigue) of listed metals, how defects occur • corrosion protection, galvanising, zinc plating, powder coating, paint systems • timber standard Canadian Lumber Stock (CLS) sizes and Timber sizing charts • structural Timber grading C16 C24	CSB MC1 MC2 MC4

- timber based sheet materials, properties of OSB, MDF, plywood, chipboard
- steel framework, Rolled Steel Joists (RSJ), stanchions
- timber preservation, topical, vacuum pressure treated
- paint systems (primers, undercoats, top coats, finishes, water and oil based)
- dry lining and stud materials, metal stud, plasterboard (foil-backed/vapour check, sound resistance, moisture resistant, fire resistant, impact resistant and thermal insulated boards) and adhesive
- types of wall finish, internal and external cement render and gypsum plaster
- adhesives and sealants, poly vinyl acetate PVA, Polyurethane (PU), styrene butadiene rubber (SBR)
- adhesive grades D1-D4 decorators caulk, silicone, fire foams.

2.2 Mechanical science principles

Range:
Mechanical science principles - force, work, energy, power, simple mechanics, basic mechanics.
Basic mechanics - theory of moments, action and reaction, centre of gravity, equilibrium, velocity and ratio, mechanical advantage, class I, II and III levers and pulleys, displacement, Archimedes screw.

What do learners need to learn?	**Skills**
Key principles of Mechanical Science and how they are used to inform construction methods including: Loads imposed on structures to include live, dead and dynamic. Energy - the two main categories Kinetic and potential including chemical, electrical, mechanical, magnetic, gravitational, elastic, radiant, thermal. Force - (is the direct contact between 2 objects i.e. tension, shear, compression bending). Work - (energy transferred by force) Power (rate of which work is done – energy conversion to power). Basic mechanics to include theory of moments, action and reaction, centre of gravity, velocity and ratio, mechanical advantage. Simple mechanics to include levers first-class lever, second class lever, third class lever) pulleys ratios (1:1, 2:1, 3:1, 4:1, 5:1), basic lifting/carrying equipment wheelbarrows, sack truck, block and tackle, gin wheels.	MC1 MC4

2.3 Electricity principles

Range:
Electricity principles - sources of power, generation, transformation, distribution, voltage, current, electrical power, energy, efficiency.

What do learners need to learn?	**Skills**
Electricity principles in relation to the construction process and use of the completed building: • types of electricity sources (including fossil fuel coal, oil and gas nuclear and renewable energy) • the types of power plants used to provide reliable sources of energy (including coal, oil, gas and nuclear) • Renewable energy sources: wind turbines, hydroelectric (wave, water turbines, tidal) air source heat pumps, ground source heat pumps, geothermal, sunlight (photovoltaic, solar thermal) • transformation (electromagnetic induction and types of transformers (step up and down, three phases, single phase), use on site	EC5 MC4

- distribution (via networks to industry and domestic users) power plant, substations above/ below ground cables
- voltage currents and the relationship with power, energy, safety and efficiency. Why different equipment requires a different voltage, 12v, 110v, 230v, 415v.

2.4 Structural science principles

Range:
Structural science principles - forces, loads, materials, structural members.

What do learners need to learn?	**Skills**
Structural science principles its use and effects and how it informs the construction and design of buildings including: • how forces act on building structures and structural members including common causes of the forces such as load, fixings, weight/mass of equipment, weather, supporting for other building members, use and supporting building services equipment • The types of loads acting on structures and the different forces they produce. • how the different materials act under the different forces and loads and suitability of different materials for use as structural members • material properties: strength, malleability, hardness, elasticity • different types of structural members: foundations, footings, walls, beams, lintels, roof trusses, columns, and bracing • basic principles of drilling and notching conventions (drilling on the neutral axis, shallow notching at ends of joists) • importance of calculations being conducted in structural design: beam, load, column • appreciate the effects of adjacent structures, trees, drains and sewers, ground conditions, on the design of foundations subsidence and heave • know where to find the Building Regulations that cover structure (approved document A) • calculations for forces (Force = Mass x Acceleration (F=MA), stress and strain.	CSB MC4

2.5 Heat principles

Range:
Heat principles - heat transfer, air temperature, air density humidity, condensation, air movement, heat loss, thermal conductivity, resistance, convection cycles.

Heat Transfer- convection, conduction, radiation.

Characteristics of air- temperature, density, humidity, specific heat capacity, thermal conductivity, condensation, moisture.

Insulation materials- thermal blocks, polyisocyanurate (PIR), expanded polystyrene (EPS/PS/XPS), sheep wool, straw, sealed glass units (double/triple glazed), insulation plasterboard, timber, fibre glass, mineral wool, multi-foil, perlite.

Sources of heat- radiators, electric panel heaters, electric storage heaters, electric radiation heaters, underfloor heating (wet and electric) solar thermal, heat recovery units, ground and air source heat pumps.

What do learners need to learn?	**Skills**
Key principles of heat transfer and its cause and effect within the built environment, including: • heat transfer: conduction, convection, and radiation and how they are managed to lessen the environmental impact • characteristics of air: temperature, density, and humidity • condensation: sources, types and effects of condensation and control measures • thermal conductivity: definition of R and U values • what impacts heat loss in a building: building fabric, ventilation, and air temperature • how buildings are affected by temperature change, (design, faults) • how condensation is created, and how construction methods are used to minimise the issues (insulation, air flow, ventilation, avoidance of thermal bridging) • effects on construction materials from excessive moisture • effects on construction materials from heat • independent methods of heating / cooling buildings, heat recovery systems, shading, heat reflective glass, air conditioning units, smart sensors • Causes of heat loss in buildings – Insulation level, drafts and cold bridging.	EC5 EC6 MC4

2.6 Light principles

Range:
Light principles - refraction, difference in artificial and natural light, glare, directed and reflected light, flow of light energy, daylight factor, colour rendering.

What do learners need to learn?	Skills
How artificial and natural light are incorporated into the design of a building considering energy use and type of experience/benefit for the end user. Methods used to diffuse light and reduce glare. The effects of glare in a working environment. Methods of switching artificial lighting to reduce energy consumption. Location and direction of doors and windows, use of light tunnels, dormer windows, sky lights, auto sensor lights. Types of lighting (ambient, task, accent and decorative).	MC3 MC4

2.7 Acoustics principles

Range:
Acoustic barriers- acoustic hoods, insulation sheeting in or on walls, insulation between floors, sound transmission class (STC), acoustic materials, sound absorption.

What do learners need to learn?	Skills
Key principles of acoustics and acoustic barriers and how they are applied to the built environment to ensure privacy and control/limit unwanted transference of sound internally and externally. Methods of airborne and mechanical transfer of noise energy. Factors that affect acoustics of types of buildings, including frequencies, reverberation, reverberation time, decibels, focusing, resonance, and echo. Acoustic principles in action in the construction industry, how insulation reduces sound transfer. • insulation to include fibreglass, mineral wool, double and triple glazed units • use of specific sound absorption and acoustic materials • Acoustic ceiling tiles, acoustic panelling, sound resistant plasterboard. Internal cavity partition insulation. Soft furnishings, acoustic sealants. The effect of noise pollution, on occupants, within the built environment. Through internal and external sources of sound and noise (eg impact, voices, music, household appliances, road noise, aircraft, industry). Use of decibels (Db): as a unit of measure and threshold limits. How to ensure compliance with approved document E (resistance to sound).	EC2 EC6 MC4

2.8 Earth science principles

Range:
Earth science principles - physical geography, hydrology, geology, earth forces, natural phenomenon (earthquakes, subsidence), weather.

What do learners need to learn?	**Skills**
Earth science principles and how these impact the built environment and basic construction design principles. Physical geography - such as water levels and water courses and their use for surface water drainage including the impact of not controlling the collection of surface storm water. Hydrology - including lakes rivers and water cycles. Geology - including structure, conditions and ground water and how these impact on renewable technologies. Weather - including climate change, temperature, rainfall and wind.	MC5

3. Construction design principles

Criteria

3.1 Benefits of good design

Range:
Benefits – efficiency**,** aesthetics, sustainability, wellbeing and improved quality of life, value for money local/community improvement, on budget.

What do learners need to learn?	Skills
The benefits of good design and the potential implications of poor design (reduced saleability, reduced efficiencies, damage to reputation, poor safety standards including fire and health risks, mould infestation, negative effect on local community) and the different parties affected in the construction chain (client, project sponsor, project team, consultants, suppliers, contractors and sub-contractors and end users). Factors that can impact on the profitability of projects – over specification leading to higher costs, difficulty of assembly leading to increased timescales and increased budgets, Corporate social responsibilities (CSR), vernacular construction, codes for sustainable homes, project scales, brownfield versus greenfield sites. Benefits of good design: • improved standard of living • blending in with the natural environment • sustainable development • reduced running costs • improves reputation.	CSC EC6

3.2 Design principles

Range:
Design principles - environmental protection, safety, economics, aesthetics, buildability manufacture, installation and construction feasibility, integration of services, infrastructure, inclusivity, accessibility, heat loss prevention, acoustics, lighting, and air quality.

What do learners need to learn?	Skills
Factors that need to be considered during the design of building services and how the range of design principles are influenced by the end design including buildability. The stages and outcomes of the Royal Institute of British Architects (RIBA) plan of work. Environmental protection: sustainable technologies and materials, energy sources, energy reduction materials, local and natural environment, grey water harvesting. Safety: safe construction methods and how a building is going to be constructed, serviced and maintained in the future to protect the health and safety of construction and maintenance operatives.	CSB EC6 DC1 DC6

Aesthetics (design features, materials used, colour). Buildability manufacture: installation, feasibility, modern methods of construction, inclusivity, and construction timescales. Provisions and services, gas, electric, water, wastewater (surface and foul/sewage) water, telecommunications. Compare methods of construction timber frame traditional oak frame, modern timber frame erection, (ICF-insulated concrete formwork), cob, limecrete and straw bale, thin joint system and off-site construction prefabricated and modular design. Listed buildings regulations. Heritage regulations and restrictions (listed buildings grade I II* II, conservation area, national parks, Areas of Outstanding Natural Beauty (AONB). Local authority restrictions. Life cycle costs and life cycle CO2 emissions.	

3.3 Role of different disciplines involved in design.

Range:
Disciplines - architects, draftsperson, building/land surveyors, quantity surveyors, civil engineers, structural engineers

Stakeholders: client, investors, shareholders, end users, local authority, manufacturers and suppliers

What do learners need to learn?	**Skills**
A basic knowledge of key job roles within construction design including the responsibilities and reporting lines/lines of escalation within roles. The key activities aligned to each of the disciplines and stakeholders.	CSB CSD

3.4 Design process from conception to completion.

Range:
Process – definition, client needs**,** research, budget, site analysis, assessment of current and proposed characteristics, planning/regulations, approval/ review, design sign off.

What do learners need to learn?	**Skills**
The key stages of the design process from initial enquiry to completed design and factors that may impact or influence design such as CDM, budget, and end user requirements including: • site analysis/survey: location plan, size, topography, existing	CSA CSB EC3 EC5 EC6

infrastructure, access, trees and tree preservation orders

- planning: local planning, listed buildings, environmental factors, planning restrictions, and regulations, how to make a planning application, how the approval is gained, appeals procedures
- what a feasibility study is
- animals/infestation/Site of Special Scientific Interest (SSSI)/protection
- planning for utilities and connecting to services (water, drainage, gas, electric, telecommunications)
- what is the frontage line and building line and how are these determined
- project planning, Gantt charts, critical path analysis, use of information for costing and efficient resources (bill of quantities)
- material storage, waste storage, welfare facilities.

MC7
MC9

3.5 The concept of the whole building, including life cycle assessment.

Range:
Life cycle assessment - raw material supply, manufacture of construction products, the construction process stage, occupation, demolition, when the materials are disposed of or recycled, energy usage, CO2 emissions

What do learners need to learn?

The concept of the whole building and how design and construction is influenced by construction systems working together, including life cycle assessments, how they influence project planning and are influenced by regulations and legislation.

How environmental regulations/legislations (Environmental Protection Act, Climate Change Act, Clean Air Act, Water Act, Building Regulations, Control of Pollution (Oil Storage) (England) Regulations, COSHH, WEEE, Hazardous Waste regulations, best practice for pollution prevention) and costs, inform on planning greener and smarter building with less impact overall on the environment. Including material acquisition, manufacturing, use and final disposal.

Stages of life cycle assessment in construction:

- raw material or recycled material supply
- manufacture of construction products
- the construction process stage
- occupation, use and maintenance stage
- demolition
- material disposal or recycling.

4. Construction and the built environment industry.

Criteria

4.1 Structure of the construction industry

What do learners need to learn?	Skills
The structure of the construction industry, including roles and business types (sole traders, contractors, sub-contractors, definitions of small, medium, and large organisations) and roles and client types (private, commercial, public limited companies and the Government). Size and scale in determining who is involved. The role of building regulations and the relationship with the customer/client (ensuring safety, health and welfare in and around built environments). The range of work undertaken (commercial, residential, industrial, health, retail, recreational and leisure, utilities, transport new build, retrofit) and the factors that define these work environments.	MC3

4.2 How the construction industry serves the economy as a whole

What do learners need to learn?

How the construction industry contributes to the UK economy both nationally and locally with reference to wealth generation from construction developments, area regeneration, improvements in infrastructure, and community developments, including housing, transport, leisure facilities, educational establishments and hospitals.

Factors that impact growth of the industry, including political changes, developments in technology/practice, skilled labour resources and environmental considerations.

Impact of infrastructure projects on:

- transport networks
- provision of services – gas, electricity, water and communications technology
- water management – drainage, sewer systems, flood defences
- renewable energy projects.

Market intelligence and industry needs, labour forecasting.

4.3 Integration of the supply chain through partnering and collaborative practices

Range:
Supply chain – client, architect, engineers, building contractor, sub-contractors, operatives, manufacturers, suppliers.

What do learners need to learn?	Skills
The integration of all partners of the supply chain in the building process. Awareness of the importance of effective planning and scheduling (inventory management), stages of design, collaborative working (integrated systems and agreed roles and responsibilities and change management approaches) and the benefits (project cost savings, increased resources ensuring that the project is completed to standards, budget and on time), and the consequences of poor planning and poor communication (disruption, increased costs, negative reputation).	CSD

4.4 Procurement of projects within the construction sector

Range:
Procured - need/demand, tendering and bidding processes, supply chain, estimation, quotation, tender documentation.

What do learners need to learn?	Skills
The key stages within procurement and the development of construction projects with consideration of different scales of building projects from domestic through to commercial and industrial. The types of common procurement routes (contractor led, design and build, fast track, lump sum, single stage, two stage). The methods of tendering (open, negotiated, selective, two-stage, preferred supplier). Project, cash flow management, contract payment periods for suppliers, contractors and sub-contractors. The difference between estimates and quotes, including how to calculate these. Documentation and information required for procurement and tendering: • expression of interest • open and closed tenders • pre-construction information • a tender pricing document • design drawings • specifications • bills of quantities • schedules – schedules of work, activity schedules. Estimate or evaluate per unit or overall costings using data, tables, costs per item, bulk costs, discounts, hidden or overhead costs.	MC2 MC9 MC10

Estimate, calculate and error check costings where costings are very large or small numbers and represented using different numerical values representations (e.g. pence [p], thousands [k], millions [M], billions [B]).

4.5 Roles and responsibilities of the construction professions

Range:
Construction professions - architect, civil engineer, building services design engineer, building services engineer technician, building services engineer, site management, facilities manager, client representatives (clerk of works), contract managers.

Onsite Construction operative professions – Groundworker Bricklayers, Carpenter, Joiners, Plasterers, Plumbers, Electricians, Painter and decorators. General operatives, plant operatives.

What do learners need to learn?

The key job roles (position or part played) and responsibilities (types of tasks and duties they are expected to complete) of construction professionals, construction operatives and the stages they may be involved in a construction.

4.6 The role of Continuing Professional Development (CPD) in developing the knowledge and skills of those working in the sector

Range:
Role of CPD - upskilling staff, maintaining occupational competence, legal requirements, product knowledge.

What do learners need to learn?

The role of CPD to individuals, companies and the building industry as a whole.

The importance in maintaining occupational competence/currency and best practice and the link to keeping clients/customers/public safe.

CPD and career progression. Workforce planning.

Types of development – apprenticeships, degree apprenticeships, graduate training programmes, higher technical qualifications.

Types of CPD, including formal, informal, qualifications, work experience, self-learning, joining trade body.

Providers of CPD

- Professional bodies
- Accreditation bodies
- Certification bodies
- Manufacturers

- In house/ toolbox talk.

4.7 Building information modelling (BIM)

What do learners need to learn?	**Skills**
The aspects of building information modelling and the effect they have on real time project delivery in a collaborative way and BIM government levels 1 to 3. The aspects of BIM and the effect it has on real time project delivery in a collaborative way and BIM government levels 1-3. • Level 1 typically comprises a mixture of 3D CAD for concept work, and 2D for drafting of statutory approval documentation and Production Information • Level 2 is distinguished by collaborative working, and requires an information exchange process which is specific to that project and coordinated between various systems and project participants • Level 3 projects at this level are fully collaborative. They use a single, shared project view for data integration, which all parties can access and modify as allowed through process and security controls. The characteristics and protocols associated with BIM and the implementation of BIM within the RIBA DPoW: • enables digital technology design and communication • embeds key product and asset data in all project stages • manages information throughout the project life cycle, using three-dimensional (3D) computer modelling • provides an information repository for digital data project information throughout a design and construction project, with the capability to manipulate and produce information and support information sharing • produces unified information output for the client at handover • provides a model of the building through the life cycle that can be updated • the model is used as part of the decommissioning and recycling of the building at the end of its life. The collaborative role of BIM in delivering real time projects: • The stages of the RIBA Digital Plan of Work (DPoW) and its application to construction projects: 1. Preparation and brief 2. Concept design 3. Developed design 4. Technical design 5. Build and commission	CSD

6. Handover and close out
7. Operation
8. End of life.

- Employer's Information Requirements (EIR)
  The characteristics and applications of Employer's Information Requirements (EIR) as part of a BIM Execution Plan, including the use of EIR as part of the appointment and tender documents, and the scope of information that is needed:
  - Who is sharing information?
  - What information is needed by stakeholders?
  - When is information needed by stakeholders?
  - What is the purpose of the information?
  - What are the effects on project outcome and delivery?

- Common Data Environment (CDE) Digital information platform that centralises project data storage and access, typically related to a construction project and building information modelling (BIM) workflows.

4.8 PESTLE factors

Range:
PESTLE - political, economic, social, technological, legal, environmental.

What do learners need to learn?	**Skills**
What PESTLE analysis is and be able to apply current examples of PESTLE factors to situations that may impact on the construction industry.	CSD

What PESTLE analysis is and be able to apply current examples of PESTLE factors to situations that may impact on the construction industry:

- Political factors determining government influence on the economy or a certain industry
- Economic factors outlining economy's performance
- Social: scrutiny of the social environment
- Technological innovations in technology that may affect the operations of the industry
- Legal implications of legislation to a project, including contract law, building regulations, building control, HASWA, civil law
- Environmental: factors that influence the surrounding environment.

5 Sustainability principles

Criteria

5.1 Sustainability when planning and delivering a construction project

Range:
Planning - use of renewable and recyclable resources, reducing energy consumption and waste, creating a healthy and environmentally friendly environment, protecting the natural and physical environment.

What do learners need to learn?	Skills
The importance of sustainability in relation to the stages of project development. Including design, planning and delivery and across different types/scales of construction project as well as environmental protection. The relevance of local sourcing, resource protection, re-use, and refurbishment of materials. The common sustainability assessment methods used in planning and delivering a construction project including BREEAM, LEED, TRADA, and WELL building standards. Consideration around carbon footprints when planning construction projects, embodied energy.	EC5

5.2 Types of sustainable solutions

Range:
Sustainable solutions - social, environmental, economic, human (habitability).

What do learners need to learn?	Skills
The use of sustainable solutions including prefab construction, self-heal concrete, energy efficiency systems, insulation, green roofs, rainwater harvesting systems, greywater harvesting systems, use of soakaways, sustainable drainage and smart glass/electrochromic glass and the benefits of using each solution. How sustainable materials are used (recycled bricks and tiles/slates and timber products in construction of building and roofs/locally sourced - reducing carbon footprint). The definition of sustainable and how renewable technologies can provide sustainable solutions. Sustainable and renewable materials, wood, straw bale, cob, recycled glass, paper and plastic, reclaimed timber and masonry/concrete, sheep wool.	CSB

5.3 Environmental legislation

Range:
Environmental legislation - Environmental Protection Act, Climate Change Act, Clean Air Act, Water Act, Building Regulations, Control of Pollution (Oil Storage) (England) Regulations, COSHH, WEEE, Hazardous Waste regulations, best practice for pollution prevention.

What do learners need to learn?	Skills
The specific purpose of environmental legislation listed (protect, preserve the environment and control hazards to health) and the obligations and responsibilities of employers and employees placed upon them by the environment legislation listed in relation to construction/maintenance activities, best practice for pollution prevention and environmental protection measures, including hazardous waste, material considerations, disposal methods, Volatile Organic Compounds (VOCs), PPE, user guide instructions, specific risk assessments.	EC5

5.4 Environmental policies and initiatives

Range:
Policies - Hazardous Waste Act, Conservation of fuel and power Approved document L1A.

Impact in design - materials used, disposal methods, VOCs, PPE, user guide instructions.

What do learners need to learn?	Skills
Implementation of environmental policies and initiatives (onsite initiatives, BREEAM, Quality Mark, government subsidies, environment performance certificates) and the impact on design and construction.	EC5

5.5 Environmental performance measures

Range:
Measures - source of materials, use of materials, energy source, energy consumption, water source, water consumption, radioactive waste, flexibility, durability and resilience, pollution and waste processing, transport, landscape and ecology, deconstruction and disposal.

What do learners need to learn?	Skills
The key environmental performance measures of construction industry and how they are considered during design and monitored during building operation times. The types of schemes that can be used to certify levels of environmental performance in construction, including BREEAM, Passivhaus and leadership in energy and environmental design.	EC5

5.6 Principles of heritage and conservation

Range:
Principles – restrictions, permission, legislation and guidance.

What do learners need to learn?	Skills
Heritage and conservation considerations associated with listed and other historical buildings (types and meaning of grades, grade I, II* and II, conservation area) and maintenance of existing stock and how current regulations (Planning Act and Heritage Protection Bill) affect the selection of materials and techniques used for building activities. Restrictions associated with listed and historical buildings: • listed building grading – Grade I, Grade II* and Grade II • permissions for buildings to be demolished, extended or altered • notification of work to a listed building that involves any element of demolition. Legislation and guidance relating to listed buildings and heritage sites: • Planning (Listed Buildings and Conservation Areas) Act • Heritage Protection Bill.	EC5

5.7 Lean construction

What do learners need to learn?	Skills
Aims of lean construction: • eliminating waste and errors through reduction, recycling and repurposing • improving work planning and forward scheduling • identifying the processes that deliver best value • eliminating activities that do not add value • ensuring the working environment is clean, safe and efficient • continuous improvement • just-in-time deliveries. The principles of lean construction (efficiency, best value, ensuring the work environment is clean and safe, improving planning and continuous review and improvement). Advantages and limitations of lean construction. The techniques aimed at maximising value and minimising waste within the construction industry including just in time (JIT) deliveries, reducing errors, recycling. Stock rotation, Accurate measurement (site surveys, accurate drawings) reduction of errors (measure twice, cut once).	CSB

5.8 Waste management

Range:
Waste management – Site Waste Management plan (SWMP), waste categorisation, segregation, reducing pollutants, recycling.

What do learners need to learn?	Skills
Transportation and disposal methods for waste (including general and specialist disposal, use of licensed disposal companies, use of registered waste carriers). Plans to reduce use of pollutants in construction projects including reduction of high carbon emissions, reducing land contamination, and correct waste disposal). The areas a SWMP covers (who is responsible, what types of waste, how it will be managed, approved contractor, how waste is measured) Reduce, reuse, recycle (3Rs).	EC2 EC3 EC5

5.9 Energy production and energy use

Range:
Energy - Wind, water (hydro), solar, photovoltaic, nuclear, fossil fuels, ground, and wind source energy, biomass.

What do learners need to learn?	Skills
Types of energy produced including nuclear, heat and power combined, fossil fuels including alternative methods such as wind, solar (photovoltaic and thermal), hydroelectric, and their impact when used (availability, impact on environment, costs). Reasons for choosing energy sources discussing the advantages and disadvantages of each method (localism, regionalism).	EC6

6. Measurement principles

Criteria

6.1 Accurate and appropriate measurement

Range:
Accurate measurement - materials quantities, materials costs, labour costs, activity time, overall time, setting out sites, positioning, construction components.

Costing techniques- Job costing, batch costing, activity costing, life cycle cost analysis.

What do learners need to learn?	Skills
The benefits of accurate measurements to contractors, the client/customer, to profitability and project success, including accuracy in site/location/areas measurements to accurately calculate material quantities, which in turn enable accurate costing of construction projects. Using plans or physical dimensions to help plan activities and measure quantities. Obtain accurate measurements to calculating quantities and costs. The benefits of accuracy in site/location/areas measurements to accurately calculate material quantities to enable accurate costing of construction projects. Use of different costing techniques to suit the activity or project being undertaken including advantages and limitations for each type. Calculating costings using costing techniques. The implications of not having accurate measurements – in terms of costs, time, and safety.	CSC MC1 MC9

6.2 Standard units of measurement and measurement techniques

Range:
Units of measurement - mm millimetres, m metres, km kilometres, g gram, kg kilogram, tn tonne, ltr litres, m^2 square metres and , m^3 cubic metres.

Measurement techniques – Approximation/estimation, use of measuring equipment including tapes, lasers and surveying equipment.

Differing situations- height, length, distance, area, volume, weight, mass, quantity, CO2 emissions, insulation.

What do learners need to learn?	Skills
The types of units of measurement and how these are applied and used in construction projects including the methods of obtaining data using measurement techniques in differing situations.	MC1 MC2 MC3 MC4

Methods of calculating a unit of measurement from data sources and measurements for differing situations. Surveying and measuring equipment (theodolite, total station laser measuring equipment, long tape). Methods of setting out (marking out) square using surveying equipment, Pythagoras, 3, 4, 5 method.	

6.3 Measurement standards, guidance and practice

Range:
Measurement standards - scale, tolerances.

What do learners need to learn?	**Skills**
Standardised scales for recording or displaying measurements, including measurement rules. Purpose of the various drawing types listed. How tolerances are applied and implications of not meeting tolerances. Calculate actual dimensions of building features using scales from drawing measurements. How to use common scales for various drawing types: • 1:1 Rod, full scale drawing • 1:2 half scale, assembly drawing • 1:5,1:10 Detail drawings • 1:20,1:50,1:100, 1:200 floor plans, elevations, sections • 1:200, 1:250, 1:500 Site plans/block plans1:1250 1:2500 location plans.	EC1 MC1 MC3 MC4

7. Building technology principles

Criteria

7.1 Construction methods

Range:
Construction methods - onsite, off site, renovation/refurbishment, maintenance.

What do learners need to learn?	Skills
Types of traditional and modern construction methods and their use and the benefits depending on the construction required. Onsite: timber frame, (traditional oak and modern timber frame construction), masonry (brick dense and aerated block, solid and cavity wall) container straw bale, cob, concrete formwork construction. Off-site: pre-assembled, precast, modular, panel systems. On-site and off-site considerations, quality control, project cost, transport cost, build time, onsite waste. Renovation and refurbishment: upgrades, cosmetic and structural changes. Maintenance: fabric services, thermal upgrades, internal and external treatments.	EC2 EC5 EC6

7.2 Forms of construction

Range:
Forms - substructure, superstructure, infrastructure, internal/external walls, external work.

What do learners need to learn?	Skills
Current forms of construction and their use and suitability for both built environment and civil engineering structures. Substructures: strip, raft, pile, pad and the type of ground condition's structure suitability, Foundation purpose, point loads, spreading loads over an area. Suitability of foundation for steel framed buildings, traditional buildings, high-rise buildings, basements, retaining wall, walls up to damp proof course (DPC) level, solid (trench block) and filled cavity Apertures for services. Superstructure: gable and hipped roofs (identification and structural properties of truss and cut roofs, wall plates, rafters, ridge, purlin and collars) fascia soffit and guttering, walls (components DPC, cills, lintels, quoins, insulation, cavity closers, wall ties), floors (solid concrete, concrete suspended), block and beam, suspended timber, sleeper walls, joists, strutting, damp proof membrane (DPM) hardcore, blinding, windows, doors and frames and	EC1 EC2 EC4 EC6

linings (plastic and timber, single, double and triple glazed). Infrastructure: access roads, sewage systems, services (gas, water, electric, communications). Internal/external walls: cavity, solid, infill, stud, openings vertical and horizontal damp proof, weather tight, preventing water ingress and allowing for egress (weep holes). External work: paving, boundaries, drainage, parking, (finished surfaces, sub-base materials).	

7.3 Key content and required notifications of UK Building Regulations and Approved Documents

Range:
Approved Documents - Part A – Structure, part B – fire safety, part C – site preparation and resistance to contaminates and moisture, part D – toxic substances, part E – resistance to the passage of sound, part F – ventilation, part G – sanitation, hot water safety and water efficiency, part H – drainage and waste disposal, part J – combustion appliances and fuel storage systems, part K – protection from falling, collision and impact, part L – conservation of fuel and power, part M – access to and use of buildings, part P – electrical safety, part Q – security, part R - physical infrastructure for high speed electronic communications network, part S – Infrastructure for charging electric vehicles.

What do learners need to learn?	**Skills**
The key content and purpose of each of the current UK Building Regulations approved documents/parts in relation to renovations and construction of buildings.	CSB EC5

7.4 Building standards

Range:
Building standards: British standards, International standards (ISO), Common minimum standards for construction (CMS).

What do learners need to learn?	**Skills**
Current British Standards and international standards that cover waste management (BS5906) , BIM (ISO 19650) , fire safety (BS9991,BS9999 BS8214). Common minimum standards for construction used for public sector projects. Their purpose and benefits (general standards, procurement, health and safety, design, historic estate, sustainability). in construction and renovation.	EC5

7.5 Manufacturers' instructions

What do learners need to learn?	Skills
Type and purpose of manufacturers' instructions (installation, operation, maintenance, safe methods of recycling and disposal instructions).)	CSA

8. Information and data principles

Criteria

8.1 Data

Range:

Key elements of data, including accuracy, generalisation, interoperability, level of detail and metadata used to inform construction and building services processes.

What do learners need to learn?	Skills
Different sources that data can be generated from including: • design and construction process • planning documents (Gantt charts, critical path analysis, schedule specifications, working drawing, site measurements/surveys) • Building Information Modelling • post occupancy evaluation • utilities, building services, meters, building management systems. • infrastructure and transport systems • enterprise systems such as purchasing systems, performance reporting, work scheduling • maintenance and replacement systems • operational cost monitoring • ICT systems and equipment. How data from sources can be used to understand behaviour, assess performance, improve market competitiveness, and allocate resources.	EC4 EC5 MC5 MC6 DC3 DC4

8.2 Sources of information

Range:
Types of information- product data, manufacturer's specifications, client's specifications, Common Date Environment, Building Information Modelling (BIM), Drawings, Plans, Gantt charts, Critical path networks, Certification and commissioning data, Test data schedules, Condition reports, Carbon emissions.

What do learners need to learn?	Skills
Be able to interpret current and accurate types of information and data sources used within construction projects. Use data to plan and schedule tasks, activities and projects. Advantages and limitations of each of the types of information.	CSC EC1 EC2 EC3 EC5 DC1 DC3 DC4

8.3 Data management and confidentiality

Range:
Confidentiality - encrypted data, virus protection software, software updates, firmware updates, GDPR Requirements, business procedures.

What do learners need to learn?	Skills
Current data protection legislation including GDPR and organisational procedures that are used to manage data and increase confidentiality (manage data access, encryption, acquisition, physically secure devices, secure disposal). Cyber security purpose and best practice, staff training to avoid phishing attacks, use of strong passwords, use of regular back-ups, use of secure data transfer using cloud-based systems, avoid use of pen drives. Data storage requirements in relation to security and protection. Common threats (cyberattacks, malware, Trojans, data loss, ransomware).	DC4 DC5

9. Relationship management in construction

Criteria

9.1 Stakeholders

Range:

Stakeholders- Client, client representative team, construction team, suppliers, community, end user.

What do learners need to learn?	Skills
The different roles of stakeholders in construction projects.	CSD EC1

9.2 Roles, expectations and interrelationships

Range:

Project management- Architect, Clerk of works, Quantity Surveyor, Contacts Manager, Site Manager, Project Manager.

What do learners need to learn?	Skills
The expectations and interrelationships of all stakeholders throughout the construction project delivery at start, design stage, through construction, to handover and in use. To include: • hierarchy of project management • promoting good relationships across the project • cost control measures • time management methods • handover processes • Corporate Social Responsibilities (CSR) and S106 • Public relations – to include behaviour of employees outside of work hours • follow up and review.	CSD EC1

9.3 Collaborative working to project delivery and reporting

What do learners need to learn?	Skills
The importance of a collaborative approach to project delivery (delivery, reporting, providing information at various stages in the development) and how this is applied in practice (with the use of BIM and workflow software packages as well as face to face methods).	CSC CSD EC1 EC2 EC3 EC5 DC3

9.4 Customer service principles

Range:
Customer service principles – good product knowledge, building trust, meeting timescales, good communication, efficiency, honesty and integrity.

What do learners need to learn?	Skills
The basic principles of good customer service and the benefits of good customer service including, repeat business, good reputation, satisfied customers and employees, increased market share.	CSC EC1

9.5 Team work to team and project performance

Range:
Project performance- efficiencies, morale of staff, creativity, accountability open communication common goals.
Consequences of poor teamwork- conflict and tension, low engagement, lack of trust.

What do learners need to learn?	Skills
The importance and advantages of good team work to team and project performance and the consequences of poor teamwork and how it impacts on a construction project such as effects of productivity and efficiency.	EC2 EC6

9.6 Team dynamics

Range:
Team Dynamics - knowledge of trade/business/product/service, accountability, cooperation, trust, support, reliability, effective communication, active participation, adaptability.

What do learners need to learn?	Skills
Qualities and characteristics of good team dynamics, including what is expected of team members, team structure, what qualities are needed and how these qualities are demonstrated.	EC2 EC6

9.7 Equality, diversity and representation

Range:
Equality, diversity and representation - age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation.

What do learners need to learn?

Current equality and diversity legislation and the protected characteristics detailed under the Equality Act, Employment Rights Act, Human Rights Act, and trade unions, including its application in the workplace.

How to promote equality, diversity and inclusion in the workplace.

9.8 Negotiation techniques

Range:
Negotiation techniques - Distributive negotiation or Win-Lose approach, lose-lose approach, compromise approach, integrative negotiation or win-win approach.

What do learners need to learn?	**Skills**
Methods of negotiation and how they are used within the construction industry (acquiring land, obtaining planning permission, awarding contracts, negotiating change orders, material costs, time extensions and resolving disputes).	EC6

9.9 Conflict management techniques

Range:
Conflict management techniques - preventative measures, compromise, problem solving, avoiding, competing, forcing, alternative dispute resolution (Informal discussions, mediation, conciliation, arbitration).

What do learners need to learn?	**Skills**
Conflict management techniques including preventative measures and common reasons for conflicts (ambiguous contract terms, breach of contracts, late supply of materials, programme delays, clashes in locations of equipment, poor provision of equipment, competing for space, personal conflict).	CSD EC6 CS1

9.10 Methods and styles of communication

Range:
Methods - verbal (pitch and tone, questioning types open/closed), and non-verbal (body language, eye contact, facial expressions).

Styles - formal and informal.

Type of communication- face to face, email, letter, telephone, walkie talkie, text message, social media, drawn information.

What do learners need to learn?	**Skills**
The styles and methods of communication, type of communication and suitability for different situations that may arise throughout a typical construction project from concept to handover. Digital project management platforms and how these can be used to communicate as part of the construction project teams.	EC1 EC2 EC4 EC6 DC1 DC3

9.11 Employment Rights and Responsibilities (ERR)

Range:
Employment Rights – wage rules (minimum wage, pension), time off (holiday, parental leave, rest breaks etc.), equal rights (against harassment and discrimination), health and safety and welfare, and access to representation in times of grievance (trade union representation/independent representation).

Responsibilities-
Employer to employee – work, pay, health, welfare and safety provided.
Employee to employer – working to contract, complying with health, safety and welfare, confidentiality and reasonable behaviour as set out in the company handbook.

What do learners need to learn?	**Skills**
The current employment rights, their implications and the responsibilities of employees and their employer.	EC5

9.12 Ethics and ethical behaviour

Range:
Ethical behaviour in the construction industry - (honesty, integrity, equality, loyalty, fairness, caring, respect, adherence to laws, commitment, reputation, accountability).

What do learners need to learn?

Ethics and ethical behaviour of individuals and corporations including the advantages they bring to project delivery.

9.13 Sources of information.

Range:
Sources of information- web based, TV, radio, hoardings, local business networks and social media networks.

What do learners need to learn?	**Skills**
How sources of information suitable for the construction industry and how they contribute, (including web-based sources, TV, radio, hoardings, local business networks and social networking)to the knowledge sharing/stakeholder experience by sharing ideas and knowledge, advertising and promotion, getting customer reviews and feedback.	CSD

10. Digital technology in construction

Criteria

10.1 Internet of things

Range:
Internet of things - Smart Technology, smart/automated building, smart learning and of artificial intelligence (AI), building control systems, building management systems, smart applications and systems security and monitoring systems.

Technology - Wi-Fi, Bluetooth, Wired LAN, routers, CCTV, smart appliances.

What do learners need to learn?	**Skills**
The use of technology to capture data in a completed building and how this data is used for the purpose of future manufacture and delivery. The use of technology and the internet of things to control the environmental conditions, lighting and security in completed buildings. The different uses of technology connected to the internet of things (smart building, smart applications and systems) and their use and role in the construction industry (productivity, assisting just in time, asset management, maintenance, smart equipment and technology, smart concrete etc).	DC1 DC3 DC5 DC6

10.2 Digital engineering techniques

Range:
Digital engineering techniques - simulation, animation, surveying, CAD modelling, drones.

Applications- design, marketing/sales, construction, project management, handover, use, maintenance.

What do learners need to learn?	**Skills**
Current Digital engineering techniques and their application in the construction industry. Simulation: structural analysis. Animation: visualisation of structural behaviour. Surveying: laser level, measuring and drones. CAD modelling: (2D drawings 3D modelling), drones.	MC6 DC1 DC2 DC6

10.3 Adapting technologies used in other industries and for use in construction and the built environment

Range:
Technology - Machine manufacturing through robotics**,** Computer Numerical Control (CNC), CAD/CAM, scanning**,** computer modelling**,** geo surveying, drones.

What do learners need to learn?	**Skills**
The benefits of using current technologies from other industries (accuracy, accessibility, efficiency, reducing risk) and how they can be adapted for use in the construction and the built environment.	MC6

11. Construction commercial/business principles.

Criteria

11.1 Business structures

Range:
Business structures – Sole traders, Partnerships, Public Limited Company (PLC. Ltd.), Private Limited Company, Small and medium enterprises (SMEs), not for profit organisations/community interest (CIC), Charities, Franchise, Direct Labour Organisation (DLO).

What do learners need to learn?

Key differences- Ownership, Management of the company, Legal status, Liability, Advantages/Disadvantages.

Types of business structures that exist in the built environment and construction industry including the advantages, disadvantages, limitations and the key differences.

11.2 Business objectives

Range:
Business objectives: Financial and social, organisation culture, quality, innovation, compliance, sustainability, project funding.

What do learners need to learn?	Skills
The business and corporate objectives used to measure the performance of the organisation in the construction industry: • Methods of funding: self-funding, corporate, partnerships, local and central government, crowd funding. • Financial: private organisations (profit, growth and innovation and market leadership) and not for profit (value for money, increased access, reduced poverty). • Social: private organisations (providing employment) and not for profit (providing housing, healthcare, services and education). • Organisational culture: beliefs, behaviours and ethical values aligning with business objectives. • Quality: measurable objectives, including use of quality marks ISO etc. • Innovation: allows for generation of ideas, innovation activities and goals aligning with business objectives.	MC6 MC9

- Compliance: regulatory compliance (external) rules and internal controls built into objectives.
- Sustainability: sustainability embedded into business objectives, from energy efficient construction to eco-friendly use of materials.

Calculating estimates and quotes (material, plant and labour costs, overheads, profit, contingency, fees, VAT), definition of fixed overheads and administration fees.

11.3 Business values

Range:
Business values - financial stability, customer service, care for life.

What do learners need to learn?	**Skills**
The fundamental business values and how these can be achieved by the practicing of ethics and transparency, codes of conduct, commit to customer and collaborative working).	CSD

11.4 Principles and examples of corporate social responsibility

Range:
Principles – economic, legal, ethical, environmental, philanthropy, design sustainability.

What do learners need to learn?

The basic principles of corporate social responsibility (CSR) and how it is used in the construction industry (in design, responsible purchasing, career management, use of local operatives/trades/suppliers and local sustainable materials, sustainable initiatives). Who gains from CSR.

Design – community led, inclusive, meets local needs.

Social, economic and environmental – positive impact.

Sustainability – use of local trades/suppliers and materials.

11.5 Principles of entrepreneurship and innovation

Range:
Principles - solution provider, development, vision, viability of products, capital, growth and marketing, exploiting ideas, creativity, value added.

What do learners need to learn?
Principles of innovation and entrepreneurship and role it plays in the construction industry such as improved product service, increased growth/profit, and advancements in industry.

11.6 Measuring success

Range:
Benchmarking- Key performance indicators (KPI's), standard setting, target setting, input, output and process.

What do learners need to learn?	Skills
How organisations use benchmarking, setting standards, KPI's and target setting (input, output and process), review, evaluation and feedback when measuring business success.	CSA

11.7 Project management

Range:
Project management- effective planning, setting clear goals and objectives, defining roles and responsibilities, setting realistic milestones, and constraints on cost and time.

What do learners need to learn?	Skills
The principles of project management, ensuring all objectives are measurable and achievable including SMART technique.	CSC

11.8 Quality management

Range:
Quality management systems- Self-assessment, Internal audit, External audit, Quality control, Quality improvement, ISO 9000 series

What do learners need to learn?	**Skills**
The quality management systems and techniques used in the construction industry including: • self-assessment • internal audit • external audit • quality control • quality improvement • ISO 9000 series. The application of each system and the purpose of quality management systems - to maintain the standard or quality of the work in a consistent manner.	CSD

Links to occupational specialisms

All aspects of the Onsite core content can be related and contextualised on delivery with the occupational specialisms. However, the following are **key areas** of the content that may be **of particular relevance** when delivering the practical content in the occupational specialisms and provide efficiencies for teaching core knowledge in context:

Onsite specific core content

- Health and safety – Regulations and safe working practices
- Construction design principles
- Construction sustainability principles
- Scientific principles
- Building technology principles
- Information and data principles

Guidance for delivery

- Visits/engagement with local industry, employers and manufacturers should be provided throughout the delivery
- Formative assessment – oral Q&A, SmartScreen worksheets (samples available) observation of measuring activities
    - Practical - Use of pre-set formative assessments carry out tasks and record on standardised form.
    - Knowledge – pre-set paper-based activity to confirm skills and understanding. Learners can use variety of methods to carry out activities, calculators, apps, office IT
- Ways of ensuring content is delivered in line with current, up to date industry practice
    - Centres will need to ensure a realistic representation of onsite components are available
    - Centres will need to provide the appropriate tools, equipment and materials
    - The provision must represent the type of equipment currently available in the UK Onsite industry
    - Current and emerging Onsite technology should be included in delivery where possible

Suggested learning resources

Books

- Building Construction Handbook – Fred Hall – Routledge 2017
- Building Regulations – Ray Trucker – Routledge 2019
- Metric Handbook – Pamela Buxton – Routledge
- Advanced Construction Technology 5th Edition – Roger Greene – Pearson's
- Chudley,R. (2016) Building Construction Handbook. Routledge.
- IRVINE,W.and MACLENNAN Surveying for Construction 5th Ed.
- Sadgrove B.M. Setting out procedures for the modern built environment. London.

Websites

- Institute for apprenticeships and technical education **- www.instituteforapprenticeships.org**
- Building Regulations portal **- www.planningportal.co.uk**
- British Standards Institution - **www.standardscentre.co.uk**
- RIBA **- www.architecture.com**
- Building information Modelling -**www.gov/government/uploads/system**
- RIBA plan of work - **www.ribaplanofwork.com**
- English Heritage - **english-heritage.org.uk**
- Historic England – **www.historicengland,org.uk**

305 Bricklaying

Level:	3
GLH:	600
Assessment method:	Practical assignment

What is this specialism about?

The purpose of this specialism is for learners to know and undertake fundamental bricklaying work within different construction environment's such as domestic brick and block work (solid and cavity walling) design and build complex masonry structures and use masonry skills to refurbish different types of buildings. Learners will have the opportunity to plan, perform and evaluate their work whilst utilising a range of materials, methods and techniques to allow the learner to progress.

Learners will develop their knowledge and understanding and skills in:

- Fundamental Health and safety regulations, control of noise, and working at height, while working safely across different construction projects.
- Bricklaying tools and equipment, building regulations and methods of work.
- Setting out masonry structures and calculating for building resources.
- Establishing sub and superstructure elements of a building.
- Finishing and establishing working areas.
- Calculating both labour and material costs.

Learners may be introduced to this specialism by asking themselves questions such as:

- What kind of tasks does a Bricklayer perform?
- What tools and equipment do bricklayer's use as part of their role?
- What are the steps required to become a qualified bricklayer?

Completion of this specialism will give learners the opportunity to develop their maths, English and digital skills.

Underpinning Bricklaying knowledge outcome

On completion of this specialism, learners will understand:

1. Bricklaying knowledge criteria

Performance outcomes

On completion of this specialism, learners will be able to:

2. Prepare for the construction of complex masonry structures
3. Construct complex masonry structures
4. Renovate masonry structures

Completion of this specialism will give learners the opportunity to develop their maths, English and digital skills.

Specialism content

Outcome 1

Common knowledge criteria

Health and safety

1.1 Implications of **legislation and guidance**

Range:
Legislation and guidance - The Health and Safety at Work Act (HASAWA), Construction Design Management, (CDM) regulations, Reporting injuries, diseases and dangerous occurrences act (RIDDOR), Control of substances hazardous to health (COSHH), Provision and use of Work Equipment Regulations (PUWER), Manual Handling Regulations, Personal protective equipment (PPE) at work regulations, Respiratory protective equipment (RPE) regulations Work at Height regulations, Control of Noise at work regulations, Control of vibration at work regulations, Electricity at work regulations, Lifting operations and lifting equipment regulations (LOLER), Hazardous waste regulations, Approved code of practice (ACOP), HSE information.

What do learners need to learn?	**Skills**
The role of legislation and regulations in the production and installation of complex masonry-based products including the role of the Health and Safety Executive (HSE). How current legislation impacts employer, employee and complex masonry projects within a domestic and commercial setting. The implications of not adhering to the legislation on the public, client, business and employers, including enforcements, penalties and imprisonment.	EC5

1.2 The identification of **hazards and risks**

Range:
Common hazards and risks - tripping hazards, slipping hazards, Inadequate or lack of personal protective equipment, Defective (unsafe) equipment, Cutting and dressing resources Manual handling, Working at heights. Moving vehicles and machinery.

Controls - identify correct PPE and maintain PPE, method statements, risk assessments, complete accident book/ record, training, good housekeeping, toolbox talks, job hazard analysis.

What do learners need to learn?	Skills
The types of hazards and risks associated with complex masonry activities, working at height, in trenches, on site. Methods used to identify hazards (walk around site, observing how task are preformed, assessing tools, equipment) and the precautions taken through the adoption of controls to minimise them.	EC5

Controls

1.3 Controls content of **inductions**, **method statements** and **risk assessments**

Range:
Inductions - site layout, site specific hazard, location of welfare facilities, location of emergency areas.

Method statements- understand job descriptions, hazards specific to the job, control measures.

Risk assessment - identify hazards, personnel at risk, measures to remove/reduce risk.

What do learners need to learn?	Skills
The content and purpose of inductions (awareness and site safety). Risk assessments and how this feed into the production of method statements in relation to bricklaying and complex masonry tasks.	EC1 EC2 EC3 EC5

Information

1.4 Types of **information**

Range:
Information - program of work, drawings (includes use of scales and drawing conventions), specifications, schedules, risk assessments, method statements, building regulations, data sheets, manufacturer's information.

What do learners need to learn?	Skills
How to obtain relevant information using a range of methods, including researching the internet, manufacturer handbooks, other primary and secondary sources, including seeking direct information from relevant parties and liaising with manufacturers, professionals, colleagues and terminology required to aid interpretation and development.	EC5 DC1 DC5

1.5 **Requirements** of building regulations and standards

Range:
Requirements- protect public interest, provides minimum standards for health and safety and general wellbeing, specifies standards.

What do learners need to learn?	Skills
Where to obtain information on current building regulations and standards (Planningportal.co.uk, gov.uk, library) and their purpose relating to complex masonry structures,	DC1

1.6 **Quality standards** applicable to masonry structures

Range:
Types of quality standards/ tolerances - gauge, level, plumb, square, ranging, dimensional accuracy, clean elevations, face.

What do learners need to learn?	Skills
Current quality standards (BS 5628-3, BS EN 771-1 NHBC standards) and tolerances applicable to masonry structures.	MC1 MC8

Tools and equipment

1.7 Types and handling of **tools and equipment** used for bricklaying

Range:
Tools and equipment

Hand tools - Laying Brick trowel, Pointing trowel, Pointing hawk, Spirit levels, 900mm 1.2m 2.0m, Pocket level, Hammers, (club, brick, comb Scutch), Line and pins, Quoin blocks, Brick bolsters, Jointing/plugging chisel, Tape measures, 3m 10m 30m; Half round jointer, Recess jointer, Gauge rod, Propriety corner profiles, Hand brush.

Equipment - Storey rod, Hand saw, Block splitter, Trammel heads, Trammel rod, Sanding block, Rasp/File, Tin Snips, Ranging poles, Surveying staff, Laser level, Optical level, Sliding bevel, Dividers, Templates, Strong boys, Sole plates. Buckets, shovels, spades, sweeping brushes and wheelbarrows, PPE.

Power - Drum Mixer (110v), Extension lead (110v), Hammer drill and bits, Jig saw (110v), Power plane (110v), Masonry saw/disc cutter (hand and table), Mortar silo.

What do learners need to learn?

Types of hand tools and equipment used in complex masonry projects and tasks and their characteristics, purpose and suitability for tasks

For example, the Pointing trowel – A handheld tool with either a wooden or plastic handle and trowel with metal pointed end. Used in construction to shape mortar into seams which joint breaks, stones etc. in masonry.

1.8 **Operation** and **handling** requirements of tools and equipment

Range:
Operation and handling - accuracy, safe working methods, cleanliness, PPE, trained, competent, storage, method statements, risk assessments.

What do learners need to learn?	**Skills**
Requirements when operating and handling tools and equipment. Including, safe handling and safe working methods, safe storage minimising potential for damage and risk of theft.	**EC4**

1.9 Importance of tools and equipment **maintenance** and how to maintain tools

Range:
Maintenance - cleaning routines for all hand tools and equipment, secure hammer heads, deburring bolster and chisels, sharpening bolsters and chisels, sharp scutch combs, lubricating tape measures, check levels for accuracy, storage methods, check spirit level and plumb rules for accuracy.

What do learners need to learn?	Skills
The processes used to maintain tools and the importance of regular maintenance of tools and equipment to ensure safe working and fit for purpose, including PAT testing. Maintenance of tools and equipment (grinding the burring on bolsters and chisels, replacing wedges to loose hammer heads, checks on electrical equipment, guards and cable, cleaning tools). Check spirit levels for accuracy.	EC4

Scientific concepts and principles applied to bricklaying

1.10 Masonry **classifications** and the **implications** of use

Range:
Classifications - half brick wall, solid wall, load bearing, reinforced, hollow, composite, post tensioned cavity wall, partition wall, separating wall.

Implications - stability, appearance, efflorescence, staining, subsidence, water penetration (porosity, permeability, absorption) frost damage, spalling, cracking, movement.

What do learners need to learn?	Skills
Types of masonry classifications (including salt content and F/S numbers, porosity) the implications, for use and the suitability of materials for the chosen application (strength, aesthetics, cost, weight durability).	EC3 EC6 MC1 DC4 EC6

1.11 **Types** and classifications of mortars, **techniques** for strengthening mortars and the **Implications**

Range:
Types - lime mortar, cement mortar, ready mixed mortar (onsite or off-site).

Techniques – batching, chemical additive, increased aggregate gauge, increased cement content, use of adjusted mortar and concrete ratios.

Implications - resistance to loading, joint failure, lateral movement, variation in strength, resistance to attack by chemicals, colour variation, effects of excessive moisture.

What do learners need to learn?	**Skills**
Different types of mortar and how they are applied, the techniques for strengthening and the implications of use in different bricklaying situations. The purpose of lime mortar and the use of additives. Consequences of over strength mortars. Drying and setting times and breakdown of mortar and the causes.	EC1 MC1 MC3

1.12 Types of pointing techniques and materials

Range:
Techniques - weather struck and cut, tuck pointing.

Materials - coloured sand, gauged additives, sand lime, gauged aggregates, resin based, lime putty.

What do learners need to learn?
The types of pointing techniques and the use of appropriate materials, their application (by hand and gun) and suitability for different situations (appearance, colour, strength, heritage work, aesthetics).

1.13 Effects of the **external environment** on masonry products and structures

Range:
External environment - drainage management, tree proximity, water table, wind exposure, frost effects, prolonged adverse weather conditions.

What do learners need to learn?	**Skills**
The effects of the external environment on masonry products and structures. (including root growth, frost heave, clay, subsoils, water table, adverse weather, movement cracking, subsidence and effects of mining)	EC5

1.14 **Manufacture** of brick, blocks and mortar used in construction

Range:
Manufacture:
Bricks and blocks - kiln fired, steamed, autoclave, handmade, machine pressed, wire cut.
Mortar – various mixes to dry powders and materials depending on mortar type.

Properties:
Bricks and blocks - shape, size, colour, composition and density.
Mortar – workability, bond and compressive strength.

Characteristics
Brick and block - uniform, compact.
Mortar - adhesion, durable workable.

What do learners need to learn?
The manufacturing processes for bricks, blocks and mortars used in construction and their properties, characteristics their suitability for different purposes (i.e. load bearing capacity, thermal insulation, high compressive strength, low water absorption, use for strength and exposed positions and ways to avoid banding).

1.15 **Causes, effects, prevention** and **treatment** of efflorescence

Range:
Causes – water soluble salts, low temperatures, moist conditions, condensation, rain, water added during trowelling, ground water, not protecting the finished work.

Effects – white/off white deposit, spoils appearance of masonry.

Prevention - keep resources dry, cover work on completion, specify bricks less susceptible to efflorescence.

Treatment - brush off crystalline products in dry weather, use a muriatic solution, light sandblasting.

What do learners need to learn?

The causes, effects, prevention and treatment of efflorescence.

1.16 The **principles** of thermal and sound efficiency their **purpose, application and installation**

Range:
Principles and purpose - heat transfer, sound transmittance.

Application and installation - selection of resources, appropriate location.

What do learners need to learn?	**Skills**
The principles and purpose of thermal and sound efficiency (including limiting heat transfer through external walls, limiting sound transmittance through masonry structure). Their application and installation and selection and appropriate location for use.	EC5
Selection of resources Including, mineral fibre, polyisocyanurate board (PIR), lamb's wool, insulation blocks, dense concrete blocks (sound).	
Appropriate Location Including, full envelope, walls (cavity), solid wall, external wall insulation (EWI), internal dry wall application. The relationship with masonry materials and techniques including, maintaining air tightness, taped insulation board joints, flush pointed mortar joints.	

1.17 **Movement** joints and differential movement

Range:
Movements - vertical movement joints in long lengths of masonry, regulation of positioning of movement joints, materials used to crate movement joints.

What do learners need to learn?	Skills
Movement joints used in the construction process, positioning types of movement joints (i.e. telescopic/flexible ties, strips of compressed board, mastic etc.) and their application (i.e. to absorb temperature expansion, absorb vibration or allow movement due to ground settlement or seismic activity).	EC1 EC5 EC6

1.18 **Resistance** to **contaminants and moisture**

Range:
Contaminants and moisture - sulphate attack, lime leaching.

Resistance - horizontal damp proof course, damp proof membrane, cavity trays, radon/gas barriers.

What do learners need to learn?	Skills
The relationship between contaminants and moisture damp proof barriers and their purpose (to protect vulnerable positions in a cavity from moisture ingress) and their application and installation (where the risk of moisture bridging occurs).	

1.19 The relationship between masonry and different forms of **construction frames**

Range:
Construction frames - timber, steel, concrete, portal, structural insulated panels (SIPs), insulated concrete framework (ICF).

What do learners need to learn?
The relationship between masonry (used as cladding, structural support, insulation) and the different forms of construction frames used. To include types of masonry support systems, (continuous angle, welded steel bracket, individual bracket and off the shelf/off site-built systems).

1.20 Chemical reactions from combining masonry materials, the effect of adding waterproofing chemicals and the **effect** plasters/mortars have on hardwoods

Range:
Effects - Colour and grain distortion, Removal of natural oils.

What do learners need to learn?	**Skills**
The effects of chemical reactions from combining masonry materials (plasters/mortars) with hardwoods (and the effect of adding waterproofing chemicals (water repellent, stain resistant, prolong life).	EC5

Building Technology

1.21 Integral building **components** and their **purpose**

Range:
Components and purpose - ties (help and maintain structural stability in cavity walls), expansion joints (to allow for structural/thermal movement in walls), lintels (carry the weight of masonry over openings), bearers/padstones (to distribute loadings), cavity trays and weep holes (used to direct water and moisture outwards from the cavity), fire stops (to stop spread of fire, DPC in cavity, non-combustible insulation), radon barriers (to ensure radon is directed to outside of building) DPC/DPM (stop the passage of water and moisture), restraint straps (aids stability).

What do learners need to learn?
Types of building components, their purpose and their application and installation in accordance with building regulations.

1.22 Types of **radial** and **battered** brickwork

Range:
Radial - serpentine wall, curved on plan (concave and convex), axed semicircle, three centred arch, segmental arch.

Battered - battered brickwork, buttress, tumbling in.

What do learners need to learn?	**Skills**
The different types of radial and battered brickwork used in complex masonry structures and the calculations used to construct both types of brickwork (including volume, cross sections height thickness and breadth). To include calculations for quantities of materials required.	MC1 MC2 MC4

1.23 **Types** of reinforced brickwork

Range:
Types - horizontal (expanded metal lath, welded fabric,), brick and a half wall vertical reinforcement, isolated brick piers including vertical reinforcement.

What do learners need to learn?	**Skills**
The different types of reinforced brickwork, their purpose (to increase tensile strength of the wall), application and installation (vertical and horizontal reinforcement in bed joints and masonry voids).	EC4 EC6

1.24 Different types of **openings**

Range:
Openings - fireplace, chimney, flues.

What do learners need to learn?
The different types of openings involved in fireplace and chimney construction (including single and back to back fireplace) and their purpose (to contain the combustion process and to conduct flue gases to the outside of the structure) and its application and installation in accordance with building regulations. Including the processes to build new or repair, block up existing openings safely and without causing future damage.

1.25 Types of **finishes** to wall plate and rafter level

Range:

Finishes - mortar bedding of the wall plate, placing restraint straps horizontal and into gable end, Use of timber and restraint straps and bolts.

What do learners need to learn?	**Skills**
Positioning and securing of wall plates rafters and trusses and how they are secured to the structure to meet current building regulations.	EC5

1.26 Different types of bonds used in masonry structures

Range:

Bonds - English, Flemish, Stretcher, Header, block bonded quoins (commonly referred to as rusticated quoins), garden wall bonds, decorative panels – herringbone, interlacing and basket weave (diagonal and vertical), Dentil, Dog tooth and oversailing.

What do learners need to learn?

The different types of bonds used in masonry structures including (327.5 – 225+102.5) thick English Bond, Flemish Bond, English and Flemish Garden wall bonds, Dutch Bond, Monk Bond, Header Bond, Block bonded quoins and closing a cavity: Block on flat at gutter level/forming a stopped end.

1.27 Types of cladding systems

Range:

Cladding systems - brick, steel, timber, composite, plastic, concrete, slate, tile, glass.

What do learners need to learn?

The different types of cladding systems used in masonry structures their purpose (thermal insulation, weather resistance, improved appearance) application (curtain wall, sandwich panels, rainscreen, patent glazing) and installation (attached to primary structure).

1.28 Basic principles of cavity ties and ancillary brick support systems

Range:

Principles - structural stability to a cavity wall, ancillary, joining new brickwork to existing masonry.

What do learners need to learn?	Skills
The basic principles of cavity ties and ancillary brick support systems. Types of cavity ties (type 1 and 2) and their application depending on general purpose (type 1 used in domestic and small commercial buildings or type 2 heavy ties suitable for most buildings).	MC1 MC2

Maths

1.29 **Application** of maths

Range:

Type of application - areas, volumes, linear, circumference (perimeter), U values, Pythagoras Theorem.

Calculations - number of bricks per Liner Metre, number of bricks per m2, volume of excavation M3, and volume of concrete required M3, surface area of columns/Piers, U values to a cavity wall, determine liner measurements, calculating waste, costing projects including VAT.

What do learners need to learn?	Skills
The application of maths and types of building calculations used in construction.	MC1 MC3 MC4

1.30 **Application of geometry** for setting out and verification

Range:

Application - setting out a range arches, calculations for concrete (area and volumes), obtuse and acute brickwork, right angled quoins, Pythagoras Theorem, curved walls on plan, arch geometry, calculations for volume and for area methods for setting out and building curved brickwork, establishing square by measurement (3-4-5).

What do learners need to learn?	Skills
The application of geometry for setting out including setting out semi-circular segmental and gothic arches, horizontal radial work using a template and a trammel. Finding an arch centre. The geometrical processes used to set out a range of arch shapes. The use of compass or dividers to create a range of angles for setting out brickwork.	MC1 MC4

1.31 **Application** of ratios to bricklaying tasks

Range:

Application - mortar mixes for low and high strength brickwork, mortar mix ratios for pointing new and existing brick/Block work.

What do learners need to learn?	Skills
The application of ratios used for mixing and preparing mortar for laying bricks and blocks and pointing and jointing mortar (for instance, chimneys 1:5 cement to sand, bricklaying 1:4 cement to sand, retaining walls 1:3 cement to sand).	MC1 MC3 MC4

Specific knowledge criteria for performance outcomes

Prepare for the construction of complex masonry structures (Outcome 2)

Business/commercial

1.32 **Costs** associated with the production, assembly and installation of masonry products and components

Range:

Costs - labour, materials, consumables/overheads, wastage, price per M2 of both brick and block work, pricing brickwork per liner metre.

What do learners need to learn?	Skills
The costs associated in the construction of complex masonry structures including the price of brickwork for cavity walling, detailed panels, raking cuts and building details at gable end and price work for different arch designs, how to use a centre line calculation for taking off and calculations for volumes for trenches and for spoil cartaway.	MC9

Outcome 2 - Prepare for the construction of complex masonry structures

Performance Criteria

2.1 Identify **information** requirements from a client brief

Range:
Information - size, location, design, function, budget, specification.

What do learners need to learn?	Skills
How to select and extract information required from a brief to meet the requirements of any given task from a variety of reliable sources. Consideration must be given to accuracy, currency and source of information.	EC5 EC6

2.2 Use **questioning techniques** to obtain and clarify information required

Range:
Questioning techniques - open and closed, probing, leading, funnel.

What do learners need to learn?	Skills
Applying the appropriate types of questioning to gain information, response or outcome required to manage stakeholder expectations (client/customer/contractor/supplier/employee/ employer) Whether in person or remotely via telephone, online video forums, email or other written form. Closed – used when making a decision Open – used when trying to get opinions Probing – used when trying to get information that isn't forthcoming or to seek full understanding of a situation Leading – used to gain influence and achieve desired outcome Funnel – used when trying to get details about a situation	EC1 EC2 EC4 EC5 EC6

2.3 Calculate volume, area and linear measurements including areas for circles and their circumference

What do learners need to learn?	Skills
How to calculate areas of both brick and block face work, linear measurements of brick/block work and areas of door and window openings. Including an allowance for waste. Calculations for volumes of concrete and spoil including an allowance for bulking or swelling.	MC1 MC2 MC3 MC4

2.4 Measure: length, height and area

What do learners need to learn?	Skills
How to measure the lengths and height and calculate the area of face brick/block work/stone and local materials for complex masonry structures (to include common sizes measured by depth x height x length). Reviewing measurements against manufacturer's specification to support calculations. The inter-relationship of materials, i.e. brick, block/stone and insulation, as well as cill height and head height.	MC1 MC2

2.5 **Interpret** scaled drawings

Range:
Interpret - dimensional references, architectural features, position of door and window openings, roof configuration, establishing corner positions.

What do learners need to learn?	Skills
How to interpret scaled drawings in elevation plan and section on orthographic projections and in isometric view.	MC5 MC7

2.6 **Inspect** tools and equipment and materials for defects

Range:
Inspect - visual inspection, PAT testing, calibration, routine checks for accuracy.

What do learners need to learn?

How to inspect and maintain the bricklayers hand tools, equipment and materials.
Burring on chisels and bolsters, wedges in hammers. PPE is fit for purpose.

2.7 Mark out measurements for **gauging** and setting out **bonding**

Range:
Gauge – check the height of course.

Level – make sure the course is level.

Plumb – make sure wall is vertical.

What do learners need to learn?	**Skills**
Use of measurements to mark out gauges and setting out bonds including checking spirit levels (using laser level or dumpy level) and building squares for accuracy (90). The calculations for setting out bonds and the frequency the brickwork should be checked.	MC1 MC2

2.8 **Inspect** equipment and tools for accuracy

Range:
Inspect - faults, calibration, serviceable.

What do learners need to learn?

Inspection of equipment and tools in line with standard practice to ensure they are serviceable and fully operational including, correctly calibrated and set for accuracy/squareness.

2.9 Select materials and resources required to enable **setting out**

Range:
Setting out - profiles, builders square, tape measures, optical level, laser level.

What do learners need to learn?
How to identify correct tools and equipment to set out masonry below and above ground level.

2.10 Estimate **resource** requirements

Range:
Resource - bricks, blocks, mortar, insulation, DPC, tie Wires, concrete, labour, plant, wastage. Make costing using modern methods of construction e.g. timber frames. Waste removal.

What do learners need to learn?	**Skills**
How to take measurements and apply building calculations to calculate and estimate resources require. Including calculating materials (amount required by item based on measurement including wastage) labour (complexity of projects, timeframe, worker experience and plant availability) including any miscellaneous costs (insurance, bank charges, vehicles expenses) and contingency allowances (project slippage, sickness etc.). Creating a bill of quantities to capture resource and costing, depending on the brief/project requirements.	MC9 MC2

2.11 Follow a method statement and risk assessment.

What do learners need to learn?	**Skills**
To interpret or produce a method statement including process, steps and resources required to carry out the tasks safely without risks to health. Create or follow instructions from a method statement and complete risk assessments. Prepare a toolbox talk to disseminate the findings of the completion of risk assessments and method statements.	EC1 EC2 EC3 EC4 EC5

Outcome 3 - Construct complex masonry structures

Performance Criteria

3.1 Present **information** on constructed masonry to stakeholders.

Range:
Information - working drawings, Building Information Modelling (BIM), building regulations.

What do learners need to learn?	Skills
How to present using communication technology the design, construction methods and finished construction including multisensory, visual, audio, text, digital and diagrammatical.	EC1 EC2 EC3 EC4 EC6

3.2 Operate tools and equipment.

What do learners need to learn?	Skills
How to use hand tools to lay and cut materials in accordance with manufacturer's instructions and according to health and safety instructions.	EC5

3.3 **Mix** mortar to application requirements

Range:
Mix - mortar/concrete by hand, Use of 110v mortar mixer what about the option of diesel mixer.

What do learners need to learn?	Skills
Methods used for gauging and mixing mortar accurately including how to batch by weight and volume and the types of mortar mix and ratio required (1:4, 1:6) for a range of applications (external brickwork, chimney).	MC1 MC2 MC3

3.4 Protect integrity and quality of **materials** during handling and storing

Range:
Materials - bricks, blocks, mortar.

What do learners need to learn?	Skills
The correct handling, storage, transportation and protection of bricklaying materials, including adhering to safe working practices. Preserved in good order (secure, static and weatherproof). To include use pallets, crates, boxes, correct stack techniques, appropriate wrapping and correct labelling of secured products. Pre and post inspection and package Considerations to include assembly order review, health and safety specifications for loading, and any special loading/transportation requirements by customer/transport operator prior to and during transportation. Types of transportation used to include light goods vehicle, larger vehicles, lorries or containers for boats.	EC5

3.5 **Maintain** plumb, line, level and axial deviation.

Range:
Maintain - gauge, level, plumb, ranging, square.

What do learners need to learn?	Skills
Maintaining accuracy in masonry including plumb, level gauge and range including use of plumb lines, sprit levels, lines and pins, string lines and water tube.	MC1

3.6 Construct **complex masonry structures**

Range:
Complex masonry structures - brick arches, horizontal and vertical radial brickwork, battered brickwork, decorative courses and panels, obtuse and acute quoins.

What do learners need to learn?	Skills
Types of complex masonry structures including arches, curved brickwork, angle quoins and how they are constructed, including the use of templates to aid construction. Arches to include set out, temporary support (props, wedges) procedure (cut and construct) and safe removal of supports curved brickwork to include set out, templates, curved on plane, construct. Obtuse and acute quoins to include set out (special bricks to form angles), templates, cut components and set out and construct.	MC1 MC2 MC3 MC4

3.7 Produce templates

Range:
Templates- segmental, semi-circle, obtuse, acute, axed bricks.

What do learners need to learn?	Skills
Produce templates for geometrical setting out of arches and angled brickwork.	MC1 MC4

3.8 Shape components for obtuse and acute quoins

What do learners need to learn?	Skills
Use of special bricks and or methods with cut bricks and bonding arrangements required to form obtuse and acute angles.	MC1 MC4

3.9 **Insert** obtuse and acute quoins into masonry structures

Range:
Insert – English or Flemish Bond with a squint quoin.

What do learners need to learn?	**Skills**
Insert obtuse and acute quoins into masonry structures using a variety of patterns How to build solid walls with obtuse and acute angles. How to bond quoins.	MC1 MC2

3.10 **Set** out decorative **brickwork features**.

Range:
Decorative brickwork features - block bonded/rusticated quoins, decorate panels, Victorian weave, decorate string courses, herringbone panels, basket weave panels, corbelling.

What do learners need to learn?

Setting out and constructing decorative brickwork including panels.

3.11 Shape masonry products to application requirements

What do learners need to learn?

Shape bricks for radial and battered brickwork and obtuse and acute angled quoins and forming arch bricks or vousoirs.

3.12 Advanced **bonding patterns**

Range:
Bonding patterns - English and Flemish garden wall, Dutch, Monk. Header bond.

What do learners need to learn?

How to set out and construct advanced/complex bonding patterns.

3.13 **Maintain** cavity widths, straight and returns and apply joints to finished masonry structures

Range:
Maintain - quoins, junctions, pointing, jointing.

What do learners need to learn?	Skills
How to maintain/build masonry structures (cavity walls) including lengths, widths (typically 100mm – 150mm), returns and heights depending on their use (as insulation, full fill, partial fill, blown etc.) and the corresponding U values.	MC1 MC2 MC3

3.14 Classify and organise waste for disposal

What do learners need to learn?	Skills
Classify waste relating to bricklaying requirements (i.e. concrete, brick, tiles and ceramics) Organise waste for safe including the use of segregated skips.	EC5

Outcome 4 - Renovate masonry structures

Performance Criteria

4.1 Assess suitability of information

Range:
Information - planning regulations, HSE Website, building regulations, The Heritage Directory, manufacturer's instructions and client requirements.

What do learners need to learn?	Skills
How to source relevant information contribute to renovation of masonry structures (researching for latest versions from manufacturer's instructions). Using trade verified web-based sources (using government, trade regulation and legislation sites). Consequence of poor information (incorrect standards and tolerance applied, health and safety affected, legal issues). Ensuring personal safety in trade open forums and networking groups (privacy settings, passwords protected, personal information retained) and ensuring the information gathered across sources is verified through appropriate channels.	EC5 DC1 DC5

4.2 Inspect masonry structures for **damage**

Range:
Damage - movement cracks, structural damage, water penetration, wind damage to gable end.

What do learners need to learn?
Identify damage to masonry - visual inspection (bulges, sways, leaning, cracks, broken components, sagging), materials testing (use of equipment) and establish the causes of the damage.

4.3 Remove **damaged materials**

Range:

Damaged materials - brick, block, wall ties, damp proof course (horizontal and vertically), lintels, stonework, range. timber (dry rot), asbestos.

What do learners need to learn?
Techniques to remove damaged materials safely without causing further damage to the structure (hammer and chisel, sand grit and blast, wire brush) including treatments for infected areas and remaining materials, fungicides and safe use of needles and shoring in removing existing structures.

4.4 **Maintain** integrity of masonry structure

Range:
Maintain - repointing, replacing loose brickwork.

What do learners need to learn?	**Skills**
Repointing or jointing masonry, matching mortar, cutting and matching for appearance and effective repair. Calculations in maintenance of masonry structures including materials, components and fixtures.	MC1 MC2 MC3

4.5 Match **masonry** to the period of construction

Range:
Masonry - imperial bricks, stonework and mortars.

What do learners need to learn?	**Skills**
How to match masonry according to different periods of construction, including heights, colour and positions of resources when building new to old. Importance of selecting correct mortars for use with different brick types.	EC5

4.6 **Blend** new masonry products and materials to existing building fabric.

Range:
Blend - colour/texture match/stain.

What do learners need to learn?	Skills
How to select and blend new brickwork to older existing brickwork, bonding into existing fabric (one brick, two brick blend). Checks for face, height length and bed depths and technical standards. To include heritage blend requirements.	MC1

4.7 Insert **supports** to maintain the structural integrity following refurbishment

Range:
Supports - adjustable steel props, strong boys, isolated brick/block piers.

What do learners need to learn?	Skills
How to provide temporary supports when carrying out repairs to masonry to support loads/form work during construction including floors walls and ceilings, underpinning for repair and during installations of lintels or RSJs and calculating used to ensure them accuracy.	MC1

Guidance for delivery

Opportunities for visits/engagement with local industry, employers and manufacturers should be provided throughout the delivery

Considerations for innovative methods of delivery to include blended learning and other forms of technology,

Innovative methods of delivery could include:

- Presentation/demonstration – delivery of topics using SmartScreen presentation (PowerPoint example available) lecture/discussions/oral Q&A enthusing and engaging learners through different teaching methods and resources
- Reinforcement of candidate learning – revisit learning, group discussions, peer support, sample questions

Formative assessment – oral Q&A, SmartScreen worksheets (samples available) observation of measuring activities

- Practical - Use of pre-set formative assessments carry out tasks and record on standardised form.
- Knowledge – pre-set paper-based activity to confirm skills and understanding. Learners can use variety of methods to carry out activities, calculators, apps, office IT

Ways of ensuring content is delivered in line with current, up to date industry practice

- Centres will need to ensure a realistic representation of bricklaying tasks are available
- Centres will need to provide the appropriate tools, equipment and test instrumentation for demonstration and practical training purposes
- The provision must represent the type of tools and equipment currently available in the UK bricklaying industry Current and emerging bricklaying technology should be included in delivery where possible

Suggested learning resources

Books

- City and Guilds Bricklaying textbooks levels 1, 2, and 3 - Clayton Rudman and Tony Tucker, Mike Jones
- Brickwork and Bricklaying – Jon Collinson
- Bricklaying Level 3 Diploma – Leeds College of Building – Oxford University Press Modern

Websites

- HSE - **www.hse.gov.uk**
- Building Regulations - **www.gov.uk/building-regulations-approval**
- English Heritage - **www.english-heritage.org.uk**
- The Brick Development Association BDA - **www.brick.org**
- FairTrades - **www.fairtrades.co.uk**
- Stone Federation GB - **www.stone-federationgb.org.uk**
- Association of Brickwork Contractors - **www.aofbc.co.uk**

Scheme of Assessment – Bricklaying

The Bricklaying occupational specialism is assessed by one practical assignment. The duration of the assessment is 24 hours. Learners will be assessed against the following assessment themes:

- Health and safety
- Design and planning
- Presentation
- Construct masonry structures
- Repair masonry structures

By completing the following tasks:

Task	Typical Knowledge and skill
Task 1 – Prepare and plan for the production and repair of complex masonry structures	Displays a breadth of knowledge and practical application that enables them to carry out and plan the design of complex decorative brickwork. Candidates will need to produce a drawing to scale that clearly show the proposed work. Candidates will demonstrate a range of methods to produce working drawings Displays a breadth of knowledge and practical skills that enables them to carry out and plan for the completion of the work. Candidates will need to produce documents to industry standards that clearly state how they will carry out the installation. Knowledge and skills demonstrated will include design, measurement and calculations of quantities, production of a method statement and risk assessment, and the design and presentation of scale drawings.
Task 2 Construct complex masonry structures	Displays a breadth of knowledge and skills to construct complex masonry structures to specification successfully. The task is completed in a clear and logical sequence. Works in a safe manner. Providing protection for the area to ensure the safety of the general public and those carrying out the work Shows a systematic approach to the work and an awareness of safe and environmentally friendly methods of waste disposal.

Task 3 – Renovate and repair masonry structures	Applies knowledge and skills in identifying, preparing and then rectifying common faults in a structure. Completes the renovation/repair work to prescribed standards with due consideration to matching the finish with existing structure. Shows a systematic approach to the work and an awareness of safe and environmentally friendly methods of waste disposal.

The information provided in the following tables demonstrates to approved providers the weightings of each performance outcome and how each performance outcome is assessed.

Performance Outcome and weighting (%)	High level tasks *Provide specific instructions for the candidates to provide evidence for and are the same for every version of the assessment*	Assessment Theme	Typical evidence
PO2 Prepare and plan for the construction of complex masonry structures (27%)	T1, T2 and T3	Health and Safety Design and planning	Risk assessments, PPE, safe working practice Method statements, scaled drawings, measurements, material/ tools lists, design of tasks
PO3 Construct complex masonry structures (57%)	T1	Presentation	Presents/communicates plan/design to stakeholder/correct terminology used.
	T2	Construct complex masonry	Preparation, use of tools, techniques, cutting, shaping and overall finish and appearance Set out and measurements joint sizes and panel components. Accuracy of plumb level and gauge of structures Secure bond and overall appearance. Accuracy of joint finish and overall appearance. Safe, efficient, and correct disposal of waste and general cleanliness of work area
PO4 Renovate masonry structures	T3	Repair of masonry structures	Maintain, match, blend, insert, use of tools inspection correct removal use of tools

306 Carpentry and Joinery

Level:	3
GLH:	600
Assessment method:	Practical assignment

What is this specialism about?

The purpose of this specialism is for learners to know and undertake carpentry and joinery work. Learners will have the opportunity to plan, perform and evaluate their work whilst utilising a range of materials, methods and techniques

Carpentry and joinery are trades involving the use of timber in the building industry, from erecting timber frame, rooves and hanging doors through to making doors, windows, and stairs. This specialism will introduce the variety of timber and materials available to a carpenter and joiner and how these are cut, jointed and fixed to construct a variety of products. Learners will be introduced to safe working practices whilst carrying out carpentry and joinery work.

Learners will develop their knowledge and understanding of, and skills in:

- Knowledge of carpentry work undertaken
- Knowledge of joinery work undertaken
- Skills to plan carpentry and joinery work
- Skills to set out, mark out, cut and fix timber components to carry out structural and first fix carpentry
- Skills to mark out, cut, fit and fix timber components to carry out second fix carpentry
- Skills to set out, mark out, produce, assemble, and finish joinery products.

Learners may be introduced to this specialism by asking themselves questions such as:

- What skills do I need to be a successful carpenter/joiner?
- What kind of tasks does a carpenter and joiner perform?
- What tools, equipment and materials do carpenter and joiners use as part of their role?

Underpinning knowledge outcomes

On completion of this specialism, learners will understand:

1. Carpentry and joinery knowledge criteria

Performance outcomes

On completion of this specialism, learners will be able to:

2. Prepare for the production of complex timber-based building products and structures

3. Produce complex timber-based components

4. Assemble complex timber-based products

5. Install complex timber-based products into complex structures

Completion of this specialism will give learners the opportunity to develop their maths, English and digital skills.

Specialism content

Outcome 1

Common knowledge criteria

Health and safety

1.1 Implications of **legislation**

Range:

Legislation and guidance - The Health and Safety at Work Act (HASAWA), Construction Design Management, (CDM) regulations, Reporting injuries, diseases and dangerous occurrences act (RIDDOR), Control of substances hazardous to health (COSHH), Provision and use of Work Equipment Regulations (PUWER), Manual Handling Regulations, Personal protective equipment (PPE) at work regulations, Respiratory protective equipment (RPE) regulations Work at Height regulations, Control of Noise at work regulations, Control of vibration at work regulations, Electricity at work regulations, Lifting operations and lifting equipment regulations (LOLER), Hazardous waste regulations, Approved code of practice (ACOP), HSE information including HSE Woodwork Information Sheets, BWF information.

What do learners need to learn?	Skills
The role of legislation and regulations in the production and installation of timber-based products including the role of the Health and Safety Executive (HSE). How current legislation impacts employer, employee and Carpentry and Joinery projects within a domestic and commercial setting. The implications of not adhering to the legislation on the public, client, business and employers including enforcements, penalties, and imprisonment.	EC5

1.2 The **identification of hazards and risks** and the development of **safe systems of work**

Range:
Hazards and risks - slips, trips and falls; cuts and lacerations, inhalation, sharp edges; plant and equipment; moving parts; working with adhesives; working at height; hazardous materials; power tools, electrocution.

Safe systems of work - identification of workplace hazards, risk assessments, method statements, employer and employee responsibilities, first aid requirements, accident reporting procedures, Sources of information.

What do learners need to learn?	**Skills**
The types of hazards and risks associated with carpentry and joinery activities, working at height, in trenches, in workshops, on site. Methods used to identify hazards (walk around site, observing how task are preformed, assessing tools, equipment) and the precautions taken through the adoption of safe systems to minimise them.	EC5

Information

1.3 Types **of information** and how to obtain **relevant information** from building regulations and industry standards

Range:
Types - program of work, drawings (includes use of scales and drawing conventions), specifications, schedules, risk assessments, method statements, building regulations, data sheets, manufacturer's information.

Relevant Information - Planningportal.co.uk, gov.uk, HSE Website, building regulations, planning regulations.

What do learners need to learn?	**Skills**
How to obtain and interpret relevant information using a range of methods, including researching the internet, manufacturer's instructions, other primary and secondary sources, including seeking direct information from relevant parties and liaising with manufacturers, professionals, colleagues. Personal safety in trade open forums and networking groups (privacy setting, passwords protected, personal information retained) and ensuring the information gathered across sources is verified through appropriate channels.	EC5 DC1 DC5

Tools and Equipment

1.4 **Hand tools and equipment**

Range:
Access equipment - ladders (pole, extension, roof, telescopic, step), podium, hop-up, scaffolds (independent, putlog, tower, proprietary, trestle).

Measuring equipment – tape measures, rules, digital.

Setting out and marking out - squares (steel, try, box, combination, mitre), drawing equipment (30/60 degree and 45 degree set squares, tee square, protractor, flexicurve, french curves, compass), sliding bevel, dividers/scribing compass, trammel heads and beam, gauges (combination, marking, mortice, cutting) straight edge.

Cutting - saws (hand, rip, hand/crosscut, floorboard, panel, tenon, pull, dovetail, pad, coping, hack), hardpoint, chisels (bevel edged, mortice, firmer, paring, butt), planes (try, jack, smoothing, block, shoulder, rebate, plough, bullnose, hand router).

Shaping - spokeshaves (convex and flat), compass plane, scratch stock.

Assembly/fixing - sash cramp (T-bar and flat), G cramp, F cramp, mitre cramps, strap cramps, bench bearers, squaring rod, winding sticks, mallet (rubber and timber), hammer (claw, cross pein/Warrington, pin), punches, ancillary items such as (pincers, pliers, sanding blocks , scrapers, dogs, string line, chalk line,), levelling and plumbing tools (spirit levels, laser levels, plumb/centre-bob, scribing block) screwdrivers, adhesive applicators.

What do learners need to learn?

Types of hand tools and equipment used for access, measuring, marking out, cutting, shaping and assembling/finishing/fixing in carpentry and joinery tasks and their characteristics, purpose and suitability for tasks.

For example, the handsaw, consists of a handle and a metal blade with teeth of various shapes, profiles and sizes intended for cutting timber with or across the grain, and other materials.

Operated by hand movement and used to cut materials, including straight, angled and curved cuts.

1.5 **Portable power tools**

Range:
Portable power tools - power sources, (240V/110V, battery, gas, ballistic cartridge, pneumatic), cutting tools and associated tooling, chopsaw, circular saw (handheld and table), power planer, band saw (handheld), timber frame morticer.

Jointing/fixing tools - Drills, (Keyed, keyless, SDS, clutch settings, rotary, rotary percussion, percussion) including associated tooling, Biscuit jointer, Dowel and loose tenon jointers, nailers (framer and finishing), ballistic fixing tools, Impact/drill driver (including tooling).

Finishing tools - belt sander, orbital sander (including associated abrasive types and grades).

What do learners need to learn?

Types of portable power tools in carpentry and joinery used for cutting, shaping, jointing/fixing and finishing and their characteristics, purpose and suitability for the task.

For example, a power planer is used for planning sawn timber, producing small rebates. Parts of a planer include the bed, adjustment, waste ejection port, cutter block, motor, tooling.

1.6 Types of **fixed machinery**

Range:
Cutting - saws (dimensioning, rip, wall, crosscut/radial arm, narrow band and resaw) including tooling.

Jointing - hollow chisel morticer, including tooling, single ended tenoner including tooling, dovetail machine.

Shaping profiling and finishing - planers (surface, thicknesser, combination, multi head planer-moulders), spindle moulder including tooling, CNC router, table router including tooling, sanders (drum, bobbin, belt, disk).

What do learners need to learn?

Types of fixed machinery used for cutting, jointing and shaping/profiling/finishing and their characteristics, purpose and suitability for tasks and their power sources Power sources (three phase 415V, single phase 240V/110V, pneumatic).

To include setting up machines, maintenance and changing of tooling as required.

Parts of each machine, safety features such as guards, false fences, power feeds and braking. Safety aids used to protect the user and improve finish/performance. Extraction methods and maintenance of extraction systems.

1.7 **Operation and handling** requirements of tools and equipment

Range:
Operation and handling - accuracy, selection/suitability, common defects, cleanliness, PPE, trained, competent.

What do learners need to learn?	**Skills**
Requirements when operating and handling tools and equipment. Including, safe handling and safe working methods, safe storage minimising potential for damage and risk of theft (for electrical tools - damaged power cable, or tooling). It is checked for suitability (voltage, is it of sufficient power to carry out the work required). Appropriate PPE is selected and checked and after use safely stored.	EC5

1.8 **Importance** of **maintenance** and how to maintain tools and equipment

Range:
Maintenance - maintenance scheduling, sharpening, cleaning, lubrication, storage methods, common faults, efficiency/lifespan, quality of finished product.

What do learners need to learn?	**Skills**
Maintaining tools and equipment, its importance, and the consequences of not keeping up regular maintenance (breakdown, increased force required, poor finish, and reduced safety). For example, a power planer will be maintained by changing the blades/knives when they become dull, as dull blades will burn or otherwise produce a poor finish.	EC5

Wood science

1.9 **Classification and types of timber**

Range:
Classification and types - hardwood (oak, beech, ash, mahogany substitutes, teak substitutes, poplar), softwood (whitewood/spruce, European redwood, cedar).

Properties - colour/appearance, workability including ability to take a finish, grade/class, durability, density.

Processing - conversion methods (through and through, quarter sawn, tangential, boxed heart), seasoning (air, kiln), engineered (finger jointed, laminated), Treatments (acetylated, pressure treated/vac-vac, dipped, brushed and sprayed).

What do learners need to learn?	**Skills**
Classification and types of timber used in construction, their properties, and how they are processed. Including comparison of materials and processing methods and identifying the most suitable timber for any given purpose according to cost, durability, weight, appearance, workability, applied finish/preservative and end use. For example, hardwood such as oak, which is a broad-leaved deciduous tree. It is dense and very durable. As the timber is dense, it does not require preservative treatment before use outside. It does not take paint finish very well but will polish to a very smooth finish. Timber has enhanced appearance when quarter sawn showing the medullary rays.	

1.10 Natural, conversion and seasoning **defects** and those arising from time, use, neglect, and the elements

Range:
Natural Defects - shakes (ring, cup, upset/thunder, star and heart), knots (dead, live, face, edge and arris), sap/resin pockets, blue stain.

Conversion defects - waney edge, sloping grain.

Seasoning defects - collapse, case hardening, cupping, springing, bowing, twisting, end checking/splits, honeycombing.

Time use and neglect - UV damage, weathering, rot (dry, wet), insect attack, wear and tear.

What do learners need to learn?	**Skills**
Types of defects and their causes and the implication to the production and installation of timber-based components and. Including how defects can be minimised (removed or positioned appropriately on components to improve strength or appearance).	

1.11 Types of man-made carpentry and joinery related **panel products**

Range:
Panel products - plywood, chipboard, fibreboard (L M and H), oriented strand board (OSB), door blanks, plasterboard, cement fibre board.

What do learners need to learn?	**Skills**
Types of manufactured carpentry and joinery related panel products, their characteristics, and their suitability for different purposes in construction. Including durability, stability, acoustic properties, and resistance to fire and moisture, weight, appearance, workability, stability, acoustic properties, resistance to fire and moisture, ability to take a finish and end use.	

1.12 Formats and stock **sizes** of timber-based products

Range:
Formats and sizes - commercially available timber sizes, commercially available sheet sizes.

What do learners need to learn?	**Skills**
Types of formats (board and sheet) and stock sizes of timber-based products and their suitability for different functions in construction. Common stock sizes for softwood (sawn and finished/PAR/PSE/CLS) standard thicknesses of hardwood boards, standard sheet sizes and thicknesses, metric sizes and imperial equivalents. Including: Standard timber sizes in metric or imperial equivalents, e.g. 50mm is 2 inches, and a 2440mm x 1220mm. Sheet of plywood is 8 feet by 4 feet. Sheet materials are also twice as long as they are wide. Add 6mm to sawn sizes from finished size (to allow for planing) for example, 50mm x 25mm sawn will give 44mm x 19mm finished size.	MC2 MC3

1.13 **Sustainable timber**

Range:
Sustainable timber- supply chain, licensing (FSC and PEFC), identification, waste management (reduce recycle and reuse).

What do learners need to learn?	**Skills**
Sustainable timber, the supply chain and licensing (FSC certified etc.), the implications of use (reducing environmental impact in production, by products, chemicals and reducing emissions) and how to minimise waste (accuracy in calculations and quantities, repair, restore, adapt, recycled/reclaimed).	EC5 MC2

Fixings and ironmongery

1.14 Types of **fixings and Ironmongery**

Range:
Fixings – screws nails, pins bolts, cavity and solid wall fixings, chemical, star dowels, timber dowels, pins, staples.

Ironmongery- hinges, locks, latches, bolts, door furniture, door closers, door selectors, letter plates, window furniture, security ironmongery.

What do learners need to learn?	**Skills**
Different types of fixings and ironmongery and their characteristics, material properties, commercially available sizes, design features and suitability for different purposes including correct proportion, load, and compatibility with different wood types. Methods of driving fixings to maximise strength and minimise potential damage (splitting or bruising) Positioning conventions (hinge spacing, spindle height, security viewer position).	EC5

1.15 Types of **adhesives**

Range:
Types of assembly and finishing materials - Polyvinyl acetate (PVA), Polyurethane (PU), contact, epoxy resin, grab/panel, Resorcinol-formaldehyde (RF), Urea-formaldehyde (UF), Cyanoacrylate (superglue and activator) abrasives (grit grades, grit types, purposes, uses).

What do learners need to learn?

The types of adhesives and their suitability for different types of timber-based products (moisture resistance, gap filling properties, strength, staining and shelf/pot life), components and assembly requirements taking into consideration the open time, curing time, end location, cost, materials being bonded, workability and durability.

Maths

1.16 **Application** of geometry and formulas for the preparation, production, assembly and installation of timber-based components and products

Range:
Application - angles, shapes, points in space on a plane, lines, curves (circular and elliptical), true lengths and shapes; surface developments, calculate quantities (linear, area, volume) and determining (stair details, roof details, dimensions and pitch.

What do learners need to learn?	**Skills**
Application of geometry to the preparation, production, assembly and installation of timber-based components and products. Including determining positions, spacings, centres, angles and arcs. Diameters and radius of arcs, use of Pythagoras, division, multiplication to determine lengths, squareness, spacings of components, Producing geometrical mathematical diagrams. For roofs (development of shapes, determining true lengths and bevels) workshop rods for curved joinery, development of stair strings. Use of ratios - 1:3.1:4, 1:6, 1:7, 1:8 and ratios for adhesives.	MC1 MC2 MC3 MC4 MC5 MC7 MC8

Specific knowledge criteria for performance outcomes

Prepare for the production of complex timber-based products and structures components (Outcome 2)

Business and Commercial

1.17 **Costs** associated with the production, assembly and installation of timber-based products and components and how they impact on profitability

Range:
Costs - labour, materials, consumables, overheads.

What do learners need to learn?	Skills
Costs associated with the production, assembly and installation of timber-based products and components (on site and in workshops) and how they impact on profitability including planning, use of hired equipment, use of materials/wastage, time management, storage and phased delivery. Estimating quantities of materials with added percentage for waste. Calculate cost of total materials required, adding other variables such as labour and VAT.	MC2 MC9

Produce complex timber-based components (Outcome 3)

Complex shapes

1.18 Types of complex **shapes**

Range:
Shapes - single curvature, gothic, semi-circular, elliptical, segmental**.**

What do learners need to learn?	Skills
Types of complex shapes and the types of components in which they are used (rails, stiles, sills) and the types of tools used to produce shapes including router, bandsaw and hand tools including spokeshaves etc. For example, a semicircular headed window will have the centre of the radius halfway along the springing line. The shape could be marked out with a set of trammel heads and beam, and the components shaped from solid, roughed out with a bandsaw then finished on a spindle moulder using a ring fence, bonnet guard, template and jig	MC4 MC7

1.19 **Techniques** used to form curved shapes and producing templates.

Range:
Techniques - built up curve, bent wood laminated.

What do learners need to learn?	Skills
Techniques used to form curved shapes (blocks of wood joined with adhesive to reduce short grain, laminated strips of timber pulled around a former using adhesive or steaming and bending around a former whilst hot and allowing to cool) and how to produce templates and work holding jigs from drawings.	MC7

Assemble complex timber - based products and components (Outcome 4)

Complex timber-based products

1.20 Types of timber-based **products**

Range:
Products - floors, walls, cut hipped roof, trussed gable-end roof, complex and nonstandard doors, panelling/cladding, veneers, windows with opening lights, shaped door and hatch linings, staircases with turns, structural carcassing, accessible encasements, partitions with openings, carcasses/units, products with single curvature features.

What do learners need to learn?

Types of timber-based products and their constituent timber-based components and function**.** How each of these products are assembled, what adjustments are required prior to final assembly, order of assembly and required resources.

Assembly techniques

1.21 **Jointing methods**

Range:

Methods - splicing, curved to curved, straight to curved.

What do learners need to learn?	Skills
Types of jointing methods and how they are achieved. Structural principles behind wood joints, shoulders, cheeks, haunches, wedges, draw dowels. Through and blind joints. Maximising joint strength. Allowance made for trimming of finished joinery.	MC3

1.22 **Types of Jointing.**

Range:
Types of jointing - bridle, mortice and tenon, dovetail, butt, mitre, heading, housing, birdsmouth and scribe

What do learners need to learn?	**Skills**
Types of jointing (framing, lengthening and widening) and their suitability for different products, environments and purposes. Joint proportions (2/3 tenon, 1/3 haunch on single tenon at top of door). For instance, mortice and tenon joints can take many forms for various purposes, bare faced double tenon for a stair (string to newel) twin tenon (middle rail to stile where a mortice lock could weaken the joint) drawbored joints where it is difficult to cramp the work together.	MC3

1.23 Types of transportation **protection.**

Range:
Protection – waterproof membrane, bubble wraps, shielding bags, covered totes, safe cart covers, foam padding

What do learners need to learn?
Types of transportation protection and transportation techniques, storage and handling. How finished products are handled carefully to avoid damage and covered in the areas that are prone to damage.

Install complex timber-based products into complex structures (Outcome 5)

Building Technology

1.24 How the type of structure of a building affects the installation task

What do learners need to learn?

The type of structure (shell, frame and solid) of a building and the different methods/materials used to install timber-based products. For example, fixings will be different depending on the structure (a solid structure will require heavy duty fixings). Consideration of tools and techniques used to limit damage to the original structure (correct fixings, drill bits, drill speed).

1.25 How the structure of building **components** affects the installation task including:

Range:

Roofs:

Different types of roofs - single, double, flat
Shapes of roofs - flat, lean to, hipped end. gabled, valley
Different types of roof coverings - tiles, slates. membrane
Different types of roofing components - rafters, wall plate, ridge, binders/collars/ceiling joist purlin,
Roof finishing's - eaves and verge finishing's, guttering and fascia's
Roof flashings - roof lights, chimneys

Openings:

Different types of openings - chimneys, stairwells, door, window.
Different types of windows - bay, sliding sash, dormer. Casement, storm proof /high performance

Carcasses:

Different types of carcasses - kitchen, wardrobes
Types of structural carcassing - floors, roof, hips and valleys

Doors:

Different types of doors - fire, composite, flush, panelled, glazed LB, FLB

Stairs:

Different types of stairs - cut string, open riser, closed string, stair with turns
Stair components - newel, string, tread nosing, riser, bullnose step, handrail, spindles, infills, carriage

Partitions:

Different types of partition - wood, metal. partition coverings, different types of plasterboard, plywood and cladding

What do learners need to learn?

How the structure of building components affects the installation task

For example, when fitting a stair into an opening, consideration must be given to access (will the stair come into the building) and the stair well (access above and associated safety arrangements.

Installation

1.26 Methods of **fixing**

Range:
Fixing - counter bored and pelleted, concealed brackets, fixing straps, anchor bolts, screws and plugs, expanding foam, grab adhesives, nails and pins, solid wall and cavity wall fixings cams and studs.

What do learners need to learn?

Methods of fixing and their suitability for different products, structures and purposes.

For instance, when fitting hardwood door linings, which will have a clear finish, screws and pellets will be used to conceal the fixings. The screws may be used in conjunction with plastic plugs if being fixed into masonry.

1.27 How to deal with unexpected **situations**

Range:
Situations - out of square buildings, uneven surfaces.

What do learners need to learn?	**Skills**
How to deal with unexpected situations (compensation, adjustment or making good) and the techniques used (levelling, scribing). For example, if a wood moulding such as an architrave is to be fixed up to an uneven surface, then it would be scribed using a scribing block and pencil or scribing tool.	MC1

Outcome 2 - Prepare for the production of complex timber-based building products and structures

Performance Criteria

Information

2.1 Identify information **requirements** from a brief

Range:
Requirements - size, shape, function, budget, timeframes, scale of project, materials, location, stakeholder(s) requirements.

What do learners need to learn?	Skills
How to select and extract the correct information required from a brief to meet the requirements of any given task. For instance, using a job sheet to determine details of a joinery product including customer, job number, design, specifications, and time allowed.	EC5

2.2 Interpret **drawings, specifications and schedules.**

Range:
Drawings - location, position, range, assembly, detailed. setting out rods.

Specifications - quantities, quality of work/materials, tolerances, finish.

Schedules - prescribed requirements/components.

What do learners need to learn?	Skills
How to interpret the types of information required to meet the requirements of any given task. Using the information to determine measurements, location and position task sequence, select required materials, calculate quantities of materials, determine types of finishes and tolerances allowed.	EC5 MC1 MC7

2.3 Use **questioning techniques** to obtain and clarify information required

Range:
Questioning techniques - open, closed, probing, leading and funnel.

What do learners need to learn?	**Skills**
Applying the appropriate types of questioning to gain information, response or outcome required to manage stakeholder expectations (client/customer/contractor/supplier/employee/ employer). Whether in person or remotely via telephone, online video forums, email or other written form. Closed: used when making a decision Open: used when trying to get opinions Probing: used when trying to get information that is not forthcoming or to seek full understanding of a situation Leading: used to gain influence and achieve desired outcome Funnel: used when trying to get details about a situation	EC3 EC5

2.4 **Calculate** lengths and angles required to meet specification

Range:
Calculate - lengths from drawings/plans using scales, lengths and angles using mathematical and geometrical methods, use of traditional methods (traditional measuring equipment), use of modern methods (digital measure, construction calculators).

What do learners need to learn?	**Skills**
How to calculate lengths and angles (90-degree corners, bisecting angles etc.) using relevant equipment tape measure, construction calculators), information (drawings, scaled plans) and mathematical /geometrical methods (Pythagorean theorem) for any given task.	MC1 MC3 MC4 MC7

2.5 Measure length and calculate area and volume

What do learners need to learn?	Skills
How to measure length (including millimetres and metres, measuring equipment) and calculate linear area (length x width) and volumes (length x width x depth) for the production of complex timber-based building products and structures. Use of Pythagoras theorem to calculate the true length of a hypotenuse.	MC1 MC3 MC4 MC7

2.6 Produce scaled **drawings** by hand

Range:
Drawing type - orthographic, isometric, workshop rods, scaled (plan elevation and section).

What do learners need to learn?	Skills
How to produce (scaled) drawings using manual drafting methods to a prescribed brief including workshop rod production templates and patterns. For instance, producing a workshop rod to full scale of a shaped item of joinery, including all required detail such as joint positions and proportions, sectional details, shape of item and checking for any errors as work progresses.	MC1 MC2 MC7

2.7 Produce **cutting and material** lists

Range:
Cutting lists - Units, windows, doors, stairs, and allowance for waste.

Material lists - Quantities of materials (timber, sheet materials, fixings, ironmongery, metal studs).

What do learners need to learn?
Produce cutting and material lists, informed by drawings, setting out details and specifications. Cutting list: listing all parts required for a task along with details of thickness, width and length including specification on waste allowance. Material list: description of and quantities of materials required for task.

2.8 **Inspect** materials.

Range:
Inspect - grade, defects, quantity, quality, missing items, damage/breakages

What do learners need to learn?	Skills
How to inspect materials (visual and inventory for correct quantity and quality) before use and report any omissions (missing items) or defects (wind, cracks, shakes, water stains).	EC5

2.9 **Mark out** measurements on to timber-based products and sheet materials.

Range:
Mark outs - Joinery components from rod - Carpentry components from pattern

What do learners need to learn?	Skills
How to mark out materials, tools required (rules, tape, square, gauges) positions of components and joints to meet requirements of job specification and setting out (using patterns where appropriate to make templates). For instance, using techniques to maximise accuracy such as use of face marks, (face to face) and batch marking out, checking for errors. Use of gauge rods setting out wall plates joists.	MC1 MC2

2.10 **Inspect** equipment.

Range:
Inspect - faults, accuracy, calibration, serviceable

What do learners need to learn?
Inspection of equipment and tools in line with standard workshop practice to ensure they are serviceable and fully operational including, correctly calibrated and set for accuracy/squareness. Where necessary adjusting and tightening of equipment (such as crown guard, riving knife, or fence in the case of a circular saw) in line with training and guidance.

2.11 Follow a method statement.

Range:

Backgrounds - splatter dash to concrete, EML to wood/concrete, bonding agents

What do learners need to learn?	Skills
To interpret or produce a method statement including process, steps and resources required to carry out the tasks safely without risks to health. Including the preparation, production installation and assemble details, either in the workshop or onsite.	EC5

Outcome 3 - Produce complex timber-based components

Performance Criteria

3.1 Research **information** required for producing **complex shapes** and **components**

Range:
Information - catalogues, manufacturer's information, drawings, rod details, Building Regulations, legislation materials, risk assessment documentation, method statements, data sheets, cutting/material lists.

Types of complex shapes - single curvature, gothic, semi-circular, elliptical, segmental.

Types of components - rails, stiles, cills.

What do learners need to learn?	Skills
Information sources available for producing complex shapes and components to include information for tools required and best techniques for different types of curved shapes and components.	EC5

3.2 Use **geometry** to determine **complex 3D shapes**

Range:
Geometry - true lengths, bevels, surface development, determining curves (circles, ellipses, radii, centres, springing line).

Complex shapes - handrails with turns (single curvature), conservatory/porch roofs, cut roofs, shaped joinery.

What do learners need to learn?	Skills
How to carry out geometrical calculations accurately, to produce complex 3D components such as roof rafters, shaped stair strings and shaped joinery.	MC1 MC4 MC7

3.3 **Protection** of materials during handling and storing

Range:

Protection - racking systems, use of bearers, preventing distortion and damage, ensuring cleanliness, safe storage, use of correct stacking techniques, protection from weather damage, use of covers and wrappings.

What do learners need to learn?

How to protect the integrity, quality and conditioning of materials during handling and storage including general housekeeping and safety within the workshop.

3.4 Use woodworking **machiner**y and **equipment**

Range:

Machinery - planer, narrow bandsaws, saws (circular, band), spindle/industrial/table router, hollow chisel morticers, sanders (bobbin, disk, belt).

What do learners need to learn?	**Skills**
To use woodworking machinery and equipment to produce complex timber-based components safely and according to the manufacturer's instructions. Accurate setting of machine tooling, such as hollow morticer chisel square to fence, with accurate setting of machine for depth of cut and distance of mortice from fence.	MC1

3.5 **Label** and prepare components

Range:

Label - face marks, edge marks, identification marks (component, profile location and joint location).

What do learners need to learn?

How to label and prepare components with reference to potential imperfections or defects in materials which will be identified through visual inspection. Orientation of the components to minimise defects.

3.6 Use tools including hand and power tools

What do learners need to learn?	Skills
How to select and use tools to produce complex timber-based components, work within recognised health and safety guidelines and safe working practices and in line with training/manufactures instructions to produce joints and components.	EC5

3.7 Create **templates** and work holding jig

Range:
Templates - pattern rafters for roof work, stair templates, radial and elliptically shaped templates for curved work.

What do learners need to learn?	Skills
How to create templates (pencil, pen marker or knife guide) and work holding jigs (to hold, guide or feed) for bespoke and curved work when using a moulding machine.	MC1 MC8

3.8 Produce Test pieces

What do learners need to learn?	Skills
How to produce test pieces for complex timber-based components. For instance, using a trial rebate to check dimensions are correct and if the machine requires further adjustment before the full run.	MC1

3.9 Produce **complex shapes** and their components using a range of **techniques**

Range:
Types of complex shapes - single curvature, gothic, semi-circular, elliptical, segmental and the types of components in which they are used e.g. rails, stiles, and cill.

Techniques - used to form curved shapes (e.g. built up, laminated); produce templates and work holding jigs from drawings; mark out and produce pattern rafters for complex cut roof components (common, hip, valley ,crown jack and cripple rafters, purlins), mark out and cut complex roof components using patterns.

What do learners need to learn?	**Skills**
How to produce complex shaped components using a range of techniques and considerations including minimising wastage and following standard site working procedures, safe use and set up.	MC1

3.10 **Set up, adjust,** and **operate woodworking machinery** using **work piece support, safety aids** and standard workshop working practice

Range:
Set up and adjust - inspect for damage/faults, change tooling, adjust beds as required, adjust fences and settings, depth of cut.
Wood working machinery - circular saw, narrow band saw, surface planer, thicknesses, profiling machine.

Work piece support - roller table, Independent roller support stand.

Safety aids - push sticks/blocks, Jigs and saddles, standard workshop practice, safe use of equipment, training (only using equipment once trained to do so), minimising wastage, use of jigs and saddles (wedge jig, saddles for angled ripping).

What do learners need to learn?	**Skills**
The correct way to set up machines, then feed materials into woodwork machinery/equipment using work piece support and safety aids adhering to standard workshop working practice. For instance, changing a cross-cutting blade for a ripping blade on a saw, resetting the riving knife to regulations, checking the guard, and setting the fence before setting timber using a push stick.	EC5

Outcome 4 - Assemble complex timber-based components

Performance Criteria

4.1 Assess **suitability** of information provided

Range:
Suitability - up to date, accurate, sufficient, and version controlled.

What do learners need to learn?	Skills
How to source relevant information (researching for latest versions from manufacturer's instructions) Using trade verified web-based sources (using government, trade regulation and legislation sites). Consequence of poor information (incorrect standards and tolerance applied, health and safety affected, legal issues). Ensuring personal safety in trade open forums and networking groups (privacy settings, passwords protected, personal information retained) and ensuring the information gathered across sources is verified through appropriate channels.	EC5 DC1 DC3

4.2 Use **tools** and **equipment** to assemble components to form products

Range:
Tools and equipment - cramps (sash, G and F), bench bearers, assembly jigs (step jig, ledged and braced door jig), squaring rods, mallets and hammers (claw/Warrington pin), draw pins, fixings (nails, pins, screws, bolts).

What do learners need to learn?
How to use tools and equipment to assemble components to form products following standard safe workshop working practice. Following a logical sequence having everything to hand before starting and having a prepared area such as bench bearers. Using the correct driving tool (hammer for wedges or nails). Mallet for assembly of components.

4.3 **Join** timber-based components to other non-timber- based components including fixtures and fittings

Range:

Join - Floors, Walls, cut roof (hipped, gable-end), trussed roof, panelling/cladding, windows, with opening lights, door and hatch linings and frames, staircases with turns, structural carcassing, kitchen carcasses, accessible encasements, partitions with openings, products with single curvature features, double and non-standard doors including associated ironmongery.

What do learners need to learn?	**Skills**
How to join and fix timber-based products to non-timber-based components. Fixing securely, using appropriate fixings and adhesives.	MC7

4.4 Use non-permanent joining **techniques (**dry fit)

Range:
Techniques - Use of cramps, draw pins, temporary fixing in.

What do learners need to learn?	**Skills**
How to use dry fit techniques in line with job specification requirements, check products are assembled correctly before gluing/permanent fixing. Adjusting as required until the dry fit is accurate and meets specification.	MC1 MC2

4.5 Use **permanent joining techniques**

Range:
Techniques - drilling, pegging/dowelling, scribing, wedging, nailing and screwing, use of adhesives.

What do learners need to learn?	**Skills**
How to assemble complex timber-based products in line with job specification requirements. Assembly following dry fit. Correct methodology and fixings used for permanent jointing/fixing of joints	MC1

4.6 **Finish** products ready for end-use

Range:

Finish - removing horns, removing arrises, clean up with smoothing plane, sand up to provide a key to take finish, apply basecoat finishes as required.

What do learners need to learn?

How to finish an assembled complex timber product with consideration of standard industry practices and good housekeeping

4.7 **Prepare** assembled timber-based products for transportation

Range:
Prepare - wrapping, boxing, palletising.

What do learners need to learn?

How to prepare the assembled timber-based product ready for dispatch to ensure it is preserved in good order (secure, static and weatherproof). To include use pallets, crates, boxes, correct stack techniques, appropriate wrapping and correct labelling of secured products. Pre and post inspection and package. Considerations to include assembly order review, health and safety specifications for loading, and any special loading/transportation requirements by customer/transport operator prior to and during transportation. Types of transportation used to include light goods vehicle, larger vehicles, lorries, or containers for boats.

Outcome 5 - Install complex timber-based products into complex structures

Performance Criteria

5.1 Assess risks associated with the installation task

Range:
Risks - access, slips, trips, falls, damage to product, risks associated with handling, cutting and the installation of materials.

What do learners need to learn?	Skills
How to assess risks when installing complex timber-based products into complex structures (site inspections, consulting risk assessments and method statements).	EC5

5.2 Prioritise and schedule tasks

What do learners need to learn?	Skills
How to plan the task ahead, carrying out the work in a logical, orderly sequence.	EC3 EC5 MC10

5.3 Check compliance with regulations and **standards**

Range:
Standards - building regulations, drawings, specifications, tolerances.

What do learners need to learn?	Skills
Where to check compliance with building regulations and standards (HSE website) and when (before, during and upon completion of the installation).	EC5 DC1

5.4 Prepare timber-based products for installation

Range:
Prepare -trim and adjust, cut, plane, sand, finish or repair if required.

What do learners need to learn?	Skills
How to prepare timber-based products for installation (windows and doors), measuring the opening/area to be worked on and adjusting the item ready to fit.	MC1 MC7

5.5 Prepare environments for installation

Range:
Prepare - protection, removing existing component to be replaced, removing debris, levelling, cleaning.

What do learners need to learn?
How to safely prepare the area ready for installation, cleaning down, removing temporary hoarding or protection, clearing the area, protecting the area, providing barriers as required.

5.6 Position **fix and secure** complex timber-based and non-timber-based products to building fabric

Range:
Fix and secure - plumb, level, straight, secure.

What do learners need to learn?	Skills
How to position fix and secure complex timber-based products (e.g. ply, fibre and particle board) and non-timber-based products (UPVC cladding) including door frames, hang doors, windows and kitchens using appropriate fixings and according to specifications.	MC1

5.7 Maintain tools.

Range:
Maintain - clean, sharpen, store correct use

What do learners need to learn?	Skills
How to maintain and secure tools during installation, ensuring efficiency and quality of finish, minimise damage and loss.	EC5

5.8 Install **door and window ironmongery** into timber-based products

Range:
Ironmongery:

Doors - hinges, locks and latches, handles, knockers and knobs, push and kick plates, door closers, door selectors, sliding bolts, letter plates, security furniture.

Windows – handles, hinges, stays, casement fasteners, casement stays, grills, vents, security furniture.

What do learners need to learn?
How to install door and window ironmongery including locations, positions, and suitability for intended end use. Including the techniques used to ensure industry tolerances, e.g. techniques used to recess the leaves of hinges neatly without hinge bind and at the correct industry norm positioning (225mm up, 150mm down).

5.9 Carry out **quality checks**

Range:
Quality checks - plumb, level, straight, secure, correct size.

What do learners need to learn?	Skills
How and what to check when carrying out quality checks on completed work (checking for plumb, level and positioning within the structure and accuracy to the plan including size).	MC1

5.10 Adapt timber-based products to meet installation requirements

Range:
Adapt - trim, adjust, repair.

What do learners need to learn?

How to trim, adjust and repair product as required when fitting, completing the job to the required standard.

Guidance for delivery

Opportunities for visits/engagement with local industry, employers and manufacturers should be provided throughout the delivery

Considerations for innovative methods of delivery to include blended learning and other forms of technology.
Innovative methods of delivery could include:

- Presentation/demonstration – delivery of topics using SmartScreen presentation (PowerPoint example available) lecture/discussions/oral Q&A enthusing and engaging learners through different teaching methods and resources
- Reinforcement of candidate learning – revisit learning, group discussions, peer support, sample questions

Formative assessment – oral Q&A, SmartScreen worksheets (samples available) observation of measuring activities

- Practical - Use of pre-set formative assessments carry out tasks and record on standardised form.
- Knowledge – pre-set paper-based activity to confirm skills and understanding. Learners can use variety of methods to carry out activities, calculators, apps, office IT

Ways of ensuring content is delivered in line with current, up to date industry practice

- Centres will need to ensure a realistic representation of carpentry and joinery and components are available
- Centres will need to provide the appropriate tools, equipment and test instrumentation for demonstration and practical training purposes
- The provision must represent the type of equipment currently available in the UK carpentry and joinery industry
- Current and emerging carpentry and joinery technology should be included in delivery where possible

Suggested learning resources

Books

- Site Carpentry and Bench Joinery – City and Guilds
- Geometrical drawing – John J O'Connor - Gill Education
- Modern Carpentry – Fred T Hodgen – Drake 2005
- Carpentry and Joinery – Peter Brett _ Nelson Thornes 2010
- Carpentry and Joinery – Paul N Hasluck – Tools for working wood - 2010

Websites

- HSE - **www.hse.gov.uk**
- Building Regulations - **www.gov.uk/building-regulations-approval**
- English Heritage - **www.english-heritage.org.uk**
- Institute of Carpenters - **www.instituteofcarpenters.com**
- British Woodworking Federation **-** www.bwf.org.uk
- The National Association of Shopfitters **- www.shopfitters.org**
  The Carpenters' Company - **www.carpentersco.com**

Scheme of Assessment – Carpentry and Joinery

The Carpentry and Joinery occupational specialism is assessed by one practical assignment. The duration of the assessment is 27 hours. Learners will be assessed against the following assessment themes:

- Health and Safety
- Design and planning
- Produce complex timber-based products
- Fix and assemble components
- Installation
- Inspect/Quality check

By completing the following tasks:

Task	Typical Knowledge and skills
Task 1 – Prepare and plan for the production of complex timber-based products	Displays a breadth of knowledge and practical application to set out complex timber-based products and components. Candidates display a breadth of knowledge and practical skills that enables them to carry out and plan for the completion of the work. Candidates will need to produce documents to industry standards that clearly state how they will carry out the installation. Knowledge and skills demonstrated will include design, measurement and calculations of quantities, production of a method statement and risk assessment and numerical skills to use setting out details to produce cutting lists and material lists, minimising wastage. Knowledge and skills to use safely and accurately hand and power tools and machines to make a template.
Task 2 - Produce complex timber-based products	Displays a breadth of knowledge and skills to produce complex timber-based components to specification successfully. Candidates will demonstrate I skills in marking components. Knowledge of health and safety, best practice and skills to use templates. Knowledge of health and safety in producing components with hand and power tools as well as woodworking machines, following a risk assessment and method statement.
Task 3 – Assemble, fix and finish complex timber-based products	Displays a breadth of knowledge and skills to assemble and finish complex timber-based products and components to specification successfully. Knowledge of safe and best practice procedures used to assemble, erect and finish joinery and carpentry projects, following a risk assessment and method statement. The task is completed in a clear and logical sequence. Works in a safe manner. Providing protection for the area to ensure the safety of the general public and those carrying out the Technical skills to assemble and finish the window and roof with a high degree of accuracy with attention to detail, knowledge of how to minimise damage to the finished item.

Task 4 - Install complex timber-based products and components	Displays a breadth of knowledge and skills in installing complex timber-based structures and components, minimising damage. Knowledge of carpentry fitting skills and technical skills ensuring accuracy of installation and good finish, following risk assessment and method statement

The information provided in the following tables demonstrates to approved providers the weightings of each performance outcome and how each performance outcome is assessed.

Performance Outcome and weighting %	**High level tasks** Provide specific instructions for candidates to provide evidence for and are the same for every version of the assessment	**Assessment Theme**	**Typical evidence**
PO2 Prepare for the production of complex timber-based products and structures (30%)	T1 and T2 T1	Health and Safety Design and Planning	Risk assessments, PPE, safe working practice Method statements, measurements, cutting/component, tools lists, templates patterns, design of tasks Presents/communicates plan/design (Rod details) to stakeholder/correct terminology used
PO3 Produce complex timber-based products and components (30%)	T2	Produce complex timber products	Set up/mark out, calculations, maths, produce complex timber structures, accuracy of joints, quality of finish and housekeeping. Selection of tools, tool use and maintenance. Inspection, calibration and use of machines, accuracy of use .
PO4 Assemble complex timber-based products (20%)	T3	Fix and assemble components	Fix and assemble components, accuracy of adjust and fit of joints, use of tools. Accuracy of assemble and fix, use of tools. protection of finished product Selection of tools, tool use and maintenance.

PO5 Install complex timber-based products into complex structures (20%)	T4	Installation Inspection/Quality check	Preparation, fix/install, standards, selection use of tools, and maintenance Inspection, quality check. verification of finished product

307 Painting and Decorating

Level:	3
GLH:	600
Assessment method:	Practical assignment

What is this specialism about?

The purpose of this specialism is for learners to know and undertake painting and decorating work. Learners will have the opportunity to plan, perform and evaluate their work whilst utilising a range of materials, methods and techniques.

Learners will develop their knowledge and understanding of, and skills in:

- Knowledge of health and safety as applied specifically to painting and decorating.
- Knowledge of tools, equipment and materials utilised in the process of painting and decoration.
- Knowledge of a range access equipment
- Knowledge of a range of processes to prepare for the application of surface coatings and wallcoverings.
- Knowledge of identification of high-quality finishing processes.
- Skills of planning and implementation including preparation of the work area.
- Skills of identifying and selection procedures for correct tools, equipment and materials.
- Skills of identifying and rectifying faults in surfaces, materials and application.
- Skills of application techniques for water borne and solvent borne coatings.
- Skills of application techniques for a range of wallcoverings.

Underpinning knowledge outcome

On completion of this specialism, learners will understand:

1. Painting and Decorating knowledge criteria

Performance outcomes

On completion of this specialism, learners will:

2. Prepare for the application of surface coatings and wallcoverings
3. Apply specialist surface coatings in complex environments
4. Apply specialist wallcoverings in complex environments

Completion of this specialism will give learners the opportunity to develop their maths, English and digital skills.

Specialism content

Outcome 1

Common knowledge criteria

Health and safety:

1.1 Implications of **legislation**

Range:
Legislation and guidance -The Health and Safety at Work Act (HASAWA), Construction Design Management, (CDM) regulations, Reporting injuries, diseases and dangerous occurrences act (RIDDOR), Control of substances hazardous to health (COSHH), Provision and use of Work Equipment Regulations (PUWER), Manual Handling Regulations, Personal protective equipment (PPE) at work regulations, Respiratory protective equipment (RPE) regulations Work at Height regulations, Control of Noise at work regulations, Control of vibration at work regulations, Electricity at work regulations, Lifting operations and lifting equipment regulations (LOLER), Hazardous waste regulations, Control of lead at work (CLAW) Approved code of practice (ACOP), HSE information.

What do learners need to learn?	Skills
The role of legislation and regulations in painting and decorating including the role of the Health and Safety Executive (HSE). How current legislation impacts employer, employee and painting and decorating projects within a domestic and commercial setting. The implications of not adhering to the legislation on the public, client, business and employers, including enforcements, penalties, and imprisonment.	EC5

1.2 The identification of **hazards**

Range:
Hazards - sharp edges, moving parts, working with chemicals, existing toxic / hazardous materials -lead, asbestos, mould. Working at height, slips, trips and falls, fumes, dust, cuts, use of PPE, RPE, fall arrest equipment.

What do learners need to learn?	**Skills**
The types of hazards and risks associated with painting and decorating activities, working at height, in trenches, in workshops, on site. Methods used to identify hazards (walk around site, observing how task are preformed, assessing tools, equipment) and the precautions taken through the adoption of safe systems to minimise them.	EC5

Information

1.3 Types **of information**

Range:
Information - specifications, drawings (orthographic projection, isometric projection, hand, computer-aided design (CAD) including the drawing information: scale, symbols, hatchings), method statements, schedules, bill of quantities, programme of works, Building Information Modelling (BIM), safety data sheets, risk assessments.

What do learners need to learn?	**Skills**
The types of information used to manage, support and organise projects for the application of surface coatings and wallcoverings including the planning, preparing, measuring, marking out, application methods, manufacturer's guidance and safety legislation.	EC5

1.4 How to obtain relevant **information** from Building Regulations and standards

Range:
Information sources - GOV.uk, HSE, Manufacturers, Local authorities, and Energy savings trust.

What do learners need to learn?	Skills
Building Regulation and standards Information relevant to the preparation and application of surface coating and wallcovering, where it is sourced and its importance (sustainable use of materials) in the profitable completion of a given task.	EC5

Tools and equipment

1.5 Types of tools and **equipment** for tasks

Range:
Equipment:

- **Work area preparation**- dust sheets, protective sheeting, masking materials,
- **Access equipment** - hop ups, steps, ladders, working platforms, tower scaffold
- **Measuring equipment** - tape measures, rulers, levels
- **Marking out equipment** - pencil, chalk line, straight edge
- **Cutting equipment** - shears, trimming knives
- **Surface preparation** - sanding machines, sanding block, scrapers, filling knives, steam stripper, hot air gun, caulking gun, paint removal machines
- **Applications** - brushes, rollers, trays, scuttle, kettle, spray equipment, paint application machines, paperhanging equipment, pasting machines
- **Safety** - PPE, signs and barriers, fall arrest equipment.

What do learners need to learn?	Skills
The identification of the tools and equipment listed in the range. How each of their individual characteristics match their purpose and suitability for the tasks at hand.	EC5

1.6 **Operation and handling** requirements for tools and equipment

Range:
Operation and handling - accuracy, safe working methods, cleanliness, trained, competent, maintenance, storage, method statements, risk assessment, PPE.

What do learners need to learn?	Skills
How to safely handle and operate tools and equipment correctly, following recommended guidance and safe working practices. The implications of not adhering to safe working practices, risk assessments, method statements or the correct PPE for a given task such as, injury, illness, death. The implications using the incorrect tool for the task, or using the appropriate tool incorrectly, resulting in poor standard of work, extra costs in time and materials.	EC5

1.7 Importance of **maintenance and** how to maintain equipment

Range:
Maintenance - cleaning, lubrication, storage methods.

What do learners need to learn?	Skills
How to maintain tools and equipment, and the implications of not keeping up regular maintenance such as, the longevity of the equipment, the safe working operation and its performance.	EC4 EC5

1.8 The **environmental impact** of tools and equipment

Range:
Environmental impact - manufacture, transportation, quality, disposal (improper waste disposal), reusable items, sharps.

What do learners need to learn?	Skills
What is the environmental impact of tools and equipment through their lifecycle and how their impact can be reduced (for instance using cardboard paint kettles, recycling of old tools) and the implications this can impose on the environment	EC4 EC5

1.9 **Principles** of waste management

Range:
Principles - re-use, recycle, reduce, correct disposal methods.

What do learners need to learn?	Skills
What are the principles of waste management (re-use, recycle, reduce and disposal) and why it is important to segregate waste and dispose of the waste correctly. For instance, the disposal of sharps and contaminated waste, evaluation of the costs from not following waste management and the implications on landfills.	EC4 EC5

Science

1.10 Internal and external **environmental effects** which may affect the preparation and application of surface coatings and wallcoverings

Range:
Environmental effects - weather, temperature, humidity, type of substrate, ventilation/air conditioning.

What do learners need to learn?	Skills
How do various internal and external environmental conditions effect and impact on the application of surface coating and wallcoverings. For instance, high humidity resulting in inconsistent drying times, alkaline surfaces causing chemical reactions, physical damage and defects.	EC4 EC5

1.11 Principles of **moisture transmission and ventilation**.

Range:
Moisture transmission and ventilation - internal, external, structural.

What do learners need to learn?	Skills
Identify the types of moisture transmission and ventilation and how they can affect various substrates, for instance, condensation affecting drying times of the coating, and their adhesion to the substrate. Identify the appropriate specialised primers and the application methods required to rectify the conditions created from moisture transmission and poor ventilation (stain block to rectify the staining effects from damp).	EC4 EC5

Maths

1.12 **Application** of geometry to the preparation and application of surface coatings and wallcoverings

Range:
Application - length, perimeter, girthing, area, volume, angles, shapes, points in a plan, lines and curves, Pythagoras theorem.

What do learners need to learn?	Skills
Identify and use the appropriate geometry and mathematical equations for the preparation and application of surface coating and wallcoverings to enable accurate calculations of materials and resources. Calculating wallpaper quantity from room measurements and allowing an additional percentage for offcuts. Working out paint quantities, from room size measurements, number of coats against material spreading rates.	MC1 MC2 MC4

1.13 Application of **ratio**, proportion and rates of change

Range:
Ratios related to - thinning of paints, paint thickness, drying times, filler, 2-pack paint, working time, mixing colour, manufacturer's instructions.

What do learners need to learn?	Skills
Identify and use the correct and appropriate ratio calculations for the preparation and application of surface coating and wallcoverings. Including working out the correct thinning of paints and the correct 2-pack paint and filler ratios, following manufacturer's instructions and the implications from incorrectly calculating the ratios i.e. coating not drying or drying too quickly before application.	EC4 EC5 MC3

Business/commercial

1.14 **Costs** associated with the preparation and application of surface coatings and wallcoverings

Range:
Costs - quantities, location, area, size and complexity, overheads, waste, quality of finish hire vs purchase of equipment, effects of labour, quality of materials, efficiency.

What do learners need to learn?	Skills
What the costs associated with correct and incorrect preparation are and how the surface preparation, before application of surface coatings and wall coverings, can impact on profitability (for instance, appropriate application methods on a large external wall, evaluate using a brush application against hiring or buying an airless spray unit).	EC4 EC5 MC9

Building technology

1.15 Key factors and **systems** of working in different sectors

Range:
Factors - signage, barriers, protective coverings and routes, low VOC, working hour restrictions, accessibility, good communication, updating information to client's ventilation, good communication.

Systems - safe working methods.

What do learners need to learn?	Skills
What are the key factors and systems to consider when working in different sectors such as occupied properties, health and education facilities where residents, patients and learners may be present. The safety of others in the vicinity of work being carried out, what precautions, operations and facilities need to be provided to protect members of the public and other work colleagues and the implications of liability such as damage, injury, illness and death.	EC4 EC5

1.16 Different **types** of construction materials to be coated and their **reaction** to coating materials

Range:
Types- timber, timber sheet products, metals, plaster, plasterboard, brickwork/blockwork, previously painted surfaces, plastics.

Reactions - physical, chemical.

What do learners need to learn?	**Skills**
Identify the different types of materials which are to be coated and any possible reactions from surface coatings. Understand the reasons for adopting the appropriate methods for their preparation including primers used and the safety considerations required in the process. Water based products on ferrous metals may promote rust or solvent based products on alkaline plaster may cause saponification.	EC4 EC5

1.17 The relationship between the **type** of building structure and the painting and decorating **task** to be completed

Range:

Type - new, commercial, domestic, industrial, heritage.

Task - scale, size, protection of surfaces, preparation of work area, access and thoroughfare, street work.

What do learners need to learn?	**Skills**
Understand the requirements when working on different types of building structures and evaluate the implications of using water borne and solvent borne coatings. The importance of identifying the type of building structure and using the appropriate preparation, application and surface coating. For instance, large commercial work may favour the use of airless spray, where a listed heritage building may require adopting more traditional methods of application.	EC4 EC5

Coating Science

1.18 **Classification** of paint coatings

Range:

Classification – function: decoration, preservation, identification. paint content: pigments, resins, thinners, driers, paint body, sanitation. Physical properties of surfaces: tactility, porosity, capillarity, adhesion, opacity, density. Chemical properties of surfaces: alkalinity, acidity, inertness, soluble, salt content, water. Drying methods, evaporation, oxidation, polymerisation.

What do learners need to learn?	**Skills**
Understand the classification and function of paint coatings, their properties and identify their characteristics and their suitability for different purposes, i.e. external softwood is coated for preservation and decoration, where metal pipework in an industrial complex is coated for preservation and identification. What are the components of a paint coating and identify how each of the primary coating dries. For instance, water-based coating dry by evaporation and coalescence.	EC4 EC5

1.19 **Properties** of commonly used materials and **potential chemical reactions** when using common surface coatings and decorating materials

Range:

Properties - water based, solvent based, spirit based, high solid adhesive, low solid adhesive.

Chemical reactions - chemically active: alkaline (saponification), acidic. mould growth, lack of adhesion, reversible and non-reversible.

What do learners need to learn?
What are the properties of commonly used surface coating materials and identifying how best to deal with any potentially chemically active surfaces and their treatment? i.e. understanding and overcoming the implications of using a water-based emulsion required to be applied to a reversible coasting of lime wash.

1.20 **Causes** and symptoms of **defects** found in coatings

Range:
Causes - poor preparation, poor application technique, incorrect material selection.

Defects - physical, chemical, environmental.

What do learners need to learn?	**Skills**
Identify and understand the causes, symptoms and characteristics of defects found in coatings and the impact of those defects on the application and the finished effect. For instance, poor application of a gloss coating can result in the physical defect of runs or sags which will need to be abraded to be removed.	EC4 EC5

1.21 The environmental **impact** and **considerations** of paint manufacture

Range:
Impact - local pollution, global pollution.

Considerations - water based against oil based, recycling, transportation, use, disposal, VOC's.

What do learners need to learn?	**Skills**
What is the environmental impact and implications of the manufacture, selection, use and disposal of paints, for instance pollution, sustainable resources. Evaluate water based against solvent based paints as to the impact each has on the environment.	EC4 EC5

Surface Coating Application

1.22 **Application techniques** and factors affecting their suitability

Range:
Application Techniques - brush, roller, spray.

Factors - size of task, complexity of work area and environment, space for working, noise, fume, dust pollution, ventilation, protection of surfaces and work area.

What do learners need to learn?	**Skills**
Identify and understand the appropriate application techniques and their suitability when applying surface coatings to the areas. Include complex areas such as large ceilings, panels, windows and alcoves whilst considering the environment around these surfaces.	EC4 EC5

1.23 The **implications** of not following manufacturers' guidance for application, drying and recoating times

Range:
Implications - defects, financial, time, wastage.

What do learners need to learn?	**Skills**
What are the implications of the potential defects that may occur if manufacturer's guidance is not followed, for instance not following thinning guidance may require recoating incurring financial and time implications.	EC4 EC5

1.24 **Principles** of good design

Range:
Principles

- **Theory of colour** - including primary, secondary, tertiary
- **Colour referencing systems** - BS 4800, RAL, NCS, Munsell
- **Colour terminology** - colour, hue, contrast, tone, value, tint, shade
- **Colour schemes** - monochrome, analogous harmony, achromatic, complementary
- **Visual design** - shape, pattern. Effects of artificial light: metameric

What do learners need to learn?	**Skills**
What are the principles of good design and what impact does colour theory have on visual design and light when creating decorative schemes, for instance advancing colours reds/oranges receding colours greens/ blues systems. Identify the different referencing systems and understand the terminology used in these systems.	EC4 EC5

1.25 Application of specialist **decorative techniques**

Range:
Decorative techniques - rag rolling, additive, subtractive, sponge stippling, dragging, glaze and wipe, replicate oak and mahogany using graining methods, replicate carrara and vert de mer using marbling methods, single and multi-plate stencilling designs, gold leaf application, paint finish effects (glitter paints, metallic, chalk paints, textured effect paints).

What do learners need to learn?	**Skills**
Understand and be able to apply to the desired effect, a range of decorative technique processes using a range of materials and methods. Including how to mix and adjust paints for decorative techniques and what processes are appropriate for the substrate.	EC4 EC5

1.26 **Techniques** for identifying and **rectifying** coating defects

Range:

Techniques - visual checks for defects.

Defects - patchiness, misses, uneven pattern, skid marks, uneven appearance, lack of adhesion, shrivelling, flaking tarnishing.

Rectify - correct poor/incorrect preparation, and application.

What do learners need to learn?

Identify and understand a range of coating defects and the appropriate methods and what techniques are used to identify and rectify them.

Wallcovering and adhesive science

1.27 Ways in which wallcoverings and adhesives are **classified**

Range:

Classification - paper production methods, printing methods, types, properties, size, application methods, adhesives.

What do learners need to learn?	**Skills**
Understand and identify how various wallcoverings and adhesives are classified, and what each of their characteristics and properties are. How are the wallcoverings produced and evaluate their suitability in various environments, for instance, durability and cleanability in a high traffic area.	EC4 EC5

1.28 Properties of commonly used **substrates** and potential chemical reactions when using wall coverings

Range:

Substrates - timber, metal, plaster, brick, block etc, plasterboard, previously decorated surfaces.

What do learners need to learn?	**Skills**
What are the properties of common substrates and any potential chemical reactions (preparation and application defects) when applying wallcoverings. To include previous coverings, size, application, sealers, efflorescence, damp.	EC5

1.29 Causes and symptoms of **defects** found in wallcoverings and adhesives and the **implications** to their application and the finished effect

Range:

Causes - inappropriate selection of materials for surface, poor preparation, poor application.

Defects - pre-application defects, post application defects.

Implications - financial, time, wastage.

What do learners need to learn?	**Skills**
Identify and understand defects found in both pre and post application of wallcoverings and their adhesives. What are the implications from poor preparation, poor selection and poor application when applying wallcoverings.	EC5

1.30 The environmental **impact** of wallcovering and adhesives

Range:

Environmental impact – manufacturing methods, transportation, disposal methods.

What do learners need to learn?	Skills
Environmental impacts from the manufacturing, use and disposal of wallcoverings and adhesives, for instance, sustainable resources, health and safety, including environmental implications of disposal.	EC5

Wall Covering

1.31 **Principles** of good design.

Range:
Principles - planning process, setting out process, pattern types, visual balance, aesthetics.

What do learners need to learn?	Skills
Why the planning process is so important before cutting or application of wallcovering and the implications of not following the setting out procedures. Understand the principles of good design when setting out wallcoverings including balance, pattern types, and use of repeats, colour and contrasts, for instance the pattern is in the middle to produce a balanced effect on a chimney breast.	EC5

1.32 Hanging **techniques** for differing wallcoverings

Range:
Techniques - manufacturing guidance, pasting and hanging methods, cutting methods, folding techniques.

What do learners need to learn?	Skills
The importance to read and following manufacturer's instructions before cutting or application of the wallcovering. Understand, follow and apply pasting, folding, hanging, and cutting techniques appropriate to the wallcovering and surface.	EC4 EC5

1.33 **Techniques** for dealing with **structural complexities** and their applications

Range:
Techniques - correct selection and application procedures.

Structural Complexities - working on staircases, ceilings, odd shaped and oversized spaces, chimney breasts, alcoves, columns, reveals.

What do learners need to learn?	**Skills**
How to identify structural complexities and assess their individual challenges.	EC4
The appropriate application techniques when measuring, selecting, cutting and applying wallcoverings appropriate to the various structural complexities.	EC5

1.34 The **implications** of not following manufacturers' guidance for application, drying and finishing

Range:
Implications – wastage, time, financial.

What do learners need to learn?	**Skills**
What the implications are of not following manufacturer's guidance during application, drying and finishing of wallcoverings, for instance, financial, economic and reputation.	EC5 DC1

1.35 The importance of **techniques** used to reduce wastage

Range:
Techniques - correct measuring procedures, measurement methods (area method, girthing method).

What do learners need to learn?	**Skills**
Understand and apply techniques and procedure used to ensure economy and the impact on reduction of waste. For instance, measuring techniques to reduce wastage.	MC1 MC2
Why it is important to use the correct procedure for the specific type of wallcovering to reduce wastage. For instance, drop pattern paper using 2 rolls.	EC4 EC5

1.36 Techniques for **identifying and rectifying** wallcovering defects

Range:
Identification - visual checking.

Rectifying techniques - correct material selection, preparation and application processes, removal and rehanging.

What do learners need to learn?	**Skills**
What are the techniques used when identifying wallcovering defects. Identify and understand defects found wallcoverings (miss-match due to oversoaking/ not following manufacturer's instructions). What the processes are that can be used to rectify defects.	EC5

Specific knowledge criteria for performance outcomes

Prepare for the application of surface coatings and wallcoverings (Outcome 2)

Preparation Methods

1.37 Suitability of preparation methods for the task **environment**

Range:
Environment – surfaces, timber, metal, trowelled, plasterboard surfaces and previously decorated surfaces.

What do learners need to learn?	Skills
What are the ranges of methods required when preparing interior and exterior surfaces. How do these surfaces react to preparation methods. What the specialist techniques are for different surfaces.	EC4 EC5

1.38 The importance of **protection** of work in progress and completed work

Range:
Protection – domestic areas (room furniture, floor/carpets, door and window furniture, wall- mounted fixtures and fittings, television, media/IT systems, lighting) and commercial areas (workstations, machinery, equipment, furniture, lighting).

What do learners need to learn?	Skills
Types of protection that are required depending on the task/specification. Including the importance of maintaining a clean workspace, and the correct disposal of waste during progress and on completion.	EC4 EC5

1.39 How to apply **traditional and modern** preparation **techniques** for different types of surfaces

Range:

Traditional techniques - may include materials and processes that require permits or license (e.g. lead based).

Modern techniques - preferably used to reduce VOCs and low risk methods for removal (e.g. non heat).

What do learners need to learn?	**Skills**
Types of preparation methods (both traditional and modern) used for a range of bare and previously decorated surfaces and substrates. Consideration must be given to factors that could affect preparation techniques, age of building, building type, health & safety and environment.	EC4 EC5

Outcome 2 - Prepare for the application of surface coatings and wallcoverings building products and structures

Performance Criteria

2.1 Identify **information requirements** from a brief

Range:
Information/requirements – size, shape and scale of project, function, budget, material specification.

What do learners need to learn?	Skills
Identifying, selecting and extracting the correct information from a brief to meet the requirements of any given task.	EC4 EC5

2.2 **Interpret** drawings, specifications and schedules

Range:
Interpret - specifications, of painting works, schedules of paint colours and finishes, drawings, plans, elevations, sections, method statements, schedules, bill of quantities, programme of works, Building Information Modelling (BIM), safety data sheets, risk assessments.

What do learners need to learn?	Skills
Understand and interpret the various types of information required to meet the requirements of any given task and understand importance of key documents to completion of job to requirements. Impacts of failing to adhere to the drawings, specifications and schedules.	EC5 MC7

2.3 Use **questioning techniques** to obtain and clarify information required

Range:
Questioning techniques – open/closed, probing, funnel.

What do learners need to learn?	**Skills**
How to use and apply appropriate questioning techniques to ascertain and clarify the information required for any given task when talking with clients/customers and using note taking for clarification. Closed: used when making a decision Open: used when trying to get opinions Probing: used when trying to get information that is not forthcoming or to seek full understanding of a situation Leading: used to gain influence and achieve desired outcome Funnel: used when trying to get details about a situation	EC1 EC2 EC4 EC5 EC6

2.4 Advise customers on **design choices**

Range:
Design choices - size and scale of project, function of project, ascertain client requirements, provide examples when advising clients, design principles related to form, shape, scale, colour, pattern, appropriate material selection from a range.

What do learners need to learn?	**Skills**
How to provide well informed advice to clients on design choices, including colour schemes and products using terminology based on established design principles.	EC1 EC2 EC4

2.5 Use **appropriate terminology** with key stakeholders

Range:
Appropriate terminology - clear unambiguous terminology used when explaining unfamiliar terms. Acronyms need explaining or writing in full with clear explanations. Drawings, pictures, or written texts used to confirm or add further explanation. Refer to given project documentation.

What do learners need to learn?	**Skills**
How to use concise clear unambiguous language and refer to key documentation to assist in explaining concepts with key stakeholders. Use of developing technologies can help improve presentation techniques, for instance digital.	EC1

2.6 **Design** decorative scheme to meet customer requirements

Range:
Design - follow the brief, colour theory and terminology, colour referencing systems, sample schemes and boards, alternative solution.

What do learners need to learn?	**Skills**
How to select from a range of colour specifications using appropriate colour terminology to design a decorative scheme to meet the needs of the customer. What effects colours can have on rooms and buildings, for instance, advancing / receding. What design types are appropriate to styles of decorative finishes (Georgian, Victorian, Modernist, Art Deco and others).	EC5

2.7 Calculate area and volume of different geometric **shapes**

Range:
Shapes - square, rectangle, irregular shapes such as L shaped, cube, cylinder, circle.

What do learners need to learn?	Skills
How to calculate areas and volumes of different geometric shapes using a range of mathematical processes when preparing and applying paints and wallpapers to avoid over ordering or under ordering.	MC1 MC2 MC4

2.8 Produce **scaled drawings** by hand

Range:
Scaled drawings - plan, elevation and section. Including 1:1250-Site plan, 1:100 ground and first floor plan, 1:100 elevations, 1.100 sections, symbols and hatchings to elevations and plans and sections. Hatchings: blockwork, brickwork, insulation, concrete, hard-core.

Symbols: window and door on plan, north point, title block.

What do learners need to learn?	Skills
How to produce building (scaled) drawings using manual drafting methods to a prescribed brief. Identify equipment used to create scale drawings. An understanding of why scale drawings are used. Identify hatchings and symbols that are used in scaled drawings.	MC7

2.9 **Inspect** materials

Range:
Inspect - missing items, breakages, damage to items, frost damage, check use by dates, quality, match specification, record keeping of deliveries.

What do learners need to learn?	Skills
How to inspect materials and delivery notes before use and use appropriate report procedures for any omissions or defects. What are the consequences of missing items, breakages for the company and productivity.	EC5

2.10 **Prepare** working environment for task

Range:
Prepare - clear work area, secure working area to protect public, workforce. Protect surfaces, use correct selection procedures for materials, tools and equipment. Select and use appropriate access equipment. Follow correct working processes for the preparation of a range of surfaces. Keep a clean and tidy workspace. Clear away at end of each stage and end of project.

What do learners need to learn?	**Skills**
How to prepare and set up the work area safely in preparation for appropriate commencement of work. What are the implications of not protecting the surrounding area appropriately in terms of financial, reputation and time. Why the area is required to be secure and consequences if not secure. Why is it important to work cleanly and clear as you work considering safety, professional image.	EC5

2.11 Mark out measurements on to materials and backgrounds

Range:
Mark out - rulers, tape measures, plumb lines, chalk lines, spirit levels, laser levels, pencil.

What do learners need to learn?	**Skills**
Use the correct equipment for planning and setting out measurements.	MC1

2.12 **Inspect** equipment

Range:

Inspect - oil moving parts, free from damage, levels calibrated, mechanical equipment serviceable tested before use.

What do learners need to learn?	**Skills**
How to inspect and provide maintenance to equipment to ensure safe and proper function. What are the impacts from using of unsafe equipment. Why equipment should be maintained and serviced regularly.	EC5

2.13 Estimate **resource requirements**

Range:
Resources - labour, materials, overheads, plant and equipment, profits, VAT.

What do learners need to learn?	**Skills**
The difference between an estimation and a quote. How to estimate the resources required, for the task given including time, materials and equipment availability. Impacts of incorrect estimation. How to work out the total cost for a job, Inc. VAT.	MC9

2.14 **Follow** a method statement

Range:
Follow - parameters of the activity or project, plant and equipment required, procedures, safe working methods, risk assessments, emergency procedures, safe handling and storage of materials to prevent pollution, waste disposal procedures.

What do learners need to learn?	**Skills**
Create or follow a plan of work adhering to safe working methods including risk assessments when carrying out activities. Importance of following method statements and what is the impact of not following (personally, business, financially and environmentally).	EC1 EC2 EC3 EC4 EC5

Outcome 3 - Apply specialist surface coatings in complex environments

Performance Criteria

3.1 **Apply** coating techniques for complex areas

Range:
Apply - water borne, solvent borne, interior, exterior.

What do learners need to learn?	Skills
How to apply appropriate surface techniques and treatments for complex areas including broad, linear and specialist. Ensuring safe methods of working and following specification and manufacturer's guidance. Suitability of coating type for task, environment, sustainability and required finish.	EC5

3.2 **Apply** water borne and solvent borne coatings

Range:
Application - rollers with sleeves of synthetic filament, woven pile, woven fabric, mohair, lamb's wool, short, medium, long pile; brushes in natural bristle, synthetic filament; trowel/texturing tools including rollers and brushes; equipment: roller cages, paint stirrers, strainers, paint pots, extension poles, buckets, scuttles, trays, dust sheets, masking machine.

What do learners need to learn?	Skills
How to apply water borne and solvent borne coatings, using the correct tools and equipment for a given task. Ensuring safe methods of working and following specification and manufacturer's guidance. Suitability of coating type for task, environment, sustainability and required finish.	EC5

3.3 Use different types of **equipment** to apply different coatings in complex areas

Range:

Equipment - brush and roller, airless spray, HVLP, brushes and specialist equipment for specialist techniques: broken colour effects, stencilling, marbling, graining and gilding.

What do learners need to learn?	**Skills**
How to determine the correct equipment dependent on the application and complex areas. How to use the appropriate equipment safely and correctly. Factors including finish, accessibility, area, environmental and health and safety.	EC5

3.4 **Inspect** finish

Range:
Inspect - visual checks to ensure quality and specification has been met, check for runs and other defects, smooth even finish with no misses, test wet and dry film thickness to compliance with the given specification.

What do learners need to learn?	**Skills**
How to inspect finishes of work to ensure the specification is met and that it is defect free. What equipment and procedures can be adopted to inspect the finish.	EC5

3.5 **Rectify** irregular **surface coating problems**

Range:
Problems - misses, grinning, runs and sags, excessive brush marks and ropiness, fat edges and wet edge build up, paint on adjacent surfaces, roller edge marks and roller skid marks, irregular cutting in, orange peel, excessive bits and nibs.

Rectification – eradicate poor material selection, poor preparation and poor application.

What do learners need to learn?	**Skills**
What are the characteristics and causes of various surface coating defects. How to visually identify the defects in surface coatings and select the appropriate remedies to rectify them.	EC5

Outcome 4 - Apply specialist wallcoverings in complex environments

Performance Criteria

4.1 **Measure** lengths

Range:
Measure - folding rule, tape measure, straight edge, pencil.

Cut - shears, trimming knives, fabric-backed vinyl joint cutter, plastic protective strip.

What do learners need to learn?	Skills
Techniques can be used to make the measuring process more efficient, for instance, length on length. Use a range of cutting equipment and methods for wallcoverings to minimise waste.	EC5 MC1 MC4

4.2 **Cut** wallpaper for complex environments, minimising waste.

Range:
Cut - shears, trimming knives, fabric-backed vinyl joint cutter, plastic protective strip.

What do learners need to learn?	Skills
Use a range of cutting equipment and methods for wallcoverings to minimise waste.	MC1

4.3 **Apply** adhesives to wallcoverings

Range:
Application - adhesive to back of covering, adhesive to wall surface.

Tools for application - folding rule, tape measure, straight edge, pencil.

What do learners need to learn?	Skills
The importance on following manufacturer's pasting instructions, and the implications of not following them (defects, imperfections).	EC5

4.4 Apply **techniques** for the hanging of a **range of wallcovering**

Range:
Range of wallcoverings – liner, foil, polystyrene, anaglypta, foil, printed, flock, bamboo, vinyl, blown vinyl, solid sheet, fabric, mylar, non-woven, pre-pasted, washable, easy walls, moisture resistant, grass cloth, embossed, patterned.

Techniques - wallpaper identification, vertical application, horizontal application, planning processes, measuring and cutting, pasting and hanging, cutting around obstacles.

What do learners need to learn?	**Skills**
Importance for selecting starting and finishing points, and methods used. How to use appropriate techniques when planning, setting out and hanging a range of wallcoverings. Why it is important to adopt appropriate hanging techniques, work cleanly and follow Manufacturer instructions and guidance.	EC5 MC1 MC2 MC3

4.5 Apply **techniques** for hanging wallcoverings in complex environments.

Range:

Techniques -vertical application, horizontal application, planning processes, measuring and cutting, pasting and hanging, cutting around obstacles.

What do learners need to learn?	**Skills**
Select and use the correct techniques, tools and equipment for hanging wallcoverings in complex environments. Complex environment includes working on staircases, ceilings, odd shaped and oversized spaces, chimney breasts alcoves, columns, reveals, internal and external angles. Why it is important to adopt appropriate techniques and tools for cutting complex areas including star cuts, angled cuts and splicing.	EC5

4.6 **Inspect** finish

Range:
Inspect - defects, cleanliness.

What do learners need to learn?	Skills
How to inspect wallcovering finishes for defects and ensure cleanliness throughout. Why it is important to pay particular attention to joints, i.e. cutting, surface damage, paste, loose edges, bubbling.	EC5

4.7 **Rectify** complex wallcovering problems

Range:
Rectify - preparation, pasting methods, application methods, cutting techniques.

What do learners need to learn?	Skills
How to identify complex wallcovering problems and defects and when is it best appropriate to apply and carry out rectification methods, during and after application.	EC5

Guidance for delivery

Opportunities for visits/engagement with local industry, employers and manufacturers should be provided throughout the delivery

Considerations for innovative methods of delivery to include blended learning and other forms of technology

Innovative methods of delivery could include:

- Presentation/demonstration – delivery of topics using SmartScreen presentation (PowerPoint example available) lecture/discussions/oral Q&A enthusing and engaging learners through different teaching methods and resources
- Reinforcement of candidate learning – revisit learning, group discussions, peer support, sample questions

Formative assessment – oral Q&A, SmartScreen worksheets (samples available) observation of measuring activities

- Practical - Use of pre-set formative assessments carry out tasks and record on standardised form.
- Knowledge – pre-set paper-based activity to confirm skills and understanding. Learners can use variety of methods to carry out activities, calculators, apps, office IT

Ways of ensuring content is delivered in line with current, up to date industry practice

- Centres will need to ensure a realistic representation of carpentry and joinery and components are available
- Centres will need to provide the appropriate tools, equipment and test instrumentation for demonstration and practical training purposes
- The provision must represent the type of equipment currently available in the UK carpentry and joinery industry
- Current and emerging carpentry and joinery technology should be included in delivery where possible

Suggested learning resources

Books

- Level 2 Diploma in Painting and Decorating - Cook A, Fearn, C, Walter, S, Yarde, B,
- Burdfield, M Published by: City & Guilds 2014
- Painting and Decorating 6th Edition - Butterfield, D, Fulcher, A, Rhodes, B,
- Stewart, B; Tickle, D; & Windsor, J
- Published by: Wiley-Blackwell, 2011)
- Design and Construction Best, - A; de Valence, B; & Langstone, C
- Published by Butterworth-Heinemann, 2002

- Parry's Graining & Marbling - (John Wiley & Sons 1995)
- Practical Gilding - Peter and Margaret Mactaggart
- Published by: Archetype Publishing Ltd
- Painting & Decorating Level 3 Published by OUP Oxford, 2015

Websites

- HSE - **www.hse.gov.uk**
- Building Regulations - **www.gov.uk/building-regulations-approval**
- English Heritage - **www.english-heritage.org.uk**
- PASMA Mobile tower scaffold industry body - **www.pasma.co.uk**
- Painting and Decorating Association - **www.paintingdecoratingassociation.co.uk**
- British Decorators Association - **www.british-decorators.co.uk**

Scheme of Assessment – Painting and Decorating

The Painting and decorating occupational specialism is assessed by one practical assignment. The duration of the assessment is 27 hours. Learners will be assessed against the following assessment themes:

- Health and safety
- Design and planning
- Presentation
- Preparation of surfaces and work area for applying specialist surface coatings
- Application of specialist surface coatings
- Inspect, finish and rectify for specialist surface coatings
- Preparation of surfaces and work area for applying specialist wallcoverings
- Application of specialist wallcoverings
- Inspect, finish and rectify for specialist wallcoverings

By completing the following tasks:

Task	Typical Knowledge and skills
Task 1 – Plan and present for the application of surface coatings and wallcoverings	Displays a breadth of knowledge and practical skills to plan for the completion the redecoration of a living room. Candidates will need to produce documents to industry standards that clearly states how they will carry out the redecoration. Knowledge and skills demonstrated will include measurement and calculations of room areas, production of a method statement and risk assessment, and the design and presentation of a mood board to the client, that includes a scale drawing of the room, applying knowledge in the use of colour theory.
Task 2 – Apply specialist wall coatings and wallcoverings	Displays a breadth of knowledge and skills to apply surface coatings and wallcoverings to the given specification successfully. Applies knowledge and practical skills in the protection of surfaces and area, preparation of surfaces, application of patterned and non - pattern wallpapers, paints including decorative techniques, making use of brush, roller and spray application. Work in a safe manner and demonstrate the ability to work to a brief. Tools, materials and equipment are selected and used correctly. All work should be carried out in line with relevant manufacturer's instructions/building regulations, including the maintenance of a safe and tidy work area. Inspect finishes and rectifies any defects appropriately.

The information provided in the following tables demonstrates to approved providers the weightings of each performance outcome and how each performance outcome is assessed.

Performance Outcome and weighting (%)	**Task** *Provide specific instructions for candidates to provide evidence for and are the same for every version of the assessment*	**Assessment Theme**	**Typical evidence**
PO2 Prepare for the application of surface coatings and wallcoverings	T1 and T2	Health and Safety Design and Planning Presentation	Risk assessments, PPE, safe working practice Method statements, scaled drawings, measurements, material/tools lists, design of decorative scheme, advising design choices, representative of scheme Presents plan/design to stakeholder/correct terminology used
PO3 Apply specialist surface coatings in complex environments	T2	Preparation of surfaces and work area for applying specialist surface coatings Application of specialist surface coatings Inspect, finish and rectify for specialist surface coatings	Work area prepared, surface reviewed, and defects corrected prior to application Set up, use of tools, application techniques, accuracy to chosen design scheme Inspection of finish, defects rectified
PO4 Apply specialist wallcoverings in complex environments	T2	Preparation of surfaces and work area for applying specialist wallcoverings	Work area prepared, surface reviewed, and defects corrected prior to application

		Application of specialist wallcoverings	Set up, use of tools, application techniques, accuracy to chosen design scheme
		Inspect, finish and rectify for specialist wallcoverings	Inspection of finish, defects rectified

308 Plastering

Level:	3
GLH:	600
Assessment method:	Practical assignment

What is this specialism about?

The purpose of this specialism is for learners to cover all aspects of the plastering trade including both traditional and modern methods and techniques in both private and commercial sector of the construction Industry. They will gain knowledge and understanding of skills and techniques required to practise and demonstrate the ability to carry out and complete specific solid plastering, rendering and fibrous related tasks.

Learners will prepare and plan tasks, evaluating resources and programs to complete plastering activities within set time frames. They will demonstrate accurate measuring, setting out of complex surfaces to allow for specific installation and application of solid and fibrous plaster components in line with technical information sources.

Learners will develop their knowledge, understanding and skills in:

- Internal and external plastering materials
- Selecting and using plastering materials and methods for moulding work
- Plastering application methods
- Planning and preparation requirements
- Safe working methods when on site and in the workshop

Learners may be introduced to this specialism by asking themselves questions such as:

- What skills do I need to be a successful plasterer?
- What kind of tasks does a plasterer perform?
- What tools, equipment and materials do plasterers use as part of their role?

Underpinning knowledge outcome

On completion of this specialism, learners will understand:

1. Plastering knowledge criteria

Performance outcomes

On completion of this specialism, learners will be able to:

2. Prepare backgrounds for plastering
3. Apply plastering systems
4. Fix plaster casted from moulds
5. Repair plastering systems

Completion of this specialism will give learners the opportunity to develop their maths, English and digital skills.

Specialism Content

Outcome 1

Common knowledge criteria

Health and safety

1.1 Implications of **legislation and guidance**

Range:
Legislation and guidance - The Health and Safety at Work Act (HASAWA), Construction Design Management, (CDM) regulations, Reporting injuries, diseases and dangerous occurrences act (RIDDOR), Control of substances hazardous to health (COSHH), Provision and use of Work Equipment Regulations (PUWER), Manual Handling Regulations, Personal protective equipment (PPE) at work regulations, Respiratory protective equipment (RPE) regulations Work at Height regulations, Control of Noise at work regulations, Control of vibration at work regulations, Electricity at work regulations, Lifting operations and lifting equipment regulations (LOLER), Hazardous waste regulations, Approved code of practice (ACOP), HSE information including HSE Woodwork Information Sheets.

Implications- fines, imprisonment, loss of reputation, loss of current or potential staff, down time and loss of productivity, loss of future contracts.

What do learners need to learn?	**Skills**
The role of legislation and regulations in the plastering/rendering tasks and activities, including the role of the Health and Safety Executive (HSE). How current legislation impacts employer, employee and Plastering projects within a domestic and commercial setting. The implications of not adhering to the legislation on the public, client, business and employers.	EC4 EC5

1.2 The **identification of hazards and risks**

Range:
Hazards - slips, trips and falls; sharp edges; working with adhesives; working at height; hazardous materials.

What do learners need to learn?	**Skills**
The types of hazards and risks associated with plastering and rendering activities, (working at height, confined spaces). Methods used to identify hazards (walk around site, observing how task are preformed, assessing tools, equipment) and the precautions taken through the adoption of safe systems to minimise them (Risk assessment, adherence to regulations, manufacturer's instructions).	EC5

Communication

1.3 The impact of **positive** and **negative** body postures and tone of voice on effective communication

Range:
Positive impact - good relationships, improves team working, motivation, communication, increased morale, boost productivity, satisfaction improves.

Negative impact - poor relationships, teamwork suffers, low morale, poor communication, misunderstanding arises, increased dissatisfaction.

What do learners need to learn?	Skills
The impacts of positive and negative body language on communication considering approach and conduct, audience, expression and translation. Examples of positive body language and tone of voice: open body position, upright relaxed, regular eye contact, voice clear and engaged. Examples of negative body language and tone of voice: closed body posture, slouched, arms crossed, avoidance of eye contact, voice indistinct and unengaged.	EC1 EC2 EC4 EC5

Information

1.4 Types of **information.**

Range:
Information - drawings, specifications, manufacturer information, schedules, method statements, programme of work

What do learners need to learn?	Skills
How to obtain relevant information using a range of methods, including researching the internet, manufacturer handbooks, other primary and secondary sources, including seeking direct information from relevant parties and liaising with manufacturers, professionals, colleagues.	EC4 EC5 MC5 MC6

1.5 **Requirements** of building regulations and standards

Range:
Requirements- protect public interest, provides minimum standards for health and safety and general wellbeing, and specifies standards (and tolerances).

What do learners need to learn?	**Skills**
The requirements of building regulations and industry standards in the plastering industry to protect people's safety, health and welfare and promote sustainable development and less negative impact on the environment local and global. Ensuring the plastering and rendering work is carried out and completed to certain standards and quality set by the industry (straight and line-able, plumb, level, correct dimensions, acceptable surface which are defect free).	EC5

Tools and equipment

1.6 Types of **tools** and **equipment** used for plastering tasks.

Range:
Hand Tools - hand board, finishing trowel (materials, sizes, types) bucket trowel, gauging trowel, margin trowels, floats (materials types sizes), levels (traditional, water, laser), straight edge, feather edge, Darby, small tools (types), joint rules, busk, files, craft knife, square, water brush, tool brush scratcher, snips, tape measure, lath hammer.

Power tools – mega mixer, drill, hammer drill, drywall gun.

Equipment - drum/cement mixer, pan mixer, mixing bath, drag (larry), shovel, brush, access equipment.

What do learners need to learn?	Skills
Types of hand tool, power and equipment used in tasks such as installing, mixing, applying, keying and finishing plastering systems, their characteristics, purpose and suitability for completing different aspects of work (fibrous plastering, dry lining, internal solid plastering and rendering work). For example, a darby, is used to ensure walls and floor are even and ready for decorative finish. It is a long and straight piece of thin metal or plastic with a centre straight handle and front side smooth front finish.	EC4

1.7 Operation and handling **requirements** of tools and equipment.

Range:
Requirements - age restrictions, training, competence, maintenance and storage, PPE, Provision and Use of Work Equipment Regulations 1998 (PUWER), risk assessment and method statements.

What do learners need to learn?	Skills
Requirements when operating and handling tools and equipment. Including, safe handling and safe working methods, safe storage, minimising potential for damage and risk of theft. Adhere to regulations and legislation when complying with operation and handling requirements.	EC4 EC5

1.8 Importance of **maintenance** and how to maintain equipment.

Range:
Operation and handling - efficiency, minimise down time, increased productivity, safe usable condition.

Maintenance – cleaning, storing, access, inspection, setting up, portable appliance testing (PAT), reporting.

What do learners need to learn?	Skills
The processes used to maintain tools and the importance of regular maintenance of tools and equipment to ensure safe working and fit for purpose, including PAT testing. Understand the implications of poor maintenance which lead to loss of production, poor finish and a risk to health and safety.	EC4 EC5

1.9 Types of **fixings** for installing plastering components.

Range:
Fixings - drywall screws varying sizes, coarse thread suitable for fixing to timber, fine thread for fixing to metal, nails varying sizes (galvanised finish, jagged shank for increased holding strength, large head to distribute load), plugs, nails and insulation fixings.

What do learners need to learn?	Skills
Types of fixings, their characteristics, material properties, stock sizes and suitability for different purposes including compatibility and suitability with internal/external situations. Fixing methods and process used to ensure materials and components are securely fixed to background surfaces such as timber, metal and solid substrates. Including different types of fixing tools, SDS drill, impact driver, dry wall, collated, nail gun, stapler.	EC4 EC5 MC1 MC2 MC9

Scientific concepts and principles applied to plastering

1.10 Plastering materials science

Range:
Type of Plaster - Class A (plaster of Paris), Class B (retarded plaster) and Class C (anhydrous plaster).

Characteristics - plaster containing gypsum, lime, or cement, as a dry powder and is mixed with water.

Types of render materials and products - traditional, pre-blended systems.

Characteristics – traditional, loose materials, cement, sand, aggregate.

What do learners need to learn?	**Skills**
Plastering materials science - consideration given to the type of plastering and rendering products that are used with plastering installation situations and their compatibility/suitability to achieve the desired finish. The importance of their characteristics including how materials set and the timings of materials including strength and curing to ensure successful installation and application of different plastering/rendering systems. In addition, consideration given to background surfaces and compatibility with plaster as well as traditional and modern backing and finishing plasters, additives and polymers, bonding agents, chemicals, reinforcements and types of beads, minimum/maximum thickness. Working out correct quantities of traditional and modern materials including adding additives for producing mixed plaster and render in line with specifications ratios and manufactures information. Measuring traditional loose materials by volume in line with specification ratios, measuring chemical liquid additives by milligrams and grams, mixing pre-blended plaster weight and water ratios.	EC4 EC5 MC1 MC2 MC3 MC6

1.11 **Principles** of thermal and sound efficiency and the **relationship** with substrates and plastering materials and techniques

Range:
Principles - heat transfer/insulation and sound transmittance/insulation/absorption.

Relationship - U values of substrates i.e. blockwork, brickwork, concrete, insulating plaster products, thermal boards, backing plasters, EWI systems.

What do learners need to learn?	Skills
The principles of sound and thermal efficiency including U values, acoustics valuation, and performance with consideration to the implications of relevant legislation and regulations. The process and benefits of installing internal and external wall insulation and the types of systems that can be installed by direct bond and mechanical fixing. The implications associated with installing internal and external systems with regards to thermal performance (water vapour, moisture, condensation).	EC4 EC5 MC1 MC2 MC4 MC5 MC10

1.12 **Principles** of fire protection

Range:
Principles - Prevention: controlling ignition and fuel sources so that fires do not start. Containment: fire should be contained to the smallest possible area, limiting the threat to life safety and the extent of property likely to be damaged.

Types of products used for passive fire protection - Plaster boarding to steel beams and columns, fire resistant partitions, fixings, manufacturer's information, specifications, Approved Document B.

What do learners need to learn?	Skills
Principles of fire protection with reference to materials used and methods of application, plastering and plasterboard products and their performance within a building. Consideration given to evaluation and performance requirements Follow current legislation (introduction to Document B) and regulations. Understand how to position, fit and improve fire rating methods within buildings, reasons for achieving increased fire performance ratings within buildings to increase safety protection and ensure safe evacuation procedures using appropriate materials such as fire line plasterboard, components and intumescing sealants.	EC4 EC5

1.13 **Chemical reactions** from various plasters and additives and the **effect** these can have on the finished product

Range:
Chemical reactions - efflorescence – migration of salt to the surface of a porous material
Effect - reduced bonding, reduced strength, overall appearance.

Remedial work - water proofer (creates surface imperious to water ingress), dextrin (gives a harder surface finish to a plaster cast), retarder (creates a slower setting plaster), accelerator alum (creates a quicker setting plaster), accelerator rendering (speeds up the setting process of cement to protect from frost), and pigments (add differing colours).

What do learners need to learn?	**Skills**
Identifying type of problematic damp and moisture related substrates and their effects on different surfaces and the different forms of remedial procedures of reducing, stopping, controlling damp, moisture and increased condensation levels in structures. Selecting suitable additives for enhancing plasters and rendering systems. The benefits of chemicals used in plastering and rendering products. Including retarders, accelerators, additives, water proofer, stabilisers, plasticiser, salt inhibitors, cement, gypsum, lime with consideration of impacts on workability, strength, curing, air drying. Measure and gauge correct quantities of liquid chemicals using millilitres and litres of liquid additives to enhance the plastering material. Interpret specifications and manufactures information when measuring and gauging powder-based materials by volume to ensure the mixed plaster or render is suitable and performs for the intended work.	EC4 EC5 MC1 MC2 MC3

1.14 Water, moisture and damp, condensation and the **importance** and implications of damp proofing/tanking including chemical damp proofing

Range:
Importance - prevention of water ingress to a building structure and damage caused, i.e. damaged plasterwork, rotten timbers and possible collapse of floors and other timber structures.

What do learners need to learn?	Skills
The importance and implications of damp proofing/ tanking and chemical damp proofing from water, moisture, damp and condensation and the problems associated with backgrounds and applied plasters, their effects, and methods for repair and reinstating to prevent rising and penetrating damp. The different waterproofing systems used to control penetrating and rising damp: recognise methods and procedures for installing and applying tanking slurries, chemical inserted damp courses, types and techniques of slurry application, membrane installation to basements.	EC4 EC5

1.15 **Causes, symptoms** and rectification of **faults** in **plastering systems**

Range:
Plastering systems -Internal solid plastering, external rendering, cast and run in situ mouldings.

Causes: - Poor mix, poor preparation i.e. backgrounds/ mould preparation, incorrect application, poor material storage, out of date materials, structural movement, lack of movement beads, weather conditions, damp, water ingress.

Symptoms: -Bond failure, cast sticking, flash setting, cracking, crazing, dusting/deterioration visible signs of damp, surface blowing (frost/efflorescence).

Faults - Structural movement, wood rot, damp, suitability of plastering product.

What do learners need to learn?	Skills
Cause and symptoms of defective work faults, and the effects of poor surface preparation and problems associated with key and poor bond. Suitability of background and materials chosen for the work, compatibility of plaster/render products, poor gauging and mixing of materials and additives, poor application and techniques and work standards met when preparing, applying and finishing traditional and modern plaster and render products to meet specifications and industry standards. The different effects of structural and surface defects and methods chosen to rectify and make good.	EC4

Maths

1.16 **Application** of maths including working out quantities both in areas, linear and volume.

Range:
Application - areas (walls, ceilings, windows doors), Volumes (floor screed) Linear (beads, cornice), circumference (walls, ceilings, floor screed, beads, cornice), U values (compliance with Approved Documents part L), Pythagoras Theorem (setting out).

What do learners need to learn?	**Skills**
The application of math's including working out quantities in areas, linear, and volume in both metric and imperial units of measurements, when planning plastering and rendering related tasks. For instance, calculating loose materials, pre-blended bagged materials, beads/fixings, sheet materials and allowances for waste. Working out singular linear measurements and perimeter for calculating lengths of internal and external beads for walls and ceilings with openings, forming drips and bell casts, expansion and stops. Working out areas and volumes of internal and external plastering materials for complex curved surfaces, inclined surfaces, beams and returns, attached and independent piers.	MC1 MC2 MC3 MC4 MC5

1.17 **Application** of geometry.

Range:
Application - setting out, Pythagoras Theorem.

What do learners need to learn?	**Skills**
The application of geometry in plastering tasks. Consideration should be made to the use of geometry to set out and install complex plastering work using metric measurements, transferring measurements from datum's, using ratios, bisecting techniques, and use of radius rules from drawings, specifications, schedules and method statements - measuring, setting out, squaring levelling, plumbing and bisecting when setting out complex work: plain walls and ceilings, walls and ceilings with openings, walls with returns, walls with attached piers, beams, independent piers, curved surfaces, incline surfaces. Interpret technical information from drawings to accurately set out and install plaster and render systems in line with specifications and manufactures information to meet and comply with schedules and work programs.	MC1 MC4 MC5

1.18 Application of **ratios** to plastering tasks

Range:

Ratios - water ratios according to manufacturer's recommendations, mix ratios for PVA, SBR, water proofer, other additives.

What do learners need to learn?	Skills
The application of ratios in relation to measuring materials to meet specification ratios, calculating and gauging for mixing traditional loose binders, aggregates, additives, and pre-blended plastering and rendering mixes to ensure correct strength and consistency of materials. Measure and apply bonding agents, sealers and primers in line with manufactures instructions. Select and consider appropriate resources and equipment for example when mixing loose aggregates and binders, pre-blended plasters, premixed materials to ensure accurate mixing and consistency to meet the industry standards. Follow manufactures information and instructions for mixing correct quantities of chemical and powder-based additives. Use appropriate techniques for diluting and applying PVA solution, grit bonding adhesives, SBR slurry to adequately prepare different types of backgrounds to receive plaster and render application. Interpret technical information to prepare, mix, dilute and apply sealers, primers and salt inhibitors on specific surfaces.	MC3 MC4

Specific knowledge criteria for performance outcomes

Prepare backgrounds for plastering (Outcome 2)

Business/commercial

1.19 **Costs** associated with the preparation of backgrounds for plastering**.**

Range:
Costs - labour, location, transportation, overheads, materials, design implications, waste, climate conditions, renewable and sustainable requirements.

What do learners need to learn?	Skills
The costs associated with the preparation of backgrounds for plastering with consideration on how they impact profitability and how selecting appropriate plastering systems to meet the buildings performance needs may impact on costs including traditional or modern, age and design performance. Type and method of work being undertaken, new, old, matching existing, restoring or renovation, deadlines, skills required Type of preparation work, planning work schedules, working out and calculating costs for labour, evaluating materials for recycling. Purchase and hire costs of appropriate equipment, machinery, access, costing and estimating materials and components, process and techniques for removing materials and waste, segregation and disposal including land fill costs.	MC1 MC9 EC4 EC6

Protection

1.20 **Techniques** used to protect the areas of work

Range:

Effects - colour and grain distortion, Removal of natural oils.

What do learners need to learn?	Skills
The types of methods used to protect internal and external surfaces such as openings in structures, building elements, services, mixing areas and general work areas as well as types of covering materials prior to carrying out the plastering work. Protecting surfaces from different climate conditions, accidental damage and vandalism. Protecting the public and nearby properties from noise and dust pollution, ensuring safe access routes.	EC4 EC5

Background preparation

1.21 The differing internal/external **backgrounds** and the preparation needed to allow for effective plastering to take place

Range:
Backgrounds - Solid backgrounds brick and block, composite, concrete, stone/slate, plasterboard backgrounds, expanded metal lath, timber lath.

What do learners need to learn?	Skills
The different types of internal and external backgrounds and areas including walls, ceilings, curved walls, piers, columns and beams with consideration to preparation methods needed to allow effective plastering to take place. Identify suitable backgrounds and methods of preparation to ensure successful bond, preparing backgrounds by hand, mechanical means, applying bonding agents and installing reinforcing materials to ensure adequate key and bonding ability Analysing materials and evaluating different methods for preparing backgrounds, gauging, mixing and applying slurry coats to ensure correct strength and durability, working out quantities of metal lath sheets and fixings to cover surface areas, working out and calculating to install and fix traditional timber laths to receive three coat plasterwork. Planning and working out the application process, one coat, two coat and three coat plastering work.	EC4 EC5 MC1 MC2 MC3 MC4 MC5

1.22 Suitability of materials, equipment and **techniques** to control suction

Range:

Techniques - scraping down, grinding/raking out of mortar joints, brushing down, hacking, removal, chemical keys, bonding agents, EML, rib lath, mechanical keys and water Scratch coats, damping down, removal of mortar snots, scutching to create key, slurry coats.

What do learners need to learn?	Skills
The suitability of materials, equipment and techniques used to control suction and with consideration to manufacturer's instructions. Understand and recognise different surface preparation methods to control suction and form a key, by hand, mechanical method and applying bonding agents to ensure successful compatibility of plaster application. Use appropriate techniques and procedures to prepare, apply, rule, key and finish scratch coats, base coats and finishing plasters.	EC4 EC5

1.23 Suitability of materials, equipment and techniques to produce a key.

Range:

Hand tools - lump hammer, broom, bolster, floor scraper, scutch hammer, claw hammer, paint brushes, paint rollers, tin snips, spirit levels, window gauge, tape measure, straight edge, timber rules.

Power tools - SDS hammer drill, rotary scabblers/strippers, angle grinders, mechanical breaker.

What do learners need to learn?	Skills
Recognise different techniques and methods to prepare background surfaces by hand or mechanical means, form a key by hand or mechanically to ensure adequate adhesion of different plaster applications. Identify different surfaces and select appropriate bonding agents to improve key in line with the manufacturer's instructions. Use mechanical stripers, breakers, grinders, needle gun scabblers to prepare poorly keyed surfaces Install mechanical key expanded metal lath sheet and coil to reinforce weak substrates. Measure and calculate correct amount of sheet and coil expanded metal lath materials and fixings when preparing and reinforcing backgrounds using area and linear formula including allowance for waste. Using appropriate metric measurements to cut materials accurately, position and fix in line using correct number of fixings in line with specifications and manufactures information.	EC4 EC5 MC1 MC3

Apply plastering systems (Outcome 3)

Application of modern and traditional plastering systems

1.24 The **suitability** of **trim beads** for internal and external use

Range:

Trim beads types:

- **Galvanized beads -** main use internal due to thin coating which can be removed when used with external render, most beads are available in thin coat and floating coat versions.
- **Stainless steel -** main use external work.
- **Plastic -** beads main use external rendering and swimming pools (due to chemical attack).
- **Corner beads** - form external angles.
- **Stop beads** - form finished edges.
- **Plasterboard edge beads**- form finished edge.
- **Bell cast bead** - forms weathering to base of external renders.
- **Movement beads -** used where cracking could occur, i.e. expansion joints in brick/blockwork.

What do learners need to learn?	Skills
Types of beads and their suitability (benefits/potential limitations) for external and internal surfaces. And procedure of installing, position and purpose when forming angles to returns, splays, stops, movement joints and drips when installing plastering and rendering systems. Using accurate measuring techniques to work out correct quantities of different types of beads for positioning and fixing onto internal and external elevation surfaces using metric linear and perimeter formula. Identifying and selecting correct depth of beads in line with accommodating subsequent application of plaster and render coats (appropriate thickness 10mm ,15mm or 20mm). Use dimensions to set out beads plumb, level, square and correct margin on plain and complex.	EC4 EC5 MC1 MC2 MC5

1.25 How to **cut and fix** various metal/plastic trim beads

Range:
Processes to cut and fix - setting out, measuring, installing using dabs, nailing, use of staples and mechanical fixings.

What do learners need to learn?	**Skills**
Standard processes for cutting, fixing positioning different types of standard and thin coat beads. Interpret drawings to set out and Install in the correct location to accommodate and assist different plaster and render applications, use correct techniques and methods for plumbing, levelling, aligning and checking margins when fixing to openings, returns, beams, attached and independent piers Measuring beads accurately to required length when positioning and fixing singular and multiple beads including accurate joining at right angles and abutments. The techniques and methods for fixing in line with the background and system, correct centres when using different types of fixings (mechanical fixings, staples or adhesive dabs).	EC4 EC5 MC1 MC2 MC5

1.26 Modern **techniques** used to apply plaster to **internal surfaces**

Range:

Internal surfaces - solid block/brick/stone/ slate/concrete masonry backgrounds, textured, solid old plaster and timber/metal studs/joists.

Type of walls -plain walls, walls with returns, walls with openings, curved walls, beams, plain ceilings, ceilings with curves and raking ceilings.

Techniques - preparing, installing plasterboards, mixing, applying keying, ruling, consolidating and finishing, spray application, two coat work, three coat work, direct bond, plaster boarding, dry wall systems and render finishes.

System of application - Scratch coats, pricking up coats, backing floating coats and finishing coats.

What do learners need to learn?	**Skills**
Traditional and modern techniques used to apply plaster to different types of internal wall surfaces, including, two coat work, three coat work, Techniques for preparing, applying, keying scratch coats, ruling different surfaces plain and complex, squaring, consolidating and devil floating, cutting back at beads, frames, corners, services, scraping back base coats and applying finishing top coats, using different types of techniques. Install direct bond and mechanically fix standard and performance plaster board and finishing dry wall systems including taping and jointing. Techniques for preparing, applying, and finishing traditional and modern pre-blended and premixed render finishes. Measuring and working out area dimensions of materials such as plasterboard, transferring dimensions from backgrounds to cut out services, setting out correct fixing centres for mechanical fixings and nail-able plugs and dry wall adhesive, mixing correct amount of plastering materials to ratio of water and apply the correct thickness in line with setting out lines for plain walls, walls with openings and returns in line with drawings, specifications and manufactures instructions.	EC4 EC5 MC1 MC5

1.27 Traditional **techniques** for plastering

Range:
Techniques - fixing laths, applying sand/lime plasters.

What do learners need to learn?	**Skills**
Applying three coat plastering to timber lath backgrounds, using traditional techniques and methods for preparing backgrounds, applying and finishing three coat plastering work. With consideration of the importance when cutting in and cleaning of internal walls angles, ceiling and skirting lines, cleaning of beads, timber door linings and window frames, removal of plaster from service points as well as the importance of completing work in line with industry standards. Working out correct quantities of timber laths and stainless-steel fixings to prepare backgrounds surfaces, correct position and fixing of laths allowing measured gaps between to accommodate for plaster penetration. Mix traditional sand lime materials by gauging volume of different materials for batching mixes in line with specification ratios, apply plastering materials to correct thickness to avoid sagging and ensure adequate curing to receive further application of base coats.	EC4 EC5 MC1 MC2

Application of render products

1.28 **Techniques** used for **application** of external **render finishes**

Range:

Materials – including loose materials, pre-blended materials, pre-mixed materials.

Backgrounds surfaces – including solid block/brick/stone/ slate/concrete, composite, masonry backgrounds, insulation expanded metal lath.

Type of walls – including plain walls, walls with returns, walls with openings.

Methods - including preparing, mixing, applying and finishing.

System of application – including scratch coats, pricking up coats, backing floating coats and render coats.

Types of render finish – including plain face, textured, scraped, dry dash, wet dash, ashlar, Tyrolean and sprayed/rubbed.

What do learners need to learn?	Skills
Applying and finishing techniques for different render surfaces preparing for follow on application, application, keying, straightening including traditional and light weight renders. With consideration of the types of common backgrounds for receiving plastering/render systems. The different preparations for elevation surfaces to include walls with openings, forming reveals, heads, stops, drips including expansion. Form returns free hand, reverse rule method and timber rules including the use of angle beads. This includes external wall insulation, cement board and the need to install different types of reinforcements such as expanded metal lath and mesh clothes, location of beads in line with the drawing, specification and manufacturer's instructions. Interpret drawings, specifications and manufactures instructions to accurately work out and calculate correct amounts of traditional and modern rendering materials for external elevations. Mix materials in line with specification ratios too meet the required industry standard. Work out plain and complex surface areas to receive render by interpreting technical information and work out coverage of different rendering products.	EC4 EC5 MC3 MC1 MC2 MC5

Fix plaster (Outcome 4)

Casting from moulds on bench

1.29 Methods for constructing a running mould including materials used

Range:

Material used-

Parts - template, profile, stock, slipper, brace, and muffle.

Types - single slipper, double slipper, double stock, peg moulds, hinged moulds, run plaster reverse mould, piece mould, case mould, flood mould, insertion mould, run loose piece mould.

What do learners need to learn?	Skills
Selecting, measuring materials and components for producing running moulds. Using appropriate constructing methods for producing a running mould. Use transferring techniques for consideration to creating templates from drawing/squeeze when obtaining profiles and matching existing design patterns, identifying different parts of the running mould (stock, slipper brace) using timber, attaching template to stock, fixing stock to slipper and fixing brace to stock and slipper. Interpret drawings to identify, select and cut timber components to correct dimensions and accurately assemble each part using appropriate fixings.	EC4 EC5 MC1 MC3 MC2 MC5

1.30 Types of **materials** used to produce moulds used in casting

Range:

Materials - plasters, reinforcements, additives, retarders, accelerators, flexible moulding compounds, sealing agents, release agents, glues, fibreglass, clay, fixings, laths.

What do learners need to learn?	Skills
Identify, select and prepare various types of materials used to produce moulds used in casting. Select, prepare, measure, gauge, mix and dilute different type of materials additives, glues, reinforcements and release agents when producing moulding work. Prepare different types of materials associated with the casting process, work out correct proportion/ratio/percentages of different casting materials: powder materials and additives, measure correct amounts of liquid materials such as methylated spirits, shellac, rubbers, sealants, fibreglass, glues and reinforcement matting, strands and timber.	EC4 EC5 MC1 MC3 MC5

1.31 How to **prepare** the casting bench ready for running a reverse mould

Range:
Preparation - repair timber /plaster topped, prepare surfaces, seal, shellac, grease.

What do learners need to learn?	Skills
The process required in the preparation of the casting bench ready to run a reverse mould with consideration of tools, materials, traditional vs modern construction (plaster topped/timber topped).	EC4 EC5

1.32 **Process** for applying casting plaster to the bench to produce a reverse mould.

Range:

Process - setting up and preparation of fibrous bench to run and cast mouldings, set out and select specific hand tools, apply release agents and sealers, fix running rule and establish a suitable working surface.

What do learners need to learn?	Skills
Prepare surfaces and equipment to produce reverse moulds. Use appropriate coring out methods and techniques traditional and modern. The process and techniques required for applying casting plaster to the bench to produce a reverse mould including muffling of moulding to allow coring.	EC4 EC5

1.33 **Methods** of preparing the reverse mould for casting

Range:

Methods - sealing, greasing agents and release agents (French chalk, tallow, paraffin/vegetable oil, methylated spirits and shellac flakes).

What do learners need to learn?	Skills
The methods and techniques for preparing the reverse mould for casting. Preparing and mixing sealers release agents, application tools, cleaning down reverse moulds. Mixing sealers and release agents to the correct consistency and apply to reverse mould surfaces in line with the manufacture's information in preparation for casting.	EC4 EC5 MC1 MC3 MC5

1.34 **Methods** of mixing the casting plaster to produce the cast

Range:

Methods – firstings, secondings, one- and two-gauge process.

What do learners need to learn?	Skills
Gauging materials to ensure correct consistency and strength, demonstrate methods and techniques for mixing the casting plaster to produce the cast using two-gauge system. Incorporating and positioning of reinforcements and building up strike offs materials. Gauge different types of casting plaster to correct ratio of water for consistency and strength, adding correct amount of retarders and accelerator to reduce and increase setting times to meet different time frames used to complete the casting process.	EC4 EC5 MC1 MC3 MC5

1.35 **Methods** used to reinforce casts

Range:

Methods - Hessian ropes, timber, matting, fibres, wooden laths, lightweight metal sections, (GRG), matting continuous strand (GRG) fibres.

What do learners need to learn?	Skills
Methods used to reinforce casts made from reverse moulds. Measuring and preparing and positioning different types of reinforcements materials to strengthen moulding work. Plan and prepare material by working out and calculating the required amount of different reinforcement materials to be incorporated with the casting process using linear measurement for laths, ropes and metal sections, use area when working out matting and weight or volume when adding fibres.	EC4 EC5 MC1

In-Situ moulds

1.36 **Techniques** for taking templates of existing in-situ moulds

Range:

Techniques - Design pattern - Plain and ornamental.

Types of squeeze process - Cut and draw, clay, plaster and rubber/silicone.

What do learners need to learn?	Skills
Techniques for taking templates of existing in situ moulds with consideration of design pattern required including plain and ornamental and types of squeeze process including cut and draw, clay, plaster and rubber/silicone. Using different techniques for transferring dimensions and design of moulding members to reproduce and match moulding designs plain and ornamental.	EC4 EC5 MC1

1.37 **Methods** of running moulds in-situ

Range:

Methods -. running, forming, turning, spinning, scotch bracketing, coring out, topping off.

What do learners need to learn?	Skills
The methods and techniques of running moulds in-situ. Producing straight and curved runs, preparing backgrounds to reduce weight by installing keels and of brackets and coring out. Demonstrate techniques for applying and finishing/running down moulding runs. Using different methods for producing traditional in situ moulding work straight and curved.	EC4 EC5 MC1 MC2 MC3 MC5

Fixing moulds

1.38 **How** to **cut** mitres

Range:

Cut - free hand, template, mitre box.

What do learners need to learn?	Skills
Demonstrate how to set out projection and depth lines on wall and ceiling backgrounds and transfer measurements to accurately cut mitres and stop end returns free hand, demonstrate how to set out and transfer measurements to cut mitres using both internal and external angles using a mitre box. Using linear measuring techniques to cut mouldings to the required length in line with background surfaces. Set out depth and projection lines to carry out pre-installation positioning and fixing of moulding work to ensure all members adequately meet up and line.	EC4 EC5 MC1 MC3 MC2 MC5

1.39 **Methods** of fixing plaster casts

Range:

Methods - screws, adhesives.

What do learners need to learn?	Skills
Methods of fixing plaster casts, with consideration to techniques for preparation, setting out, fixings and lining all members. Assess backgrounds and weight of moulding to establish when to use different types of fixings procedures and methods Assess the type of moulding work being fixed for weight and background characteristics. Position and fix mouldings using correct amount of mechanical fixing and adhesive in line with the weight and stress of design.	EC4 EC5 MC3 MC1 MC2

1.40 **Principles** of jointing casts when fixing

Range:
Principles - leaving gaps, application of plaster to gaps.

What do learners need to learn?	Skills
Principles of jointing casts when fixing, with consideration of the type of fixing used, internal/external mitres, stop ends, straight joints and stopping in. Aligning and stopping in different type of moulding members.	EC4 EC5

Repairing plastering systems (Outcome 5)

Repairing plastering systems

1.41 **Techniques** for the inspection of plastering systems

Range:
Techniques - visual, manual, mechanical testing (impact, adhesion).

What do learners need to learn?	Skills
The techniques for the inspection of plastering systems. With consideration to the reasons for carrying out checks (defect analysis and identification) and assessing material quality for plastering and rendering systems including effects of damaged and defected plasters, renders, plasterboard and accessories used with the work and possible defects that can be caused. Choose appropriate methods for reinstating and making good, defected surfaces.	EC4 EC5 EC1 EC2

1.42 How to **protect** surrounding areas when repairing plastering systems

Range:
Protect - protect surfaces and surroundings, remove /relocate services, protection of public areas and access and egress routes, (polythene sheeting, floor protection, door and jamb protection, protection of glazing).

What do learners need to learn?	Skills
Protection methods for surrounding areas when repairing plastering systems with consideration to method statements, waste management and potential consequences of poor protection measures in the work area. Respecting client property and personal items whilst carrying out repairs.	EC4 EC5

1.43 Methods for the removal of damaged plaster in various internal plastering systems

Range:
Methods – hand and mechanical**,** waste and disposal.

What do learners need to learn?	Skills
Key removal methods for damaged plaster in internal plastering systems. Using appropriate techniques and different methods used to remove loose or stubborn plastered surfaces by hand or mechanical means. Select appropriate PPE from risk assessments and carry out the work in line with method statements.	EC4 EC5

1.44 **Techniques** for the removal of damaged ornate plaster systems

Range:
Techniques – assess moulding surfaces, preparation, match mould pattern.

What do learners need to learn?	Skills
Methods for the removal of damaged ornate plastering systems and the types of procedures for removing defective internal plastering work to reinstate and make good (e.g. repairs to lath and plaster/plasterboard and solid walls).	EC4 EC5

1.45 **Methods** for the removal of damaged renders in various external rendering systems

Range:
Methods – by hand, mechanical means (breaker, grinding, scabbling).

What do learners need to learn?	Skills
Methods and techniques for the removal of damaged renders in various rendering systems and the process of removing defective plain and ornate moulding work to reinstate and make good by selecting appropriate tools and completing the work in line with the method statement.	EC4 EC5

1.46 How to **reinstate** internal plasterwork to various plaster systems

Range:
Reinstate - float & set, board & set, bonding agent & set, patch repairs.

What do learners need to learn?	**Skills**
Methods used to reinstate external render system. Consideration of materials, preparation methods and process to carry out and make good/reinstate defective internal plastering work (plasterboard, solid walls) to meet industry standards by selecting appropriate tools and completing the work in line with the method statement. Mixing different type of modern and traditional materials and bonding agents to carry out the repairs to meet industry standards Calculate areas for reinstating and work out the correct amount of materials for preparing backgrounds and making good surfaces. Mix materials to the correct consistency and strength and carry out the repair work in line with manufactures instructions.	EC4 EC5 MC3 MC1 MC2 MC5

1.47 **Reinstating** external render systems

Range:
Reinstate - hand applied, scratch coat, floating coat, aggregates, machine applied, beads, hard angles.

What do learners need to learn?	**Skills**
Methods used to reinstate external render system. Consideration of materials, preparation methods and process to carry out and make good/reinstate defective internal plastering work (plasterboard, solid walls) to meet industry standards by selecting appropriate tools and completing the work in line with the method statement. Demonstrate appropriate techniques to prepare, apply and finish defective surfaces using one, two and three coat application. Interpret and follow technical information to carry out and complete the work.	EC4 EC5 MC1 MC2 MC3 MC5

1.48 **Methods** of reinstating ornate plaster systems

Range:
Methods - matching up to existing work, plug and screw, nail, adhesive, wire and wad.

What do learners need to learn?	Skills
Methods used to reinstate ornate plaster work. Consideration of materials, preparation methods and process to make good defective plain and ornate moulding work, including joint lines.	EC4 EC5 MC1 MC2 MC3 MC5

Outcome 2 - Prepare backgrounds for plastering

Performance Criteria

2.1 **Interpret** drawings, specifications and schedules

Range:
Interpret - materials type, positioning, shapes of mouldings and joints, scale, dimensions, costs, timescales.

What do learners need to learn?	Skills
How to use technical information available to aid the preparation of backgrounds for plastering (Work planning, selecting materials and the preparation /installation methods to be used) to meet job requirement. Plan and schedule the work in line with time frames allowing sufficient time for drying and setting of materials. Set out dimension and transfer levels datums to position mouldings accurately in line with drawings and specifications. Interpret information from drawings and specifications to work out and calculate costs and quantities of required labour, materials and equipment when producing a schedule to complete work-related tasks in line with work programmes.	EC5 MC7 MC1 MC2 MC5

2.2 **Use questioning techniques** to obtain and clarify information required

Range:
Questioning techniques - open/closed, funnel, probing, leading.

What do learners need to learn?	Skills
How to use questioning techniques to obtain the information, response or outcome required to effectively complete the task. Questioning may be in person or remote i.e. on the telephone. Closed: used when making a decision Open: used when trying to get opinions Probing: used when trying to get information that is not forthcoming or to seek full understanding of a situation Leading: used to gain influence and achieve desired outcome Funnel: used when trying to get details about a situation	EC1 EC2 EC3 EC4 EC5 EC6

2.3 **Measure** length, area and volume.

Range:
Measure - backgrounds surfaces (walls and Ceilings) pre-blended plasters, loose plastering materials, sheet materials, beads, additives, components, fixings.

What do learners need to learn?	**Skills**
How to measure surfaces for plastering systems. Working out quantities of materials and waste for plastering projects in line with drawings, specifications and manufactures instructions. Identifying different types of materials and recognise the appropriate formula to work out surface areas to receive plastering work: linear, area, cubic and volume. Gauging materials using millilitres, litres, grams and kilo grams in line with manufactures information sources to produce plastering materials that meet the required standards regarding quality and strength.	EC4 MC1 MC2 MC3 MC4 MC5

2.4 Produce **scaled drawings** by hand in plan, elevation and section

Range:
Scaled drawings - drawing equipment, symbols, hatchings, scale, orthographic and isometric projections.

What do learners need to learn?	**Skills**
How to produce scaled drawings by hand. Consideration should also be made to the correct interpretation of scales and use of units of measurement appropriate to specification. Using appropriate geometry techniques and equipment to produce orthographic and isometric drawings to produce different drawing designs using different scaled measurements and hatching symbols to identify materials.	MC1 MC2 MC7 MC8 MC9

2.5 Inspect **backgrounds** for suction and/or defects

Range:

Backgrounds: aerated blocks, breeze blocks, concrete blocks, engineering bricks, common bricks, stock bricks, clay bricks, stone, composite.

What do learners need to learn?	**Skills**
Inspect and analyse the characteristics of different types of background surfaces in preparation for carrying out plastering work. Select appropriate methods and procedures for controlling suction by carrying out a simple water absorption test to determine low/medium and high absorption rate. Assess backgrounds for key, strength and suitability of plaster application.	EC4 EC5

2.6 **Remove** loose materials from backgrounds

Range:
Remove - hand or mechanical.

What do learners need to learn?	**Skills**
How to remove loose material from backgrounds in accordance with the task. Assess risks and hazards with the work activity to ensure compliance with health and safety legislation when carrying out the removal of loose plaster/render from backgrounds. Consider the effects of removing defective plaster on surrounding surfaces, selecting appropriate tools and equipment and access and plan the work using safe techniques and methods.	EC4 EC5

2.7 Apply **preparations**

Range:
Preparations - clean background surfaces, primer, bonding agent, dubbing out coat, scratch coat, damping, hacking.

What do learners need to learn?	Skills
How to apply preparations methods, removing dust and controlling suction, using tools, equipment and materials for preparing surfaces, mixing plastering materials, applying, keying, and finishing in accordance with manufacturer's guidance and specification. Identifying and selecting appropriate hand tools for mixing and applying primers and bonding agents (brush applied, roller or thrown on by paddle).	EC4 EC5

2.8 **Inspect** materials

What do learners need to learn?	Skills
How to carry out inspections (visual) on materials for quality and any potential defects (e.g. correct type of plaster etc.) If defects are identified consideration should be made as to whether defects can be removed or minimised or if disposal of unusable materials is necessary. Carry out visual checks on delivered and stock materials for good storage, quality of product, date, and shelf life to ensure they are fit for purpose.	EC2 EC5

2.9 **Inspect** tools and equipment.

Range:
Inspect – Visual check, check lists, maintenance records, service document, PAT testing.

What do learners need to learn?	Skills
How to carry out inspections of tools and equipment (safety guards, electrical cables) in line with standard workshop practice to ensure they are serviceable/fully operational including checking fitness for use. Where necessary adjusting and calibrating of equipment in line with training and guidance. Escalate/report faulty or inappropriate tools/equipment that have been identified in line with health and safety reporting.	EC4 EC5

2.10 Estimate **resource requirements**

Range:
Resources requirements - timelines, materials, quantities, stock, equipment availability, resources/labour, location, budget.

What do learners need to learn?	Skills
How to estimate requirements with consideration. With reference to all available sources (job specification, plans, drawings). Plan schedules, materials and resources accurately for the proposed work. Calculate labour requirements, materials and equipment in line with work programs. Check stock levels of materials in line with schedules to ensure continuation and minimise disruption to work patterns, assess quality of materials including shelf life.	EC4 MC1 MC2 MC9

2.11 Follow a method statement

What do learners need to learn?	Skills
How to follow a method statement to carry out work duties safely, methodically, and competently in line with the method statement with consideration to the location of tasks – (workshop and onsite task requirements).	EC1 EC2 EC5

2.12 Apply keys to differing **backgrounds**.

Range:
Backgrounds - Splatter dash to concrete, EML to wood/concrete, bonding agents.

What do learners need to learn?	Skills
How to apply and form keys to a range of background surfaces by forming hand and mechanical key to improve adhesion of plaster using traditional and modern methods Fix mechanical reinforcements, measure mix, apply slurries and bonding agents Measure and calculate correct amounts of liquid/powder-based bonding agents too ratio of cement for producing slurries to ensure the applied plaster bonds adequately to the background surface. Ensure materials are mixed to the required consistency and strength for applying onto the background. Work out and calculate correct amount of expanded metal lath area and linear including fixings to produce a mechanical key on low suction and weak backgrounds.	EC4 EC5 MC3

2.13 **Protect** surrounding areas

Range:
Protect - dust sheets, timber sheeting, visqueen, netting, and hoarding.

What do learners need to learn?	**Skills**
Protect internal and external surfaces prior and during the work activity. Including surfaces such as windows, doors, services, drains, furniture, floors, surrounding surfaces using a range of coverings.	EC4 EC5

Outcome 3 - Apply plastering systems

Performance Criteria

3.1 Protect integrity, quality and condition of materials during handling and storage

What do learners need to learn?	Skills
Protect and store material to maximize limitation of product. Considers safe handling, lifting and transporting requirements of materials and components to competently complete plastering/rendering related tasks.	EC4 EC5 MC2 MC3

3.2 Use tools including hand and power tools.

What do learners need to learn?	Skills
Use tools including hand and powered tools (both wired, and battery operated) in relation when preparing, mixing, applying, ruling, keying backing, finishing coats (plasters/renders) including installation of performance plasterboard system to the job specification. All tools should be used in line with safe working practices and in line with training/manufactures instructions.	EC4 EC5

3.3 **Set out** plasterboard to stud work and direct bond

Range:
Set out - checking backgrounds, set out dimensions.

What do learners need to learn?	Skills
Set out plasterboard to studwork and direct bond. Plans the work task in line with the drawing and specification, carries out pre-installation checks, prepare background surfaces and selects appropriate materials, fixings and adhesives for the chosen system. Check backgrounds for correct dimension of stud and joist centres to receive plasterboard sheets at appropriate thickness (400 mm centres and 600 mm centres). Calculate surface areas and work out the correct amount of plasterboard sheets and fixings for installation including allowances for waste. Work out correct amount of dry wall adhesive to install plasterboards by direct bond installation.	MC1 MC2 EC4 EC5 MC5

3.4 **Fix** plasterboard to timber/metal stud work and solid backgrounds

Range:
Fix - traditional lath, wall plates, dry wall screws, jointing tape, jagged plasterboard nails, adhesive.

What do learners need to learn?	**Skills**
Techniques and methods to fix timber lath on to backgrounds to receive traditional pricking up coats. The procedures to install and fix plasterboard systems to timber, metal and solid backgrounds using mechanical fixings and direct bond. Apply different types of finish including taping and jointing systems Calculate the required amount of sheet materials, components, fixings and reinforcements using area and linear measurement for a given task. Using different fixing procedures for installing dry lining e.g. vertical positioning and fixing, horizontal positioning and fixing, staggered fixing, double staggered fixing. Setting out chalk lines for pre-installation of direct bond plain walls, window walls and forming square returns.	MC1 MC2 MC3 MC5 EC4 EC5

3.5 **Mix** mortar, including plaster and render

Range:
Mix - ratios, thickness, materials, consistency, additives, equipment, procedure.

What do learners need to learn?	**Skills**
To mix mortar, including plaster and render gauging quantities of loose materials such as aggregates, binders and additives when mixing including mixing pre-blended plasters and renders to ensure accuracy of strength and consistency of materials for applying and finishing. Measure and gauge traditional loose materials and additives by volume and weight in line with specification ratios and manufactures information to produce mortar for consistency and strength.	EC4 EC5 MC1 MC3 MC2 MC5

3.6 Apply light weight **plasters** to internal surfaces

Range:
Plasters: two coat, three coat and finishing plaster.

What do learners need to learn?	Skills
To apply light weight plasters to internal surfaces, selecting suitable and compatible gypsum-based plaster systems. Use techniques for applying, ruling and consolidating the surface of backing coat including cutting back. Consider any reinforcement requirements before applying finishing plaster to solid and plasterboard background surface ready for decoration. Calculate and work out correct amount of pre-blended bagged plaster to the correct percentage/ amount of water using metric litre measurements to ensure plaster is mixed to the correct consistency and quality in line with the manufacture's information instructions. Calculate and work out approximate coverage and timings of different lightweight plaster.	EC4 EC5 MC1 MC3 MC2 MC5

3.7 Apply tape to a drywall system joint

What do learners need to learn?	Skills
To apply tape to drywall system joints, preparing plasterboard surfaces and carrying out tape and joint application to butt joints, internal and external corners and spotting to fixings. Prepare jointed surfaces by sanding and sealing if they are being decorated. Use linear and area formula measurements to calculate the required amount of jointing adhesive, tape, beads, sealers, and primers for producing tape and joint surfaces for installing dry lining systems.	EC4 EC5 MC1 MC3 MC2 MC5

3.8 Apply render plasters to internal surfaces

What do learners need to learn?	Skills
To prepare, mix and apply specialist render systems to internal surfaces. Applying and forming plain and textured surfaces in line with manufactures instructions. Apply different backgrounds such as EWI, Cement board, EML and solid.	EC4 EC5 MC1 MC3 MC2 MC5

3.9 Fix laths to surfaces

Range:
Laths - expanded metal, rib and timber.

Finishes - plain face, ashlar, tyrolean and dry dash.

What do learners need to learn?	Skills
Produce traditional external render finishes using a range of techniques and application methods. Finish different types of plain and textured surfaces using appropriate hand tools and equipment.	EC1 EC4 EC5 MC1
Follow manufactures technical information for working out render surface coverage areas for different elevations of the building including apex surfaces, bay windows and other complex areas.	MC3 MC2 MC5

3.10 Apply light weight **one coat renders**

Range:
One coat render - plain, ashlar, brick render, pebble dash/ dry dash, rough casting/wet dash, scraped texture, rubbed texture and tyrolean.

What do learners need to learn?	Skills
Apply and finish lightweight one coat premixed and pre-blended renders to form plain/ complex surfaces in line with the manufacturer's instructions.	EC1 EC2 EC3
Mix ratios depending on strength, correct consistency of material for application and correct colour consistency.	MC1 MC2 MC3
Add correct amount of water percentages to pre-blended materials to ensure correct colour, consistency and strength in line with the specification, schedules and manufactures instructions.	MC5
Schedule each phase of the work to allow materials to set and cure e.g. applying primers, bonding agents, base coats and topcoats. Estimate drying and setting time of different render systems.	

Outcome 4 - Fix plaster casted from moulds

Performance Criteria

4.1 **Transfe**r **moulding shapes** to metal

Range:
Transfer - drawings, draw directly onto zinc, use of squeeze to produce a drawing, stick pre- drawn template to zinc.

Moulding shapes/members - cyma recta, cyma reversa, ovolo and cavetto, fillet, scotia, torus/bead, drip, weathering.

What do learners need to learn?	Skills
Transfer moulding shapes to metal. Construct reverse running moulds from drawings, specifications and squeezes, transfer moulding outlines designs to templates and assemble various running mould components to construct a reverse running mould. Use geometry equipment and graph paper to draw and produce moulding member designs and transfer dimensions accurately on to profiles to meet the specified design in accordance with drawings.	MC1 MC2 MC3 MC5 MC7 MC8

4.2 **Cut** shapes from metal

Range:
Cut – Hand and power tools, Aviation snips curved and straight, nibblers, files straight, half round, round, drill, screw gun, vice.

What do learners need to learn?	Skills
Transfer moulding profile outlines to sink or aluminium metal sheet and cut out shapes accurately using appropriate hand tools and power tools in line with the method of work and required design profile. Transfer moulding member designs accurately from templates and profiles to ensure accurate designs are produced.	EC1 EC4 EC5 MC1 MC7 MC8

4.3 **Join templates to running moulds**

Range:
Join - hammer, pins.

What do learners need to learn?	Skills
Identify components, prepare materials to construct running mould components and Join templates to stock using appropriate hand tools, equipment and workshop resources.	EC4 EC5 MC1 MC7
Measure timber components to the required dimensions in line with drawings and assemble different parts of the running mould and attach the template profile in preparation for producing moulding work, positive and reverse running moulds.	MC8 MC2 MC5

4.4 **Apply** running rule to casting bench

Range:
Apply - chalk line, straight edge, timber rule, screws, and nails.

What do learners need to learn?	Skills
Fix running rules to prepared fibrous bench using correct fixings to ensure reverse mould is run accurately, straight and in line.	MC1 MC2
Measure and set out dimensions on work benches and work out linear length of timber batten to run the length of moulding required and fix position ensuring straight line with adequate amount of mechanical fixings.	

4.5 Grease bench in preparation for reverse mould

What do learners need to learn?
Prepare grease release agent and apply to bench and reverse mould surfaces to ensure positive and cast moulds can be removed and released without damage.

4.6 Prepare **materials**

Range:
Materials - hessian ropes, wooden laths and casting plaster, retarder (size), shellac, grease.

What do learners need to learn?	Skills
Prepare moulding materials for producing casts using different types of plasters one- and two-gauge systems, using reinforcements such as canvas, hessian, strands laths for strengthening, release agents, additives and appropriate mixing equipment.	EC4 EC5 MC1 MC2 MC3

4.7 **Run** a reverse mould on the bench

Range:
Run - bench preparation, running lath, muffle, core, finish.

What do learners need to learn?	Skills
Run positive and reverse moulds using traditional mortar and plaster core and using modern materials such as plasterboard including using plaster muffles and timber templates. Set out and measure required quantities of materials in preparation for casting. Fix additional templates to the running mould profile or muffle ensuring appropriate thickness to reduce the amount of casting plaster and avoid expansion when running the finish.	EC4 EC5 MC3 MC1 MC2 MC3

4.8 **Prepare** moulds ready for casting

Range:
Prepare - drawing, cut to required size, shellac, grease.

What do learners need to learn?	Skills
Prepare reverse moulds using shellac sealer and release agents in preparation for casting from solid and flexible reverse moulds. Prepare moulding background surfaces for release purposes. Work out linear length of required casts from drawings and prepare the reverse mould by cutting to the required length. Measure and calculate the quantity of sealer and release agent required for applying onto the reverse mould in preparation for casting.	MC1 MC2 MC3 EC4 EC5 MC5

4.9 **Cast** from **moulds**

Range:
Cast - size, canvas, laths, ropes, reinforcing wads, strike off.

Moulds - one gauge, two-gauge, plaster moulds, rubber moulds, fibreglass moulds.

What do learners need to learn?	Skills
Cast moulds from reverse plaster, rubber and fiberglass models using one- and two-gauge casting methods and procedures. Measure and set out the required length of reinforcements and laths for strengthening and wading producing strong durable casts Gauging and mixing required quantities of plaster materials by weight to water to ensure consistency and strength of produced cast. Measure required amount of lengths for the task and allow for waste.	MC1 MC2 MC3 EC4 EC5 MC5

4.10 **Take templates** from an existing in-situ mould

Range:
Take templates - remove section of original, take a squeeze (saw cut and profile, clay, rubber plaster), transferring profiles.

What do learners need to learn?	Skills
Take squeeze templates using different methods and procedures for reproducing plain and pattern designs. Transfer moulding members to sink profile and construct in-situ running mould. Measure and mark out dimensions of moulding design to be removed, transfer design by taking a squeeze.	EC4 EC5 MC1 MC2 MC7 MC8

4.11 **Run** moulds in-situ including coring out and topping off.

Range:
Run - sweetening, running rules, running mould, scotch brackets, laths, sand/lime, putty lime, casting plaster, muffle, core, finish.

What do learners need to learn?	Skills
Set out and run in-situ moulding work including coring out/bracketing to form straight, curved and raking moulding work using traditional materials. Set out and position running rules and apply plaster screeds to ensure smooth running of mould. Muffle running mould and apply coring out material, mix materials to required consistency and strength in line with specifications and manufactures instructions. Measure timber brackets to required length and position and fix in correct position to allow penetration of mortar and sufficient coring out of moulding design. Set out running rules to accurate dimension and in line and fix and wad in place. Mix materials accurately by volume to run core and finish.	EC4 EC5 MC1 MC2 MC7 MC8

4.12 **Mark out** materials including mitres

Range:
Mark out - square, level, chalk line, tape measure, mitre box.

What do learners need to learn?	Skills
Mark out complex mouldings designs to include intersections of moulding members at mitres, returns and stop ends to ensure moulding members meet and intersect in line accurately when setting out straight, curved and raking moulding work. Setting out to run moulding work using gig stick and centre block, trammel board, raking moulds.	MC1 EC4 EC5 MC2 MC3 MC5

4.13 **Cut** castings to produce internal and external angles

Range:
Cut - square, tape measure, mitre box, saw.

What do learners need to learn?	Skills
Cut produced in-situ moulds including short breaks to required dimensions when forming internal and external mitres including stop end returns using free hand methods, templates and mitre boxes and appropriate hand tools. Mark out dimensions to cut out moulding runs at mitres for producing and positioning short breaks including returns. Setting up and produce up stand to accurate dimension and ratio to run short breaks. Core out and run short breaks, position to ensure members match and line through before making good and stopping-in.	EC4 MC1 MC2 MC5

4.14 **Fix** plaster casts

Range:
Fix - drill, hammer, punch, plugs, screws, galvanised nails, adhesive, joint rules, small tools, wire and wad.

What do learners need to learn?	Skills
Fix moulding work using adhesive, screws and wire and wad methods in line with the method of work. Assess background and weight of moulding to be fixed and choose appropriate fixing methods. Set out moulding dimension and accurately snap chalk lines to produce position of depth and projection fixing lines. Measure linear lengths of cornice and cut to the required internal or external mitre including abutments at joins.	EC4 MC1 MC2 MC5

4.15 **Apply** plaster to internal and external joints to produce a finish

Range:
Apply - small tools, joint rules, tool brush, busk.

What do learners need to learn?	Skills
Apply and make good internal and external mitres and stop end returns using appropriate reinforcements, mortars and casting plaster ensuring moulding members in line and accurate using small tools, joint rules, busks and small brushes.	EC4 MC1 MC2 MC5

Outcome 5 - Repair plastering systems

Performance Criteria

5.1 **Inspect** plastering system for damage

Range:
Inspect – visual, manual, mechanical analyses, testing.

What do learners need to learn?	Skills
Inspect different types of damaged/defected surfaces to internal plastered surfaces, external rendered surfaces, and ornate plasterwork in preparation for carrying out repair work to make good defects. Identify the cause of defect and implement methods and procedures for carrying out repairs.	EC1 EC5

5.2 **Remove** damaged **materials**

Range:
Remove - protect surroundings, tools manual and powered, removal of waste product in line with current regulations, comply with health and safety legislation.

Materials - internal plastering, external render and ornate plaster finishes, lightweight pre-blended backing/finish plasters, loose materials (traditional render systems), pre-blended modern render systems, sand/lime mixes, plaster lath, (in situ mouldings), casting plaster, canvas, plaster lath (fibrous mouldings).

What do learners need to learn?	Skills
Removal of damaged materials, setting up work areas safely to remove damaged surfaces by hand or by mechanical means in line with risk assessments and method statements. Protect surfaces from impact and accidental damage and remove and dispose of waste in line with legislation.	EC4 EC5

5.3 **Maintain** integrity of plastering system **materials** and surrounding building fabric

Range:
Maintain - check for shelling, cracking, and effects of other structures.

What do learners need to learn?	**Skills**
Maintenance of the integrity of plastering system materials and surrounding building fabric. Assess and evaluate the type of work to be repaired, re-instated and restored, private, commercial, or listed and plan methods for protecting the surrounding area with regards to people, vehicles, and surrounding buildings. Estimate and calculate required amounts of materials to carry out the repairs.	EC1 EC4 EC5 MC1 MC2 MC9

5.4 Match new materials to existing plastering system materials

Range:
Match - traditional, modern, drawings, schedules, specifications.

What do learners need to learn?	**Skills**
Match new materials to existing plastering system materials, removing loose material from backgrounds in accordance with the task. Assess risks and hazards with the work activity to ensure compliance with health and safety legislation when carrying out the removal of loose plaster/render/ornate plaster work from backgrounds. Carry out specific traditional and modern techniques and methods to ensure the work is reinstated complying with the drawing specification and manufactures instructions.	EC4 EC5

5.5 **Blend** new materials to existing plastering system

Range:
Blend - lime plasters, horsehair/goats' hair, heritage England.

What do learners need to learn?	Skills
Analyse materials, mix and gauge different types of limes and aggregates to make and batch mortar plastering mixes. Blend new materials (making good surfaces) to existing plaster systems. Ensuring surfaces match existing with regards to using appropriate materials, binders, aggregates, additives, reinforcements, beads, colour, surface being plain, textured, pattern design including moulding members and enrichments. Allow sufficient drying and curing times of applied materials during different application. When repairs should also meet conservation and heritage legislation to meet listed building design. Planning work and estimating drying times of using traditional lime-based materials in line with plastering schedules to meet work programmes.	EC4 EC5 MC1 MC2 MC3

Guidance for delivery

Opportunities for efficiencies in delivery

Opportunities for visits/engagement with local industry, employers and manufacturers should be provided throughout the delivery

Considerations for innovative methods of delivery to include blended learning and other forms of technology,

Innovative methods of delivery could include:

- Presentation/demonstration – delivery of topics using SmartScreen presentation (PowerPoint example available) lecture/discussions/oral Q&A enthusing and engaging learners through different teaching methods and resources
- Reinforcement of candidate learning – revisit learning, group discussions, peer support, sample questions

Formative assessment – oral Q&A, SmartScreen worksheets (samples available) observation of measuring activities

- Practical - Use of pre-set formative assessments carry out tasks and record on standardised form
- Knowledge – pre-set paper-based activity to confirm skills and understanding. Learners can use variety of methods to carry out activities, calculators, apps, office IT.

Ways of ensuring content is delivered in line with current, up to date industry practice

- Centres will need to ensure a realistic representation of plastering tasks are available
- Centres will need to provide the appropriate tools, equipment and test instrumentation for demonstration and practical training purposes
- The provision must represent the type of equipment currently available in the UK plastering industry
- Current and emerging plastering technology should be included in delivery where possible.

Suggested learning resources

Books

- Plastering Encyclopaedia: B.F Pegg and W.D Stagg: Blackwell Publishing - 1999
- Plastering: J. B. Taylor: Pearson Education
- The City and Guilds Textbook – Level 2 Diploma in Plastering: Mike Gashe: City and Guilds
- Plastering: J T Sawyer: Routledge: 2007
- Lime and Lime mortars: A D Cowper: Donhead - 1998
- Plastering - Plain and Decorative

Websites:

- HSE - **www.hse.gov.uk**
- Building Regulations - **www.gov.uk/building-regulations-approval**
- English Heritage - **www.english-heritage.org.uk**
- The Federation of Plastering and Drywall contractors (FPDC) - **www.fpdc.org**
- FairTrades – Plasterers, Association - **www.fairtrades.co.uk**
- Federation and Interiors Sector (FIS) - **www.thefis.org**

Scheme of Assessment – Plastering

The Plastering occupational specialism is assessed by one practical assignment. The duration of the assessment is 26 hours. Learners will be assessed against the following assessment themes:

- Health and safety
- Design and planning
- Presentation
- Internal plastering systems
- External rendering systems
- Produce and fix mouldings
- Repair to damaged surfaces

By completing the following tasks:

Task	Typical Knowledge and skills
Task 1 - Prepare and plan backgrounds for installation	Displays a breadth of knowledge and practical skills to plan for the completion the renovation work for the internal and external installation and repair work required to the brief specification. Candidates will need to produce documents to industry standards that clearly states how they will carry out the renovation. Measurement of work areas and calculations will be made to determine the type and quantities of materials and components required for producing plaster and render finishes. A method statement for the installation and repair work alongside a risk assessment for all tasks is required and the candidate will present to the client recommended materials to be used for the different internal plastering works and colour through design for the external rendering.
Task 2 - Plaster and render Installation	Displays a breadth of knowledge and practical skills to complete the internal plastering and external rendering work to the given specification successfully. The tasks are carried out in a clear and logical sequence. Working in a safe manner and demonstrates the ability to work to a brief. Tools, materials and equipment are selected and used correctly, prepares materials and components for installation, gauges and mixes plastering and rendering materials to the required consistency and standards. Consideration to environmental sustainability and recycling of materials.
Task 3 - Repair to plaster surfaces	Displays a breadth of knowledge and practical skills to carry out repairs by making good defected surfaces, removes any damage, and matches new materials and blends new materials to existing plastering systems. Tools, materials and equipment are selected and used correctly in for the installation process. Maintains safe working practices.

The information provided in the following tables demonstrates to approved providers the weightings of each performance outcome and how each performance outcome is assessed.

Performance Outcome and weighting (%)	**High level tasks** ***Provide specific instructions for the candidates to provide evidence for and are the same for every version of the assessment***	**Assessment Theme**	**Typical evidence**
PO2 Prepare backgrounds for plastering (26%)	T1, T2 and T3	Health and Safety Design and Planning Presentation	Risk assessments, PPE, safe working practice Method statements, scaled drawings, measurements, material/ resource lists, recommended materials based on brief, colour through design, with swatches/samples Presents plan/design to stakeholder/correct terminology used.
PO3 Apply plastering systems (50%)	T2	Internal plastering systems External rendering systems	Set up, gauging and mix, use of tools, techniques, finish Selection, preparation positioning (plumb and level), install, use of tools Set out, measurements, position, apply and install, use of tools. Prep of surfaces, measure, gauge, mix, scratch coat, key, technique, use of tools and finish. Selection, preparation positioning (plumb and level), install, use of tools

PO4 Fix plaster cast from moulds (14%)	T2	Produce and fix mouldings	Preparation, casting, moulds, gauge and mix, measure, cut, position, fix use of technique and tools.
PO5 Repair plastering systems (10%)	T3	Repair to damaged surfaces	Identify problem, use of tools techniques, rectifies problem

Appendix 1 Sources of general information

The following documents contain essential information for Providers delivering City & Guilds T Level Technical Qualifications. They should be referred to in conjunction with this specification and the Provider approval and quality assurance information.

You can download these from **www.cityandguilds.com**.

Centre Contract General Terms
Quality Assurance Standards: Centre Handbook
Quality Assurance Standards: Centre Assessment

Within these documents you will find information in relation to;

- centre assessment,
- internal quality assurance (IQA),
- IQA strategy,
- alternative locations and subcontractors,
- non-compliance,
- malpractice, and
- centre support roles and resources

All T Level providers must ensure they familiarise themselves with the above documents and adhere to the general terms as part of their conditions of approval.

Useful contacts

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

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes ILM (management and leadership qualifications), City & Guilds Licence to Practice (land-based qualifications) and Learning Assistant (an online e-portfolio).

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Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

T: 0300 303 53 52

E: **technicals.quality@cityandguilds.com**

W: **www.cityandguilds.com/tlevels**

Web chat available **here**.