

# Level 1 Diploma in Electrical Installation (7202-01)

September 2017 Version 1.3



## Qualification at a glance

Subject area	Building Services Industry
City & Guilds number	7202
Age group approved	14-16, 16+
Entry requirements	None
Automatic approval	Available
Assessment	Assignment
Support materials	Centre handbook Practical Task Manual Assessor Guidance
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	GLH	TQT	City & Guilds number	Accreditation number
Level 1 Diploma in Electrical Installation	416	440	7202-01	600/9790/5

Version and date	Change detail	Section
1.1 July 2013	14-16 age group added	Qualification at a glance
1.2 May 2016	Age restrictions statement updated to match age group	Centre requirements
	City&Guilds Group statement updated	Useful contacts
	Phone numbers removed	Useful contacts
1.3 September 2017	Added TQT and GLH details	Qualification at a Glance, Structure
	Deleted QCF	Appendix



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# 1 Introduction

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

Area	Description
Who is the qualification for?	This qualification is for learners wanting to learn the basic skills and knowledge involved in electrical installation.
What does the qualification cover?	The qualification covers a range of basic tasks and underpinning knowledge involved in electrical installation.
What opportunities for progression are there?	It allows learners to progress to the following City & Guilds qualification: <ul style="list-style-type: none"><li>• Level 2 Diploma in Electrical Installations (Buildings and Structures) (2365-02)</li><li>• Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (Buildings, Structures and the Environment) (2357-13)</li><li>• Level 3 NVQ Diploma in Electrotechnical Services (Electrical Maintenance) (2357-23)</li></ul>

## Structure

To achieve the **Level 1 Diploma in Electrical Installation (7202-01)**, learners must achieve **44** credits from the mandatory units.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value
<b>Mandatory</b>			
T/505/1711	Unit 101	Structure of the construction industry	4
A/505/1712	Unit 102	Fundamental safe working practices	5
F/505/1713	Unit 103	Environmental and sustainability measures in domestic dwellings	4
J/505/1714	Unit 104	Site preparation for working in the construction industry	7
L/505/1715	Unit 105	Electrical installation wiring and terminations	9
R/505/1716	Unit 106	Fabrication techniques for electrical installation	11
Y/505/1717	Unit 107	Electrical science and technology	4

## Total Qualification Time

Total Qualification Time (TQT) 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.

Title and level	GLH	TQT
Level 1 Diploma in Electrical Installation	416	440



## 2 Centre requirements

### Approval

If your Centre is approved to offer

- Level 2 Diploma in Electrical Installations (Buildings and Structures) (2365-02)
- Level 3 Diploma in Electrical Installations (Buildings and Structures) (2365-03)
- Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (Buildings, Structures and the Environment) (2357-13)
- Level 3 NVQ Diploma in Electrotechnical Services (Electrical Maintenance) (2357-23)

you will receive automatic approval for the new Level 1 Diploma in Electrical Installations.

To offer this qualification, new centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual - Supporting Customer Excellence* for further information.

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

### Resource requirements

#### Centre staffing

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

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

Centre staff may undertake more than one role, eg tutor and assessor or internal quality assurer, but cannot internally verify their own assessments.

## **Assessors and Internal Quality Assurer**

Assessor/Internal Quality Assurer TAQA qualifications are valued as qualifications for centre staff, but they are not currently a requirement for the qualification.

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

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

## **Learner entry requirements**

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

## **Age restrictions**

City & Guilds cannot accept any registrations for learners under 14 as this qualification is approved for 14-16s and 16+.



## 3 Delivering the qualification

### Initial assessment and induction

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

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

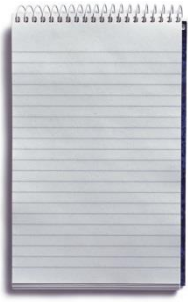
We recommend that centres provide an induction programme so the learner fully understands the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

### Support materials

The following resources are available for this qualification:

Description	How to access
Practical Task Manual	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
Assessor Guidance	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>





## 4 Assessment

Candidates must successfully complete one assignment for each mandatory unit.

Unit	Title	Assessment method	Where to obtain assessment materials
101	Structure of the construction industry	Assignment 7202-101 The assignment covers the knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
102	Fundamental safe working practices	Assignment 7202-102 The assignment covers the skills and knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
103	Environmental and sustainability measures in domestic dwellings	Assignment 7202-103 The assignment covers the knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>

Unit	Title	Assessment method	Where to obtain assessment materials
104	Site preparation for working in the construction industry	Assignment 7202-104 The assignment covers the skills and knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
105	Electrical installation wiring and terminations	Assignment 7202-105 The assignment covers the skills and knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
106	Fabrication techniques for electrical installation	Assignment 7202-106 The assignment covers the skills and knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
107	Electrical science and technology	Assignment 7202-107 The assignment covers the skills and knowledge in the unit. It is set by City & Guilds, delivered and marked by the tutor/assessor, and will be externally verified by City & Guilds to make sure it is properly carried out.	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>



## 5 Units

### Availability of units

The following units are also on The Register of Regulated Qualifications: <http://register.ofqual.gov.uk/Unit>

### Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- guided learning hours
- unit aim
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

UAN:	T/505/1711
Level:	1
Credit value:	4
GLH:	37
Aim:	This unit is designed to provide learners with a broad understanding of the structure of the construction industry. They will know about different organisations, industry bodies and employment rights and responsibilities in the industry.

<b>Learning outcome</b>
The learner will: 1. know the roles of the different trades in the construction industry.
<b>Assessment criteria</b>
The learner can: 1.1 identify the <b>key trades</b> in the construction industry 1.2 identify the different <b>jobs</b> common to each trade 1.3 state common <b>hazards</b> associated with each trade.

<b>Range</b>
<b>Key trades</b> Electrician, plumber, carpenter, bricklayer, plasterer.
<b>Jobs</b>
<b>Electrician</b> Lighting wiring, power supply wiring, maintenance.
<b>Plumber</b> Hot and cold water supply, central heating, bathroom installation, sanitation and drainage.
<b>Carpenter</b> Hanging doors, installing windows, timber roof installation.
<b>Bricklayer</b> Brick laying, stone work, concrete block installation.

<p><b>Plasterer</b> Plastering, dry lining.</p> <p><b>Hazards</b> Electric shock, burns, cuts and abrasions, dust inhalation, working at height, lifting and carrying, solvents, vapours, asbestos, vibration, noise, extremes of temperature, slips trips and falls.</p>
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<b>Learning outcome</b>
The learner will: 2. know different types of organisation and job roles in the construction industry.
<b>Assessment criteria</b>
The learner can: 2.1 identify different <b>types of organisation</b> within the construction industry 2.2 identify specialist <b>plumbing</b> organisations 2.3 identify specialist <b>electrical</b> organisations 2.4 identify <b>job roles</b> within the construction industry.

<b>Range</b>
<p><b>Types of organisation</b> Small, medium, large, specialist firms and services, sole traders, sub contractors.</p> <p><b>Plumbing</b> Domestic plumber, heating engineers, industrial plumbers, drainage specialist, maintenance engineer.</p> <p><b>Electrical</b> Domestic electricians, industrial commercial electricians, maintenance electricians, alarm engineer.</p> <p><b>Roles</b> Architect, structural engineer, clerk of works, estimator, buyer, site manager.</p>

<b>Learning outcome</b>
The learner will: 3. know the industry bodies within the plumbing and electrical industries.
<b>Assessment criteria</b>
The learner can: 3.1 identify the relevant <b>industry bodies</b> within the plumbing and electrical industries 3.2 state the key <b>responsibilities</b> of <b>industry bodies</b> a. Joint Industry Board (JIB)

- b. Water Authority (WA)
- c. Institute of Engineering Technology (IET)
- d. Electrical Contractors Association (ECA)
- e. Association of Plumbing and Heating Contractors (APHC)
- f. Local Authority.

**Range**

**Industry bodies**

Joint Industry Board (JIB), Water Authority (WA), Institute of Engineering Technology (IET), Electrical Contractors Association (ECA), Association of Plumbing and Heating Contractors (APHC)

**Responsibilities**

**JIB**

Grades, wages, allowances, benefits, employment advice, industrial agreements.

**Water Authority**

Water resources and uses, quality of service, infrastructure, water supply and sanitation.

**IET**

International standardisation of regulations, wiring regulations.

**ECA**

Support services to contractors, build a sustainable industry, to enhance the profile of the industry.

**APHC**

Support to contractors, encourage training, knowledge and professional advice.

**Local Authority**

Building regulations.

**Learning outcome**

The learner will:

- 4. know basic employment rights and responsibilities in the construction industry.

**Assessment criteria**

The learner can:

- 4.1 identify the **employment rights** that exist within the construction industry
- 4.2 identify forms of **discrimination**
- 4.3 identify employment law **information sources**.

**Range**

**Employment rights**

Contracts, paid leave entitlement, termination of employment, minimum wage, sick pay, maternity/ paternity leave, working hours.

**Discrimination**

Gender, sexual orientation, age, race, disability, religion.

**Information sources**

Direct gov. Advisory, Conciliation and Arbitration Service (ACAS).

<b>Learning outcome</b>
The learner will: 5. know career opportunities within the construction industry.
<b>Assessment criteria</b>
The learner can: 5.1 identify the <b>key requirements</b> to become a qualified tradesperson 5.2 identify career <b>progression routes</b> .

<b>Range</b>
<b>Key requirements</b> Construction Safety Certificate Scheme (CSCS), relevant trade qualification, relevant trade on site experience.
<b>Progression routes</b> Apprentice, qualified trades person, supervisor, manager, director.



# Unit 101            Structure of the construction industry

## Supporting information

Candidates undertaking this unit are unlikely to have any prior experience of the Construction industry and may also have limited work experience, therefore, the delivery of this unit should be approached from a very basic level.

It is also important that there should be a focus on workplace skills in the construction industry.

Wherever possible centres should adopt a practical hands-on approach to learning and the unit could be delivered in an interactive format engaging the candidates in a full range of diverse learning opportunities

Whilst delivering and assessing the outcomes, it should be made clear to candidates that good workplace skills are essential to the financial success of a business and that being able to demonstrate such skills are imperative to the candidate's future employment prospects in the construction industry.

UAN:	A/505/1712
Level:	1
Credit value:	5
GLH:	48
Aim:	This unit provides learning in the essential health and safety job knowledge required to prepare a learner to work safely in the Plumbing and Electrical installation industries. The knowledge covered relates to work carried out in a construction environment. The unit also provides learning in the practical application of a range of key health and safety requirements under simulated conditions.

<b>Learning outcome</b>
The learner will: 1. know health and safety legislation that applies to the plumbing and electrical installation industries.
<b>Assessment criteria</b>
The learner can: 1.1 state the key <b>aims</b> of general health and safety legislation 1.2 list the responsibilities of <b>employers</b> and <b>employer representatives</b> under health and safety legislation 1.3 list the responsibilities of <b>employees</b> under health and safety legislation.

<b>Range</b>
<b>Aims</b> Health, safety and welfare of people at work, protect other people from harm.
<b>Employers/employer representatives</b> Create safe working environment, provide PPE, training, safety and welfare of employees.

## Employees

Take reasonable care, cooperate with employers, report hazards.

<b>Learning outcome</b>
The learner will: 2. know ways of controlling hazardous work areas.
<b>Assessment criteria</b>
The learner can: 2.1 identify <b>common signs</b> used in the construction industry 2.2 identify possible <b>dangerous situations</b> occurring during work activities 2.3 identify <b>ways to prevent accidents</b> occurring during work activities.

<b>Range</b>
<b>Common signs</b> Signs, safety notices, mandatory signs, prohibition signs, hazard warning signs, information signs, hazardous substances.
<b>Dangerous situations</b> Open holes and trenches, wet surfaces, trip hazards, overhead working, confined space working at height.
<b>Ways to prevent accidents</b> Follow procedure, report hazards, stay alert, use correct PPE, read and follow safety signs, training, inductions.

<b>Learning outcome</b>
The learner will: 3. know how to recognise and respond to the dangers presented by asbestos in the workplace.
<b>Assessment criteria</b>
The learner can: 3.1 state the <b>dangers to health</b> posed by asbestos 3.2 identify <b>situations</b> where asbestos may be commonly found in the workplace 3.3 state what <b>action</b> to take if materials containing asbestos are identified in the workplace.

<b>Range</b>
<b>Dangers to health</b> Lung cancer, asbestosis, mesothelioma, can be fatal, can take 20 years for illnesses to develop after exposure.
<b>Situations</b> Insulating material within the building fabric, sheeting materials for roofs floors and walls, coating materials eg Artex, asbestos cement materials for gutters, flues, heat proofing materials, gaskets.

**Action**

Stop work , inform supervisor.

**Learning outcome**

The learner will:

4. know safe personal protection measures.

**Assessment criteria**

The learner can:

4.1 identify key items of **Personal Protective Equipment (PPE)**

4.2 state the **purpose** of key items of PPE.

**Range****Personal Protective Equipment (PPE)**

Protective clothing, high visibility wear, eye protection, gloves, safety helmet, safety footwear, hearing protection, dust mask/respirator.

**Purpose****Protective clothing**

Protection from oils and grease.

**High visibility wear**

Can be clearly seen around site.

**Eye protection**

Protection from dust and dirt.

**Gloves**

Protection from hot materials, sharp implements/tools.

**Safety helmet**

Protection from falling objects and bumps.

**Safety footwear**

Protection from dropping heavy objects, tools and nails on feet.

**Hearing protection**

Protection from noise.

**Dust mask/respirator**

Protection from inhaling dust and fumes.

**Learning outcome**

The learner will:

5. be able to apply manual handling techniques.

**Assessment criteria**

The learner can:

5.1 manually handle heavy and bulky items

a. individually

b. as a team

c. using mechanical lifting equipment

5.2 state the **procedures** for manually handling heavy and bulky items.

<b>Range</b>
<b>Procedures</b> Assessment of a safe load that a person can lift , application of safe kinetic lifting technique, use of simple mechanical lifting aids – sack trolley.

<b>Learning outcome</b>
The learner will: 6. know how to respond to accidents and emergencies.
<b>Assessment criteria</b>
The learner can: 6.1 indicate the <b>actions</b> that should be taken when an accident or <b>emergency</b> is discovered 6.2 outline the <b>requirements</b> for first aid in the workplace 6.3 outline the <b>procedures</b> for dealing with common injuries such as cuts, minor burns, objects in the eye 6.4 state the <b>procedures</b> for reporting an accident at work.

<b>Range</b>
<b>Actions</b> Raise the alarm, follow concise instructions for contacting emergency services, emergency evacuation procedures.
<b>Emergency</b> Gas leak, fire, collapse of buildings, electrocution.
<b>Requirements</b> First aid box, first aider (appointed person).
<b>Procedures</b> <b>Cuts</b> Clean and protect.
<b>Minor burns</b> Run under cold water.
<b>Objects in the eye</b> Eyewash station.
<b>Procedures</b> Report to supervisor/site agent, complete details in accident book, witness statement.

<b>Learning outcome</b>
The learner will: 7. be able to use access equipment safely.
<b>Assessment criteria</b>

<p>The learner can:</p> <p>7.1 list situations where it may be necessary to work at height</p> <p>7.2 identify the following types of access equipment:</p> <ul style="list-style-type: none"> <li>a. step ladders</li> <li>b. ladders</li> <li>c. mobile elevated work platforms</li> </ul> <p>7.3 list <b>safety checks</b> required on the following access equipment before it is used:</p> <ul style="list-style-type: none"> <li>a. step ladders</li> <li>b. ladders</li> <li>c. mobile elevated work platforms</li> </ul> <p>7.4 carry out safety checks and use the following access equipment:</p> <ul style="list-style-type: none"> <li>a. step ladders</li> <li>b. ladders.</li> </ul>
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<b>Range</b>
<p><b>Safety checks</b></p> <p><b>Step ladders</b></p> <p>Hinges, ropes, fitted on level ground, adequate size and height, check stiles.</p> <p><b>Ladders</b></p> <p>Stiles, rungs, cracks, clean, safety tags.</p> <p><b>Mobile elevated work platforms</b></p> <p>Handrails, locking wheels, working platform boarded, components assembled, safety tags/permit, access steps, kick boards.</p>

<b>Learning outcome</b>
<p>The learner will:</p> <p>8. know how to deal with fires in the workplace.</p>
<b>Assessment criteria</b>
<p>The learner can:</p> <p>8.1 identify the elements of the fire triangle</p> <p>8.2 identify different <b>categories</b> of fire</p> <p>8.3 state how to <b>prevent fires occurring</b></p> <p>8.4 state the <b>method</b> for fighting small localised fires that can occur in the workplace.</p>

<b>Range</b>
<p><b>Categories</b></p> <p>A solids, B flammable liquid, C flammable gases, D metals, E electrical apparatus.</p> <p><b>Prevent fires occurring</b></p> <p>Good housekeeping, storage of flammables, removal of waste materials.</p>



**Method**

Know when to avoid tackling fires, types of extinguisher, selection of extinguisher by fire type, method of use.

## Unit 103

## Environmental and sustainability measures in domestic dwellings

UAN:	F/505/1713
Level:	1
Credit value:	4
GLH:	33
Aim:	This unit covers a range of basic measures associated with protection of the environment. It covers types of energy, use of energy sources and good working practices within the domestic environment.

<b>Learning outcome</b>
The learner will: 1. know the methods of conserving and reducing wastage of water and electricity within domestic dwellings.
<b>Assessment criteria</b>
The learner can: 1.1 state the importance of water and electricity conservation in domestic dwellings 1.2 list the <b>methods</b> for reducing wastage of water 1.3 list the <b>methods</b> for reducing wastage of electricity.

<b>Range</b>
<b>Methods (AC1.2)</b> Flow reducing valves, spray taps, low volume wc flush, regular maintenance of terminal fittings and float valves, promoting user awareness.
<b>Methods (AC1.3)</b> Energy efficient lighting, switching equipment from standby to off, energy efficient equipment, 'A' rated cookers/washing machines.

<b>Learning outcome</b>
The learner will: 2. know the applications of energy sources used in domestic dwellings.
<b>Assessment criteria</b>
The learner can: 2.1 outline the <b>types of energy</b> used in domestic dwellings 2.2 state the importance of reducing carbon emissions from buildings 2.3 state <b>methods of reducing carbon emissions</b> from buildings 2.4 outline the basic operating principles of <b>installations</b> using environmental sources 2.5 list key <b>organisations</b> providing advice and guidance on energy saving and conservation techniques.

<b>Range</b>
<b>Types of energy</b> <b>High carbon</b> Natural gas/LPG, fuel oils, solid fuels (coal/peat), electricity (from non-renewable sources). <b>Low carbon</b> Solar thermal, solid fuel (biomass), heat pumps, combined heat and power (CHP). <b>Zero carbon</b> Electricity-wind, electricity-tidal, hydroelectricity, solar photovoltaic.  <b>Methods of reducing carbon emissions</b> System controls (thermostatic), improved insulation, low energy lighting, double glazing, draught proofing, A rated appliances.  <b>Installations</b> Solar thermal, photovoltaic, biomass, heat pumps, wind turbines.  <b>Organisations</b> Energy Saving Trust, Carbon Trust.

<b>Learning outcome</b>
The learner will: 3. know working practices that can conserve energy and reduce waste.
<b>Assessment criteria</b>
The learner can: 3.1 outline <b>working practices</b> that can be employed to conserve energy and protect the environment

3.2 state **methods** for reducing material wastage.

<b>Range</b>
<p><b>Working practices</b> Source materials locally, reduce transportation costs, use low energy appliances where possible, use of rainwater harvesting/grey water recycling, use renewable sources.</p> <p><b>Methods</b> Follow good housekeeping eg keep site tidy to reduce loss of materials and waste, measure, cut and set out pipe and cable/trunking runs accurately, reuse off cuts of pipe/cable.</p>

<b>Learning outcome</b>
The learner will:
4. know how to dispose of waste and materials safely and efficiently.
<b>Assessment criteria</b>
The learner can:
4.1 identify how to <b>dispose of waste materials</b> safely
4.2 list <b>types of metals</b> that can be recycled
4.3 identify current regulations relating to waste disposal
4.4 identify <b>hazardous, non-hazardous</b> and <b>inert waste</b>
4.5 state the <b>appliances</b> that must be disposed of under the Waste Electrical and Electronic Equipment (WEEE) regulations.

<b>Range</b>
<p><b>Disposal of waste materials</b> Licensed waste disposal, waste carriers licence, recycling.</p> <p><b>Types of metals</b> Copper tube, brass, lead, low carbon steel, copper cable, conduit, galvanised steel trunking.</p> <p><b>Types of waste</b></p> <p><b>Hazardous</b> Asbestos, lead, waste electrical equipment, solvents.</p> <p><b>Non-hazardous</b> Timber, paper/cardboard, water based glues/paints, scrap metal (excluding lead).</p> <p><b>Inert</b> Bricks, glass, ceramics/tiles, sand and gravel.</p> <p><b>Appliances</b> Motors, control equipment, lamps, printed circuit boards, drills.</p>



UAN:	J/505/1714
Level:	1
Credit value:	7
GLH:	61
Aim:	This unit is designed to provide learners with a fundamental understanding of the Site preparation for new and existing dwellings. Learners will look at tools and fixings used in the installation process and understand the operational health and safety risks involved in working on new build and existing properties.

<b>Learning outcome</b>
The learner will: 1. know common hand tools used in site preparation.
<b>Assessment criteria</b>
The learner can: 1.1 identify key <b>hand tools</b> and their uses 1.2 identify common <b>faults</b> found with hand tools 1.3 state <b>maintenance requirements</b> for hand tools 1.4 identify appropriate <b>safety procedures</b> when using hand tools.

<b>Range</b>
<b>Hand tools</b> Lump hammer, claw hammer, spirit level, tape measure, chalk line, adjustable spanner, wood chisel, steel chisel, bolster chisel, flat head screwdrivers, cross head screwdrivers, pad saw, wood saw, junior hacksaw, hacksaw.
<b>Faults</b> Mushroom head, loose heads, blunt ,damaged.
<b>Maintenance requirements</b> Sharped points, make tools safe/remove from use, replace blades.
<b>Safety procedures</b>

Follow risk assessment, select appropriate PPE.

### Learning outcome

The learner will:

2. know power tools used in site preparation.

### Assessment criteria

The learner can:

- 2.1 identify **power tools** and their uses
- 2.2 identify **faults** found with power tools
- 2.3 identify power tools for drilling and cutting
- 2.4 describe relevant **safe working practices** when using power tools
- 2.5 list basic maintenance **safety checks** required for power tools
- 2.6 list **common electrical dangers** when working with electrical tools.

### Range

#### Power tools

Jig saw, mains power drill, 110 volt, battery powered tools, circular saw, SDS chuck.

#### Faults

Damaged plugs, damaged lead, missing safety parts, out of date P.A.T label.

#### Safe working practices

Select appropriate tool for task, follow risk assessment, follow manufactures instructions, use appropriate PPE, carry out visual inspection.

#### Safety checks

Current Portable Appliance Test (PAT), cable, plug, fuse, Residual Current Device (RCD), damaged casing.

#### Common electrical dangers

Faulty electrical equipment, signs of damaged or worn electrical cables, power tools and property hard wiring system, trailing cables, damp/wet work area.

### Learning outcome

The learner will:

3. know fixings and components used in the installation process.

### Assessment criteria

The learner can:

- 3.1 identify types of **drill bits**



- 3.2 identify types of **screw heads**
- 3.3 identify types of **fixings**
- 3.4 state the **reasons** for using screws in different situations
- 3.5 describe which **fixings** to use on different **surfaces**.

<b>Range</b>
<p><b>Drill bits</b> Masonry, diamond tipped core drills, hole saws, wood boring bit, steel.</p> <p><b>Screw heads</b> Slotted, phillips, pozidrive, roundhead, countersunk.</p> <p><b>Fixings (AC3.3 &amp; 3.5)</b> Brass wood screws, round head screws, self tapping screws, countersunk wood screws, mirror screws, plasterboard fixings, nails, plastic wall plugs.</p> <p><b>Reasons</b> Corrosive properties, cost, different applications.</p> <p><b>Surfaces</b> Solid/brick wall, wood, tiles, plasterboard.</p>

<b>Learning outcome</b>
The learner will: 4. know site preparation techniques for installing systems.
<b>Assessment criteria</b>
The learner can: 4.1 identify the purpose of <b>information</b> that is used for preparatory work 4.2 identify the <b>installation process</b> for a new build 4.3 identify the installation process when carrying out work in an existing dwelling/property 4.4 identify different <b>flooring materials</b> 4.5 describe processes for <b>lifting wood flooring</b> surfaces 4.6 identify <b>risks</b> faced when working in a dwelling 4.7 state <b>regulations</b> covering cutting holes and notching timber joists.

<b>Range</b>
<p><b>Information</b> Manufacturer’s instructions, job specification, plans/drawings, work schedule.</p> <p><b>Installation process</b> 1<sup>st</sup> fix requirements, 2<sup>nd</sup> fix tasks.</p>

**Flooring materials**

Wooden floor boards, chipboard, carpets, vinyl floor coverings, laminate flooring.

**Lifting wood flooring**

Techniques used to lift floorboard/chipboard, fitting boards down, tools used.

**Risks**

Drilling into existing pipes and cables, open floor, working in a loft space.

**Regulations**

Building regulation A, maximum depth of notch, maximum size of holes.

**Learning outcome**

The learner will:

5. know how to communicate effectively with customers and other trades.

**Assessment criteria**

The learner can:

- 5.1 describe how to maintain good **customer relationships**
- 5.2 describe how to maintain good working **relationships with other trades**.

**Range****Customer relationships**

Protecting customer's property, checking for pre-installation damage, using appropriate language and behaviour, dress code, passing on information, timekeeping.

**Relationships with other trades**

Methods of communication, using work programmes, site meetings, resolving disputes.

**Learning outcome**

The learner will:

6. be able to carry out techniques in cutting, drilling and fixing.

**Assessment criteria**

The learner can:

- 6.1 operate **power tools** safely
- 6.2 **mark** fixings
- 6.3 **select** appropriate fixings
- 6.4 **secure fixings** to different surfaces.

**Range**

**Power tools**

Drill, jig saw.

**Mark**

Level, measure.

**Select**

Screws, wall plugs, plaster board fixing.

**Secure fixings**

Brick/blocks, wooden surface, plaster board.

## Unit 105

## Electrical installation wiring and terminations

UAN:	L/505/1715
Level:	1
Credit value:	9
GLH:	88
Aim:	This unit provides learning in basic electrical tasks. The learner will have the skills and knowledge to terminate electrical wiring

<b>Learning outcome</b>
The learner will: 1. be able to follow health and safety practices.
<b>Assessment criteria</b>
The learner can: 1.1 use <b>Personal Protective Equipment (PPE)</b> for electrical practical applications 1.2 follow relevant health and safety practices 1.3 identify and report any potential workshop hazards.

<b>Range</b>
<b>Personal Protective Equipment</b> Hard hats, boots, overalls, goggles, gloves, ear defenders.

<b>Learning outcome</b>
The learner will: 2. be able to use tools and equipment for wiring and terminations.
<b>Assessment criteria</b>
The learner can: 2.1 identify <b>tools and equipment</b> used for wiring and terminations 2.2 state <b>methods</b> of maintaining tools and equipment 2.3 safely use the following tools and equipment: a. pliers b. screwdrivers (crosshead, slot head and terminal) c. wire stripper d. low resistance Ohm meter e. insulation resistance meter f. tape measure g. spirit level h. hammer i. electrician's knife j. side cutters k. crimping tool.

<b>Range</b>
<b>Tools and equipment</b> Pliers, screwdrivers (crosshead, slot head, terminal, torque), wire stripper, low resistance Ohm meter, Insulation resistance meter, tape measure, spirit level, hammer, side cutters, electrician's knife, crimping tool.
<b>Methods</b> Calibration, sharpening of drills and tools, oiling, cleaning.

<b>Learning outcome</b>
The learner will: 3. know types of electrical materials, components, fixings and termination methods.
<b>Assessment criteria</b>
The learner can: 3.1 identify the following <b>materials and components</b> : a. cable and flex b. conductor identification (sleeving) c. socket outlets d. light switch plates e. consumer unit f. main switch g. main earthing terminal

<ul style="list-style-type: none"> <li>h. ceiling rose and lamp holders</li> <li>i. 13 amp 3 pin plug top</li> <li>j. earth clamps (BS951)</li> </ul> <p>3.2 state the main difference between circuit breakers and fuses</p> <p>3.3 identify <b>fixing methods</b></p> <p>3.4 identify different <b>termination methods</b>.</p>
---

<b>Range</b>
<p><b>Materials and components</b></p> <p><b>Cable and flex</b> PVC/PVC/CPC (flat twin and earth), single PVC insulated cables, 2 and 3 core flexes.</p> <p><b>Socket outlets</b> Single, twin, switched/unswitched, surface, flush and dry lining boxes.</p> <p><b>Light switch plates</b> One-way, two-way.</p> <p><b>Lamp holder</b> Bayonet, Edison screw.</p> <p><b>Fixing methods</b> Clips, wood screws, roofing screws, roundhead screws, plasterboard fixings, wall plugs, wall bolts.</p> <p><b>Termination methods</b> Screw terminal, soldered terminal, crimp terminal, insulation displacement terminal, push-fit terminal.</p>

<b>Learning outcome</b>
The learner will:
4. be able to carry out wiring and terminations.
<b>Assessment criteria</b>
The learner can:
4.1 produce <b>circuit diagrams</b>
4.2 produce <b>wiring diagrams</b>
4.3 correctly install the following electrical wiring and accessories to a specification:
a. 13 amp plug top
b. one way lighting circuit
c. 20A radial circuit
4.4 safely inspect and test completed wiring circuit for continuity and insulation resistance
4.5 leave work area in a <b>safe condition</b> after completion of work.

<b>Range</b>
<b>Circuit diagrams</b>

One way, two way lighting circuits.

**Wiring diagrams**

One way, two way lighting circuits, radial socket circuit (1363).

**Safe condition**

Area is left clean and tidy, return tools and equipment, return excess materials, dispose of any waste materials.

# Unit 104      Site preparation for working in the construction industry

## Supporting information

### Guidance

#### Learning outcome 4 AC4.3

Prior to assessment centres could provide a range of training activities/ practice tasks for learners which could include the following:

- induction tasks
- pendant lamp holder
- ceiling rose
- small consumer unit
- bonding.



UAN:	R/505/1716
Level:	1
Credit value:	11
GLH:	110
Aim:	This unit covers a broad range of basic activities designed to prepare the learner for entry into the electrical Industry with the primary emphasis on Electrical Installation. The learner will be expected to plan, prepare for and carry out hand fitting activities. They will produce a work plan containing job instructions, materials, tools, equipment and components that may be required for the activities.

<b>Learning outcome</b>
The learner will: 1. be able to plan and prepare for hand fitting activities.
<b>Assessment criteria</b>
The learner can: 1.1 produce a <b>work plan</b> prior to carrying out work activities 1.2 prepare the work area to ensure that it is safe and free from hazards.

<b>Range</b>
<b>Work plan</b> Sequence of activities, health and safety requirements, materials, tools and equipment.

<b>Learning outcome</b>
The learner will: 2. be able to use hand skills to manufacture and assemble components.
<b>Assessment criteria</b>
The learner can:

- |     |  |
|-----|--|
| 2.1 | comply with health and safety legislation, regulations and other relevant guidelines   |
| 2.2 | select correct tools and equipment for the task and check that they are in a safe and useable condition  |
| 2.3 | use <b>measuring equipment</b> during hand fitting and checking activities   |
| 2.4 | mark out the <b>components</b> for the required operations using appropriate <b>marking out equipment</b> and marking out methods and techniques |
| 2.5 | use a range of <b>fabrication techniques</b>   |
| 2.6 | cut and shape <b>materials</b> to the required specification, using appropriate tools and techniques   |
| 2.7 | check work for <b>accuracy</b> and <b>good workmanship</b>   |
| 2.8 | leave the work area in a <b>safe and tidy condition</b> on completion of work activities.  |

<b>Range</b>
<p><b>Measuring equipment</b> Rules, tape measures.</p> <p><b>Components</b> Metal cable tray bracket, drill gauge, cable gauge.</p> <p><b>Marking out equipment</b> Scribers, punches, squares, pencils.</p> <p><b>Fabrication techniques</b> Filing, sanding, sawing, drilling, threading, reaming.</p> <p><b>Materials</b> Wood, plastic, steel.</p> <p><b>Checks for accuracy</b> Dimensions, tolerances, ensuring ends are square.</p> <p><b>Good workmanship</b> De-burring, no sharp edges, finish eg no indents, vice marks.</p> <p><b>Safe and tidy condition</b> Return tools, fixings and equipment, drawings and work instructions to the designated location.</p>

<b>Learning outcome</b>
The learner will:
3. be able to assemble electrical wiring support systems.
<b>Assessment criteria</b>
The learner can:

- 3.1 comply with health and safety legislation, regulations and other relevant guidelines
- 3.2 select the correct tools and equipment for cutting, forming and assembly operations
- 3.3 check tools and equipment are in a safe and useable condition
- 3.4 cut and form the electrical wiring support system **components** to the required size and shape, using appropriate tools and techniques
- 3.5 assemble types of electrical wiring support system **components**
- 3.6 mount and secure the electrical wiring support system components safely and correctly to meet the specification requirements
- 3.7 **construct** electrical wiring support systems according to relevant industry standards
- 3.8 **check** that completed assembly is secure and meets the required specification
- 3.9 leave the work area in a **safe and tidy condition**.

<b>Range</b>
<p><b>Components (AC3.4 &amp; 3.5)</b>  Metal conduit systems, non-metallic conduit systems, metal trunking system, tray work systems, electrical accessories: straight connectors/couplings, bends/elbows (solid and inspection type), tee pieces (such as solid or inspection type), boxes, reducers, adaptors, fixings, conduit accessories.</p> <p><b>Construct</b>  Cutting materials to the correct lengths, removing burrs and sharp edges, producing external threads on conduit, producing bends in conduit, offsets.</p> <p><b>Checks</b>  Positioning, level, secure, supports used where applicable.</p> <p><b>Safe and tidy condition</b>  Return tools, fixings and equipment, drawings and work instructions to the designated location.</p>

<b>Learning outcome</b>
The learner will:
4. know electrical wiring support systems component accessories.
<b>Assessment criteria</b>
The learner can:
4.1 identify types of plastic and metal <b>conduit accessories</b>
4.2 identify types of <b>trunking accessories</b>
4.3 identify types of cable <b>tray accessories</b>

4.4 identify **specialist tools** for wiring support systems.

**Range**

**Conduit accessories**

Lock ring, lock nut, expansion coupler, male and female bushes, nipples, conduit boxes, crampet, saddles, hospital distance, spacer bar, inspection and non inspection bends, male and female adaptors, lids and seals, brass M4 screws, coupler, reducer, conduit clip, male hook, hook plate.

**Trunking accessories**

Couplers, stop ends, end caps, tees, internal and external 90, 45 bends, earth strap, sets, M6 nuts and bolts, reducers, internal pin racks, brackets, flared connector, crossover

**Tray accessories**

Brackets, M6 nuts and bolts, reducers, tees, bends, risers, couplers

**Specialist tools**

Bending machines, stocks and dies, reamer, pipe grips, bush spanner, pipe vice, bending spring, conduit cutter, ruler, tape measure, square, centre punch, hacksaw, taps and dies, files, drills, spanners, pliers, metal scribe, screwdrivers, hammers, levels, chalk line, emery cloth, adhesive, conduit draw tape, cutting compound, vice jaw protectors.

# Unit 106      Fabrication techniques for electrical installation

## Supporting information

### Guidance

In order to carry out the activities centres are advised that they may use manufactured fittings and accessories for both tray and trunking tasks.

### Learning outcome 1

The learner will need to produce a work plan listing the sequence of activities required, health & safety and tools, equipment and materials required. They will be required to carry out all necessary preparations, within the scope of their responsibility. This will include preparing the work area and ensuring that it is in a safe condition to carry out the intended activities.

### Learning outcome 2

When making electrical components the learner will be expected to use appropriate tools and equipment and to check that they are in a safe and usable condition prior to use. They will mark out the material for a range of features to be produced, and then to use hand tools, portable power tools, appropriate fitting techniques to the type of material and operations being performed. These activities will include hand sawing, filing, drilling, and threading.

### Learning outcome 3 and 4

The assembly activities will include the forming and assembly of metallic and/or non-metallic systems, and will cover the selection of the appropriate materials, cutting and bending/forming the appropriate pieces that make up the support system. The learner will also need to assemble the prepared pieces, using a range of connection devices, and to position, align and secure them in the correct locations, using the specified/appropriate techniques.

UAN:	Y/505/1717
Level:	1
Credit value:	4
GLH:	39
Aim:	<p>The aim of this unit is to enable the candidate to understand the elementary values of electrical science.</p> <p>This knowledge provides the foundation for electrical studies which can be applied when calculating, constructing and testing simple electrical circuits.</p>

<b>Learning outcome</b>
<p>The learner will:</p> <ol style="list-style-type: none"> <li>1. know the standard units of measurement used in the electrical installation industry.</li> </ol>
<b>Assessment criteria</b>
<p>The learner can:</p> <ol style="list-style-type: none"> <li>1.1 define internationally recognised (SI) <b>units of measurements</b></li> <li>1.2 specify <b>SI derived units</b> for various electrical quantities.</li> </ol>

<b>Range</b>
<p><b>Units of measurement</b> Metre, kilogram, second, ampere.</p> <p><b>SI derived units</b> Volt, watt, ohm.</p>

<b>Learning outcome</b>
<p>The learner will:</p> <ol style="list-style-type: none"> <li>2. know how to use multiples and submultiples.</li> </ol>
<b>Assessment criteria</b>
<p>The learner can:</p> <ol style="list-style-type: none"> <li>2.1 state the difference between standard form/scientific notation and engineering notation</li> <li>2.2 list the <b>multiples</b> used in electrical theory</li> </ol>

2.3 list the **submultiples** used in electrical theory.

**Range**

**Multiples**

Kilo, mega, giga, tera.

**Submultiples**

Milli, micro.

**Learning outcome**

The learner will:

3. know the principles of electrical science.

**Assessment criteria**

The learner can:

3.1 state the basic principles of **electron flow** theory

3.2 use simple **units** of electrical measurement

3.3 list the **effects** of an electric current

3.4 perform simple electrical **calculations**

3.5 identify AC and DC supplies

3.6 identify how electrical **measuring instruments** are connected.

**Range**

**Electron flow**

Measurement of electric flow, material conductivity and resistance.

**Units**

Coulombs, current/ampere, voltage/potential, resistance, power.

**Effects**

Chemical, magnetic, thermal.

**Calculations**

Ohm's law, coulombs, series circuits, parallel circuits, power, energy & tariffs.

**Measuring instruments**

Ammeters, voltmeters, ohm meters, wattmeter.

**Learning outcome**

The learner will:

4. be able to use technical information.

**Assessment criteria**

The learner can:

4.1 identify different **drawing types**

- 4.2 identify common **electrical symbols** used in drawings
- 4.3 perform simple calculations to convert scales from drawings to actual dimensions.



<b>Range</b>
<p><b>Drawing types</b> Circuit drawings, wiring diagrams, architectural (layout) drawings.</p> <p><b>Electrical symbols</b> Switching (one way, two way, intermediate, pull, switched socket outlets, unswitched socket outlets), lighting points (fluorescent, incandescent, wall), cooker control unit, consumer control unit, fuse, circuit breaker, energy meter.</p>

<b>Learning outcome</b>
The learner will: 5. know the properties of materials used in the electrical installation industry.
<b>Assessment criteria</b>
The learner can: 5.1 identify common <b>conductor materials</b> used in the electrical installation industry 5.2 identify common <b>insulating materials</b> .

<b>Range</b>
<p><b>Conductor materials</b> Copper, aluminium, brass, steel, silver and gold (silver and gold used in control wiring /contacts).</p> <p><b>Insulating materials</b> Thermoplastic (PVC), thermosetting, silicone rubber.</p>

# Unit 107      Electrical science and                                  technology

## Supporting information

### Guidance

#### Learning outcome 2 AC2.3

When teaching AC2.3 there are a number of other multiples and sub multiples that candidates should be introduced to.

#### Learning outcome 3 AC3.4

Candidates should be introduced to the key principles of electrical generation through the use of magnetism. Michael Farady's laws on electromagnetic induction.

#### Learning outcome 4 AC4.2

Using the symbols as illustrated in the onsite guide (BS7671).



## Appendix 1 Relationships to other qualifications

### Links to other qualifications

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

This qualification has connections to the:

- Level 1 Diploma in Plumbing Studies

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

This qualification can develop skills that can be used in the following qualifications:

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



## Appendix 2 Sources of general information

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

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

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

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

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

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

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

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

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

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## Useful contacts

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

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