City & Guilds Certificate in Electrical Testing and Verification of Electrical Installations (Ireland)

(2407-07)

Version 1.0 (June 2026)

Qualification handbook

Qualification at a glance

Subject area	Electrical Installation
City & Guilds number	2407-07
Age group approved	18+
Entry requirements	Candidates undertaking this qualification must be experienced electricians and hold the Level 6 Advanced Certificate Craft – Electrical qualification (or recognised equivalent), following the completion of their electrical apprenticeship. This qualification must not be taken by candidates new to the industry or who do not possess sufficient skills, knowledge, and experience to undertake inspection and testing of electrical installations safely and competently. Prior to qualification enrolment, centres should conduct a thorough initial assessment of applicants to establish that their current skills, knowledge, and experience is sufficient to conduct fixed wire testing. The Level 6 Advanced Certificate Craft – Electrical is the standard qualification for a fully qualified electrician in Ireland.
Assessment	Multiple choice test, Practical assessment
Grading	Pass/fail
Level	Designed at a comparable standard to Level 3 qualifications in the UK.
Approvals	Fast track approval/full approval required
Support materials	Sample assessments
Registration and certification	Consult Walled Garden for last dates

Title	City & Guilds qualification number	GLH	TQT
City & Guilds Certificate in Electrical Testing and Verification of Electrical Installations (Ireland)	2407-07	40.5	56

Version and date	Change detail	Section
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Contents

Qualification at a glance 2

Contents 4

1 Introduction 6

Structure 8

Total Qualification Time (TQT) 9

2 Centre requirements 10

Approval 10

Resource requirements 11

Quality assurance 11

Learner entry requirements 12

Access arrangements, reasonable adjustments and special consideration 12

3 Delivering the qualification 14

Initial assessment and induction 14

Inclusion and diversity 14

Sustainability 14

4 Assessment 16

Assessment of the qualification 16

Time constraints 17

Recognition of prior learning (RPL) 17

Test specification for knowledge test 19

5 Units 20

Structure of the unit 20

Guidance for delivery of the units 20

Unit 305 Electrical Testing and Verification of Electrical Installations 21

Learning outcome 1 22

Learning outcome 2 23

Learning outcome 3 25

Learning outcome 4 27

Learning outcome 5 39

Learning outcome 6 **42**

1 Introduction

This document includes information needed to deliver the qualification:

Area	Description
Who is the qualification for?	This qualification is intended for experienced and suitably qualified electricians, who want to undertake Continuing Professional Development (CPD), learn new skills, and enhance their understanding of methods and procedures of inspecting and testing electrical installations in the Republic of Ireland.
What does the qualification cover?	This qualification covers a broad array of knowledge and skills: • safe isolation practices for electrical installations • documentation and certification requirements • initial and periodic verification procedures and purposes • use of test instruments to verify compliance with electrical standards • verification of electrical system performance and integrity • identification, reporting and resolution of non-compliance, defects and omissions. The qualification is based on the inspection and testing standards required by the Commission for Regulation of Utilities (CRU) and follows the current edition of the National Rules for Electrical Installations I.S. 10101.
What opportunities for progression are there?	This qualification is designed for practising electricians and supports professional progression by enabling learners to meet regulatory requirements for the inspection, testing, verification, and certification of electrical installations in Ireland.

Area	Description
Who did we develop the qualification with?	Industry specialists in electrical inspection and testing, with reference to the regulatory requirements and guidance published by CRU.
Is it part of an apprenticeship framework or initiative?	No. This qualification is a standalone, competence-based qualification for practising electricians and is not part of an apprenticeship framework or apprenticeship initiative.

Structure

To achieve the City & Guilds Certificate in Electrical Testing and Verification of Electrical Installations, candidates must achieve:

City & Guilds unit number	Unit title	GLH
Mandatory units:		
Candidates must achieve the mandatory unit.		
305	Electrical Testing and Verification of Electrical Installations	40.5

Total Qualification Time (TQT)

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

TQT consists of the following two elements:

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

Title	GLH	TQT
City & Guilds Certificate in Electrical Testing and Verification of Electrical Installations	40.5	56

2 Centre requirements

Approval

Full approval

To offer this qualification, centres will need to gain both centre and qualification approval. Please refer to the document **Centre Approval Process: Quality Assurance Standards** for further information.

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

Or

Fast-track approval

If your centre is approved to offer the 2407-01 then you can apply for fast-track approval for the new 2407-07 using the fast-track approval form, available from the City & Guilds website.

Centres should use the fast-track form if:

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

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

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

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

Resource requirements

Centre staffing

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

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

Continuing professional development (CPD)

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

Quality assurance

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

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

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

In order to carry out the quality assurance role, internal quality assurers (IQAs) must:

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

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

The role of the EQA is to:

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

Learner entry requirements

Candidates undertaking this qualification must be experienced electricians and hold the Level 6 Advanced Certificate Craft (or recognised equivalent) – Electrical qualification, following the completion of their electrical apprenticeship.

This qualification must not be taken by candidates new to the industry or who do not possess sufficient skills, knowledge, and experience to undertake inspection and testing of electrical installations safely and competently.

Prior to qualification enrolment, centres should conduct a thorough initial assessment of applicants to establish that their current skills, knowledge, and experience is sufficient to conduct fixed wire testing.

The Level 6 Advanced Certificate Craft – Electrical is the standard qualification for a fully qualified electrician in Ireland.

Access arrangements, reasonable adjustments and special consideration

City & Guilds has considered the design of this qualification and its assessments in order to best support accessibility and inclusion for all learners. City & Guilds understands however that individuals have diverse learning needs and may require reasonable adjustments to fully participate. Reasonable adjustments, such as additional time or alternative formats, may be provided to accommodate learners with disabilities and support fair access to assessment.

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

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

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

Special consideration is a post examination adjustment to a candidate's mark or grade to reflect temporary injury, illness or other indisposition at the time of the examination/assessment.

Please refer to the documents 'Joint Council for Qualifications (JCQ) Access Arrangements and Reasonable Adjustments', 'JCQ – A guide to the special consideration process' and 'Access arrangements – When and how applications need to be made to City & Guilds' for more information. All of these are available on the **City & Guilds website**.

Digital credentials

A digital credential is a verified, visual representation of knowledge and skills earned in various learning environments. Please see an example below:

Digital credentials are issued and verified online, making it easy for individuals to demonstrate their competencies to employers, clients and peers online. Each digital credential has a unique URL that can be shared electronically via social media, in an email signature and on a CV. This is a complimentary service in addition to the paper certificate.

For further information, please visit the City & Guilds EPA digital credentials webpage and the general terms in respect of our privacy policy or contact digitalsupport@cityandguilds.com.

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
- any 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.

Inclusion and diversity

City & Guilds is committed to improving inclusion and diversity within the way we work and how we deliver our purpose which is to help people and organisations develop the skills they need for growth. More information and guidance to support centres in supporting inclusion and diversity through the delivery of City & Guilds qualifications can be found here:

Inclusion and diversity | City & Guilds (cityandguilds.com)

Sustainability

City & Guilds are committed to net zero. Our ambition is to reduce our carbon emissions by at least 50% before 2030 and develop environmentally responsible operations to achieve net zero by 2040 or sooner if we can. City & Guilds is committed to supporting qualifications that help our customers to consider sustainability and their environmental footprint.

More information and guidance to support centres in developing sustainable practices through the delivery of City & Guilds qualifications can be found here:

Our Pathway to Net Zero | City & Guilds (cityandguilds.com)

Centres should consider their own carbon footprint when delivering this qualification and consider reasonable and practical ways of delivering this qualification with sustainability in mind. This could include:

- reviewing purchasing and procurement processes (such as buying in bulk to reduce the amount of travel time and energy and considering and investing in the use of components that can be reused, instead of the use of disposable or single use consumables)
- reusing components wherever possible
- waste procedures (ensuring that waste is minimised and recycling of components is in place wherever possible)
- minimising water use and considering options for reuse/salvage as part of activities wherever possible.

4 Assessment

Assessment of the qualification

Candidates must:

- successfully complete the practical assessment required for the mandatory unit **plus**
- successfully complete the multiple-choice knowledge assessment required for the mandatory unit.

Assessment types			
Unit	**Title**	**Assessment method**	**Where to obtain assessment materials**
305	Electrical Testing and Verification of Electrical installations	**Multiple-choice knowledge assessment (350)** The multiple-choice assessment is externally set and externally marked and will be delivered online via e-volve. IT systems set up to receive e-volve tests is therefore necessary. This test is available on demand. The multiple-choice test must be taken in the presence of an invigilator.	www.cityandguilds.com https://www.cityandguilds.com/what-we-offer/centres/working-with-us/e-volve
305	Electrical Testing and Verification of Electrical Installations	**Practical assessment (351)** Centres must use the materials provided by City & Guilds.	www.cityandguilds.com

Time constraints

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

Candidates must finish their assessment within 12 months.

Recognition of prior learning (RPL)

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

RPL is not allowed for this qualification.

Retakes/resits

Multiple-choice test

Candidates who fail an online multiple-choice test are permitted up to three resit attempts before re-registration is required.

Practical assessment

Candidates who fail the practical assessment are permitted up to three resit attempts before re-registration is required.

Summary of assessment methods

Candidates will be required to complete the following assessments for unit 305 to achieve this qualification:

- multiple choice assessment covering the 305 knowledge outcomes
- practical assessment covering the 305 skill outcomes.

Learning outcomes	Assessment type	
	Multiple-choice test	**Practical assessment**
LO1 Know the requirements for, and purpose of, safe, and secure isolation of electrical installations	✓	
LO2 Know the requirements for the completion of electrical inspection and test documentation as detailed I.S. 10101	✓	
LO3 Know the regulatory requirements for restricted and controlled electrical works	✓	
LO4 Understand the purpose and procedures of inspection and testing of electrical installations	✓	
LO5 Be able to carry out initial verification of electrical installations as detailed in I.S. 10101		✓
LO6 Be able to carry out periodic inspection and testing of electrical installations as detailed in I.S. 10101		✓

Overall grading: pass/fail

Test specification for knowledge test

The way the knowledge is covered is laid out in the table below:

Permitted materials:
• A non-programmable calculator
• A hard copy of the current edition of I.S 10101

Graded: pass/fail

The boundary may be subject to slight variation to ensure fairness should any variations in the difficulty of the test be identified

Available for remote invigilation.

Test: 2407-350	**Duration: 2 hours**		
Unit	**Outcome**	**Number of questions**	**Percentage (%)**
305	**LO1** Know the requirements for, and purpose of, safe, and secure isolation of electrical installations	4	8%
	LO2 Know the requirements for the completion of electrical inspection and test documentation as detailed in I.S. 10101	4	8%
	LO3 Know the regulatory requirements for restricted and controlled electrical works	3	6%
	LO4 Understand the purpose and procedures of inspection and testing of electrical installations	39	78%
	Total	50	100%

5 Units

Structure of the unit

This unit has the following:

- City & Guilds reference number
- title
- guided learning hours (GLH)
- unit aim
- assessment method
- learning outcomes (LOs), which are comprised of topics and content elements

Guidance for delivery of the units

This qualification is made up of a single unit. A unit describes what is expected of a competent person in particular aspects of their job.

The unit is divided into LOs which describe in further detail the skills and knowledge that a candidate should possess.

Each learning outcome is supported by a set of knowledge and skills topics. These concise statements define the scope and depth of learning required and clearly indicate the specific knowledge and practical skills that learners are expected to develop to achieve the learning outcome.

Topics are further amplified through content elements, which define the required depth and breadth of teaching and learning to be delivered for each learning outcome.

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

Unit 305 Electrical Testing and Verification of Electrical Installations

GLH:	40.5
Assessment method:	Multiple-choice test and practical assessment
Aim:	The aim of this unit is to enable learners to understand the purpose and requirements of the initial verification and periodic verification of electrical installations. Learners will gain an understanding of the requirements for completing electrical inspection and test documentation as detailed in the National Rules for Electrical Installations I.S. 10101. Learners will also develop the skills needed to carry out initial verification and periodic verification of electrical installations.

Learning outcomes

The learner will:

1. Know the requirements for, and purpose of, safe and secure isolation of electrical installations
2. Know the requirements for the completion of electrical inspection and test documentation as detailed in I.S. 10101
3. Know the regulatory requirements for restricted and controlled electrical works
4. Understand the purpose and procedures of inspection and testing of electrical installations
5. Be able to carry out initial verification of electrical installations as detailed in I.S. 10101
6. Be able to carry out periodic inspection and testing of electrical installations as detailed in I.S. 10101

Learning outcome 1

Know the requirements for, and purpose of, safe and secure isolation of electrical installations.

Topics	Content elements
1.1 Health and safety measures, tools and equipment for carrying out safe isolation of electrical installations	1.1.1 Health and safety measures: a) risk assessment and method statement (RAMS) b) permit to work systems. 1.1.2 Tools and equipment: a) adequate lighting for the environment b) barriers and signage c) proving unit d) voltage indicator e) lock-off kit f) insulated tools.
1.2 Purpose and implications of carrying out safe isolation when working on electrical installations	1.2.1 Purpose of carrying out safe isolation: a) protection from contact with live parts which may cause injury b) to maintain a safe environment for: i. persons ii. property iii. livestock c) to prevent unexpected energisation of electrical systems d) to ensure compliance with Health and Safety Authority (HSA) Safety, Health and Welfare at Work Regulations: Part 3: Electricity. 1.2.2 Implications of not carrying out safe isolation of electrical installations: a) electric shock i. burns ii. cardiac arrest iii. loss of sight iv. fatality v. falls from height b) regulatory fines c) reputational damage. 1.2.3 Implications of carrying out safe isolation: a) loss of general supplies and circuits b) loss of safety systems c) loss of services i. lighting ii. lifts iii. security

Topics	Content elements
	d) automatic initiation of alternative supplies.
1.3 Procedure for carrying out safe isolation of electrical installations	1.3.1 Procedure for safe isolation: a) obtain relevant permission to carry out the task b) obtain permit to work (where required) c) check the voltage indicator is functioning correctly using proving unit or a known live source d) identify all live sources of supply to be isolated e) isolate the supply(s) f) confirm the system(s) is dead using the voltage indicator g) re-check the voltage indicator is functioning correctly h) secure the point of isolation with an appropriate locking device i) display warning signs/notices j) start agreed work only once system is confirmed dead.

Learning outcome 2

Know the requirements for the completion of electrical inspection and test documentation as detailed in the I.S. 10101

Topics	Content elements
2.1 Relevant documents associated with the electrical inspection and testing of electrical installations	2.1.1 Relevant documents for initial and periodic verification: a) documentation for initial verification i. Certificate No. 1 Completion Certificate for the connection of new electrical installations (less than 50 kVA) ii. Certificate No. 2 Completion Certificate for the connection of new electrical installations (greater than or equal to 50 kVA) b) documentation for periodic verification i. Periodic Inspection Report c) documentation for additions to existing installation i. Certificate No. 3 (covers minor works and alterations including additions and extensions to existing installations) d) test record sheet (applicable to initial and periodic verification).
2.2 Purpose of completing initial and periodic inspection test documentation	2.2.1 Purpose of completing initial inspection and testing documentation: a) ensure installation is safe to use prior to energisation/handover to client b) demonstrate compliance with the current electrical regulations and standards

Topics	Content elements
	c) confirmation equipment installed meets clause 511 of I.S. 10101. 2.2.2 Purpose and method of completing periodic inspection and testing documentation: a) ensure the electrical installation is safe for continued use b) identify departures from I.S. 10101 and determine their urgency using recommendations c) confirmation equipment installed meets I.S. 10101.
2.3 Reasons for recording and retention of electrical inspection and testing documentation.	2.3.1 Reasons for recording and retention of documentation: a) to verify that a new electrical installation is safe and suitable for its intended use b) to verify that an extension, addition or an alteration, to an existing electrical installation, is safe and suitable for its intended use c) to verify that an existing electrical installation is safe and suitable for its continued use d) for insurance purposes e) for a change of occupier of a property f) for a change of use of a property g) used after damage to an electrical installation: i. fire damage ii. flood damage iii. structural damage h) to identify if the installation has become otherwise damaged or deteriorated.

Learning outcome 3

Know the regulatory requirements for restricted and controlled electrical works

Topics	Content elements
3.1 Definitions, scope and regulatory requirements for Restricted Electrical Works	3.1.1 Definition of Restricted Electrical Works, in a Domestic Property, as set out by Statutory Instruments, S.I. No. 264/2013 - Electricity Regulation Act 1999 (Restricted Electrical Works) Regulations 2013, relating to the: a) installation, commissioning, inspection and testing of a new electrical Installation b) modification, installation or replacement of a distribution board c) installation or replacement of one or more circuits in an electrical installation d) inspection, testing or certification of, or reporting on, existing electrical installations. 3.1.2 Scope of Restricted Electrical Works: a) covers majority of electrical works in a Domestic Property: i. dwelling house ii. flat or maisonette iii. any surgery, consulting room, office or other accommodation not exceeding 50m^2 in total forming part of domestic property and used in a commercial capacity iv. any part of domestic properties out-buildings or curtilage used for non-commercial purposes v. the domestic properties connection to the electricity network vi. A caravan or motor caravan intended for habitation purposes including its curtilage, used for non-commercial purposes, (excluding electrical circuits and equipment for automotive purposes). b) does **not** include electrical works: i. in potentially explosive atmospheres ii. in a commercial premises setting including MV and HV connection and installations iii. on a construction site iv. within exhibitions, shows and stands v. on agricultural and horticultural installations vi. on public lighting and associated cabling vii. that are minor electrical works. 3.1.3 Regulatory requirements for Restricted Electrical Works: a) parties wishing to carry out Restricted Electrical Works: i. must be registered with the safety supervisory body regulatory scheme

Topics	Content elements
	ii. those without registration to the safety supervisory body will be subject to prosecution.
3.2 Definitions, scope and regulatory recommendations for Controlled Electrical Works	3.2.1 Definitions of Controlled Electrical Works, relating to the: a) installation, commissioning, inspection, and testing of a new fixed electrical installation b) modification, installation or replacement of a distribution board c) installation or replacement of one or more extra circuits in an existing installation d) subsystems installed in commercial, industrial, and domestic installations where the installation falls within the remit of I.S. 10101 e) inspection, testing and certification of existing electrical installations in accordance with I.S. 10101. 3.2.2 Scope of Controlled Electrical Works: a) covers majority of electrical works in commercial and industrial environments 3.2.3 Regulatory recommendation for Controlled Electrical Works: a) Commission for Regulation of Utilities (CRU) recommendation to hire RECs b) parties other than RECs can carry out the work.
3.3 Completion and validation of certification for Electrical Works	3.3.1 Purpose of certification system: a) certification system is used to monitor and validate that the electrical works completed meet required safety standards (I.S. 10101). 3.3.2 Completion of certification system, the REC: a) confirms post-connection tests on the completion certificate, otherwise the certificate is invalid b) issues original white copy of the completion certificate to the customer c) issues a copy of the certificate to the safety supervisory body d) named Qualified Certifier (QC) certifies electrical works on behalf of the REC. 3.3.3 Reasons for validation of certification: a) certificates are validated by the safety supervisory body to confirm: i. the safety supervisory body provided the certificate to the certifying REC for completion ii. that the certificate contains all requisite information iii. test values are within acceptable limits.

Learning outcome 4

Understand the purpose and procedures of inspection and testing of electrical installation

Topics	Content elements
4.1 Purpose of initial verification and periodic inspection and testing, and setting of sample size	4.1.1 Purpose of initial verification: a) new electrical installation is safe and suitable for its intended use b) extensions, additions or alterations to existing electrical installations not impairing safety of the existing electrical installation c) existing electrical installations do not impair the safety of the extension, addition or modification d) compliance with the requirements of I.S. 10101 i. on completion and before being placed into service ii. comparison of results with relevant criteria within I.S. 10101 e) in compliance with industry specific statutory requirements i. Commission for Regulation of Utilities (CRU) requirements ii. Regulation 89 of the Safety Health & Welfare at Work (General Application) Regulations iii. Safety Supervisory Body regulatory scheme iv. controlled works v. restricted works f) not impairing safety through damage and defects. 4.1.2 Purpose of periodic inspection and testing: a) existing electrical installations are safe and suitable for continued use i. safety of persons and livestock against the effects of electric shock and burns ii. protection against damage to property, or fire and heat, arising from the electrical installation iii. ratings and settings of protective devices remain suitable iv. installation is not damaged or deteriorated v. identification of defects and non-compliances with the requirements of I.S. 10101 vi. correct functioning of circuits, equipment and devices b) remain in compliance with industry specific statutory requirements i. Commission for Regulation of Utilities (CRU) requirements ii. Regulation 89 of the Safety Health & Welfare at Work (General Application) Regulations c) satisfy other statutory or non-statutory requirements

Topics	Content elements
	i. insurance purposes ii. licensing iii. landlord responsibilities iv. based on risk v. based on national regulations due to the building type or use 4.1.3 Setting sample sizes for periodic inspection and testing based on factors: a) quality of maintenance received b) general condition of the electrical installation and equipment c) quality of the previous information, documentation and data d) agreed limitations.
4.2 Information required to undertake inspection and testing	4.2.1 Information required to undertake initial verification of new electrical work and periodic verification of existing electrical installations: a) information as detailed in Clause 514.5.1 of I.S. 10101 i. diagrams, documentation, charts and tables ii. type and composition of each circuit iii. characteristics of devices performing the function of protection, isolation and switching iv. types and cross-sectional areas of conductors v. lengths of circuits vi. nature and type of protective devices vii. rated current or adjustment of the protective devices viii. prospective short-circuit currents and breaking capacities of protective devices b) supply characteristics including i. nominal voltage, current, frequency, external earth fault loop impedance, prospective fault current (PFC) ii. maximum demand iii. conductor arrangement and earthing system c) agreed extent and limitations of periodic inspection and testing d) operational limitations of periodic inspection and testing 4.2.2 Previous information relating to an existing electrical installation prior to undertaking periodic inspection and testing: a) Initial verification documentation i. certification ii. schedules of inspections iii. test record sheets, results and data iv. outcomes, departures or defects b) Previous electrical installation condition reports

Topics	Content elements
	i. details of the electrical installation ii. previous limitations affecting the sample inspected and tested iii. outcomes and recommendations from previous inspection and tests iv. previous test data v. schedules of inspections vi. test record sheets. 4.2.3 Actions to be taken where inadequate information is available when undertaking periodic inspection and testing: a) preliminary surveys where circuit details, charts or previous reports are available b) setting greater samples where test data, certificates or reports are missing.
4.3 Purpose and procedure for inspecting electrical installations	4.3.1 Reason for undertaking inspections prior to testing: a) prior to energising the system b) to confirm compliance of equipment with safety standards (e.g. IS EN standards) c) items are correctly selected and erected in accordance with I.S. 10101 and manufacturer's instructions d) to confirm the electrical installation is not visibly damaged or defective so as to impair safety e) to check the electrical installation meets the client's needs and is suitable for the environment. 4.3.2 Items to be checked during an initial verification: a) items as detailed in Clause 6.4.2.3 in I.S. 10101 b) items specific to special installations or locations as detailed in Chapter 7 of I.S. 10101. 4.3.3 Senses to be used during the inspection process to check for defects or non-compliances: a) touch used to check i. securely fixed items ii. secure connections of terminations iii. no sharp edges b) smell used to check i. signs of overheating ii. loose connections under load conditions c) hearing used to check i. sign of arcing ii. equipment malfunction noise d) sight used to check i. correct identification of conductors

Topics	Content elements
	ii. labelling iii. correct connection of accessories iv. routing of cables 4.3.4 Recording the outcome of inspections during the process: a) certification b) condition reports c) schedules of inspections 4.3.5 Procedure for rectifying any defects found during initial verification before further testing or certification is issued.
4.4 Test sequence and reasons testing is carried out in a relevant sequence	4.4.1 Reasons for a set test sequence as given in Chapter 6 of I.S. 10101: a) safety b) ensure validity of previous tests c) to ensure the results of one test validate the results of others. 4.4.2 Test sequence as given in I.S. 10101 for initial verifications before the installation is energised: a) continuity of conductors b) insulation resistance c) detection of erroneous connections between circuits d) insulation resistance to verify SELV, PELV or electrical separation e) polarity f) functional tests g) voltage drop. 4.4.3 Test sequence as given in I.S. 10101 for initial verifications after the installation is energised, where applicable: a) to confirm the effectiveness of automatic disconnection of supply b) to confirm the effectiveness of additional protection c) phase sequence. 4.4.4 Procedure to follow in the event of one test failing to comply during an initial verification: a) rectify defect b) retest any tests affected by the defect c) continue and complete remaining tests. 4.4.5 Potential factors that affect the sequence of tests during a periodic inspection and test: a) disrupting the client b) safety of the inspector and others c) agreed sample d) validity of results.

Topics	Content elements
4.5 Test instruments, settings and use during the inspection and testing process for accurate results	4.5.1 Test instruments: a) low resistance ohmmeter b) insulation resistance (IR) tester c) earth fault loop impedance (EFLI) tester d) residual current device (RCD) tester e) earth electrode resistance tester f) phase rotation tester g) voltage indicator h) multi-function test instruments incorporating the function of multiple instruments 4.5.2 Setting for each test and the units of measurement: a) megohms MΩ (unit of measurement for IR tests) b) ohms Ω (setting and unit of measurement for continuity, earth electrode resistance testing and EFLI tests) c) milliseconds ms (unit of measurement for RCD tests) d) voltage V (setting for insulation resistance (IR) tests, (250 V, 500 V and 1000 V) e) other features and settings on multi-functional test instruments, to measure other values or safety settings i. phase sequence indication ii. ramp testing iii. auto test of RCDs iv. earth electrode resistance testing v. leakage current testing vi. polarity indication vii. voltage measurement viii. bluetooth communication ix. result storage and retrieval. 4.5.3 Safety, and accuracy, checks to be made on test instruments, leads and probes, before use: a) damage or defective leads or instrument(s) b) instrument function and battery level(s) c) minimal length of exposed probe tips d) fused leads where required by manufacturers e) finger guards present where required f) colour identification of leads and probes where required g) calibration, and accuracy checks, of instruments at regular intervals h) checking function of instruments before use i) firmware updates to multi-function testers. 4.5.4 Reasons why details of test instruments are recorded on test documentation:

Topics	Content elements
	a) instrument previous usage is traceable if subsequently found to be inaccurate b) comparison of test data can be made.
4.6 Procedures, factors and reasons for verifying continuity	4.6.1 Reasons for verifying continuity of conductors: a) to confirm earthing conductors are continuous b) to confirm earthing and circuit protective conductors (cpc) connect to all exposed conductive parts c) to confirm resistance values support effective disconnection d) to record maximum circuit resistances for radial circuits (R_p+R_e or R_e) e) to confirm and record ring circuit end-to-end values f) confirm bonding conductors are continuous g) to confirm bonding conductors are correctly connected. 4.6.2 Factors affecting conductor, or measured, resistances: a) conductor length b) conductor cross-sectional area c) conductors in parallel d) temperature. 4.6.3 Procedures for measuring conductor continuity: a) using a long lead i. nulling lead resistance ii. considering hazards posed by long lead, such as trip hazard iii. connections of leads and probes iv. reading to be recorded v. verifying reading by calculation of anticipated resistance value. b) using a temporary link between line and earth i. nulling lead resistance ii. considering hazards of using a link between electrical connections iii. connections of leads and probes iv. reading to be recorded v. verifying reading by calculation of anticipated resistance value. c) ring circuit continuity i. nulling lead resistance ii. connections of leads and probes iii. reading to be recorded iv. verifying reading by calculation of anticipated resistance value. d) differences in measuring ring circuits and radial circuits i. parallel conductors

Topics	Content elements
	ii. series conductors iii. how readings change for the different circuit arrangements iv. how circuit polarity is confirmed during continuity testing of ring and radial circuits. 4.6.4 Ways in which continuity testing procedures may be different when testing during an initial verification or periodic testing: a) parallel resistances b) sampling c) limitations.
4.7 Reasons, actions, factors and procedures for verifying insulation resistance including erroneous connections between circuits and electrical separation	4.7.1 Reasons for verifying insulation resistance: a) to ensure circuit live conductors are, where applicable, electrically independent b) to ensure live conductors are electrically independent from earth c) why particular test voltages are applied to circuits in accordance with Table 6.1 of I.S. 10101 d) why a test for electrical separation is carried out on certain circuits i. SELV circuits ii. PELV circuits iii. electrically separated circuits. 4.7.2 Actions taken before insulation resistance testing is undertaken: a) vulnerable equipment removed from circuits under test to avoid damage b) linking circuit live conductors to avoid readings being influenced by connected equipment c) why distribution circuits are disconnected from, but final circuits are connected to, switchboards during test to avoid parallel circuits d) situations where it is acceptable to test circuits of up to a nominal voltage of 500 V using 250 V DC, such as those containing SPDs e) disconnection of transformers of electrically separated circuits. 4.7.3 Factors influencing insulation resistance tests: a) parallel conductors b) circuit lengths. 4.7.4 Procedures for testing insulation resistance: a) between live conductors

Topics	Content elements
	b) between live conductors and Earth c) between individual circuits and all other circuits for erroneous connections d) verifying results with Table 6.1 of I.S. 10101 e) making further investigations by inspection, or test, where results have evident differences. 4.7.5 Procedure for testing the effectiveness of SELV, PELV and electrical separation by insulation resistance by testing for separation between circuits: a) supply (primary) to separated (secondary) live conductors b) supply (primary) earth to separated (secondary) conductors in the case of SELV and electrical separation c) testing insulation resistance of separated circuit using the applicable voltages in Table 6.1 of I.S. 10101. 4.7.6 How insulation resistance testing procedures may be different when testing during an initial verification or periodic testing due to: a) connected equipment b) sampling c) limitations. 4.7.7 Procedure variations for testing insulation resistance including: a) disconnecting equipment and linking circuit b) use of a reduced test voltage such as 250 V DC c) disconnecting the main Neutral conductor.
4.8 Reasons and procedures for verifying polarity of circuits and supplies	4.8.1 Reasons for verifying circuit or supply polarity: a) to confirm that every fuse or single-pole device is connected to the line conductor only: i. protection ii. control iii. switching b) to confirm the correct connection of applicable Eddison Screw (ES) lampholders as defined in I.S. 10101 c) to confirm wiring is correctly connected i. circuit connections ii. socket-outlets iii. accessories d) to confirm the supply terminals are correctly identified at the origin of the installation. 4.8.2 Procedures for confirming polarity of circuits with the supply isolated: a) radial circuits using a long lead b) radial circuits using a temporary link

Topics	Content elements
	c) ring circuits by testing at each socket-outlet during a continuity test d) three-phase circuits. 4.8.3 Procedures for testing the supply polarity before an installation is energised: a) using a voltage indicator b) three-point test for single-phase supplies c) ten-point test for three-phase supplies. 4.8.4 Procedure for checking the polarity at socket-outlets using a plug in polarity check device: a) during periodic testing when the installation is energised b) limitations of plug-in polarity check devices.
4.9 Procedures and reasons for functional tests before and after an installation is energised	4.9.1 Reasons for functional testing before an installation is energised during initial verification: a) testing safely before equipment is energised i. to avoid damage to equipment ii. to avoid danger to persons and livestock b) ensuring all electrical equipment is properly mounted c) ensuring all settings are correctly adjusted d) ensuring all equipment complies with I.S. 10101 and functions as intended by the designer e) ensuring all protective measures are in place and correctly selected i. providing automatic disconnection of supply ii. providing additional protection. 4.9.2 Reasons for functional testing after an installation is energised during initial verification: a) RCD test facilities and RCD function b) equipment functions as specified when energised i. movement sensors ii. emergency switching and stopping systems iii. switches iv. control gear v. drives vi. interlocks c) equipment functions as specified by the manufacturer. 4.9.3 Reasons for testing the function of equipment during a periodic verification: a) possible faults b) continued suitability c) continued compliance with I.S. 10101.

Topics	Content elements
	4.9.4 Procedures for testing the function of equipment by test or inspection: a) RCD b) movement sensors c) emergency switching and stopping systems d) switches e) control gear f) drives g) interlocks.
4.10 Reasons, factors and procedures for verifying voltage drop	4.10.1 Reasons for verifying voltage drop between the origin of an electrical installation and any load point: a) equipment functions as intended b) compliance with Table 52G.1 within I.S. 10101 c) exclusions permitted for extra-low voltage circuits. 4.10.2 Reason why verification of voltage drop is not normally needed during an initial verification if good design practices are followed. 4.10.3 Conditions that effect the voltage drop within an electrical installation: a) load or design current b) cross-sectional area of conductors c) length of circuits d) number of phases e) resistivity of conductors f) reactance per unit length of conductors g) power factor conditions h) variations due to abnormal loading or motor starting. 4.10.4 Procedures for verifying voltage drop within electrical installations: a) measurement and comparison under load and no-load conditions b) calculation using circuit data, factors and conditions c) comparison to supply origin values of voltage and application of Table 52G.1 in I.S. 10101.
4.11 Reasons, factors and procedures for verifying the effectiveness of automatic disconnection of supply	4.11.1 Reasons for verifying the effectiveness of automatic disconnection of supply: a) ensure earth fault loop impedance is within maximum values in Part 41 of I.S. 10101 b) achieve disconnection times as given in Part 41 of I.S. 10101 c) risk of electric shock due to faults.

Topics	Content elements
	i. final circuits ii. distribution circuits iii. circuits rated at or below 35 A iv. circuits rated above 35 A v. TT systems vi. TN systems vii. Fuse, or circuit-breaker, type 4.11.2 Reasons different overcurrent protective devices are used for different circuits: a) general purpose fuses b) general purpose domestic fuses c) circuit-breakers d) RCBO e) Type B f) Type C g) Type D h) inrush currents i) load types. 4.11.3 Safety reasons continuity tests shall be carried out prior to testing earth fault loop impedance in accordance with Clause 6.4.3.7.3. 4.11.4 Factors affecting disconnection times in electrical installations: a) external earth fault loop impedance b) earthing system (TT and TN arrangements) c) earth fault loop paths d) distribution circuit resistance/impedance e) final circuit resistance/impedance f) nominal voltage g) overcurrent protective devices i. general purpose fuses ii. general purpose domestic fuses iii. circuit-breakers iv. RCBO v. Type B vi. Type C vii. Type D viii. values of current causing effective disconnection of devices (I_a). 4.11.5 Procedures for verifying automatic disconnection of supply for new and existing electrical installations:

Topics	Content elements
	a) direct measurement of earth fault loop impedance using an earth fault loop impedance tester b) direct measurement of source earth fault loop impedance of the supply c) calculation of earth fault loop impedance using circuit continuity and source earth fault impedance d) measurement of earth electrode resistance as detailed in Annex 6C of I.S. 10101 i. method C1 ii. method C2 iii. method C3 e) comparison with maximum permitted values of earth fault loop impedance in Part 41 of I.S. 10101 i. TT installations ii. TN installations iii. application of formula for measured values $Z_s(m) \leq \frac{2}{3} \times \frac{U_0}{I_a}$
4.12 Reasons and procedures for verifying additional protection	4.12.1 Reasons for the provision of additional protection in accordance with I.S. 10101: a) in addition to basic protection by the use of an RCD b) in addition to fault protection by the use of supplementary bonding c) residual current settings for RCDs to be 30 mA or below d) voltages between simultaneously accessible exposed and extraneous parts to be less than 50 V AC e) the type and rating of circuit i. socket-outlet circuits having a rating up to and including 32 A including any permitted exemptions ii. mobile equipment used outdoors with a rating up to and including 32 A iii. circuits with luminaires f) circuits within special locations as given in Chapter 7 of I.S. 10101. 4.12.2 Procedures for verifying additional protection: a) measuring resistance of supplementary bonding i. where fault protection needs additional protection ii. measuring the resistance between accessible exposed and extraneous parts iii. values to comply with Clause 415.2.2 in I.S. 10101 b) testing RCDs for effective disconnection i. rating in compliance with Clause 415.1.1 ii. injecting test currents in accordance with Annex 6E of I.S. 10101 iii. disconnection in accordance with Annex 6E in I.S. 10101

Topics	Content elements
	iv. why test button operations on RCDs should be operated after instrument tests during periodic testing v. how test button operations can influence test data during periodic testing.
4.13 Reasons for and procedures for testing phase sequence	4.13.1 Reasons for testing phase sequence of three-phase systems and circuits: a) maintaining correct sequence throughout an installation b) rotation of three-phase machinery and equipment. 4.13.2 Procedures for testing phase sequence: a) measuring at the origin of the installation b) measuring at switchboards c) measuring at equipment reliant on correct sequence d) measuring at all other relevant points.
4.14 Non-compliances, defects and omissions found during the verification process	4.14.1 Procedure on finding defects or omissions before issuing certification during an initial verification: a) correction of defect or omission b) reinspect and retest as required c) notice of potential hazards when linked to an existing part of an electrical installation. 4.14.2 Reporting non-compliances, defects and omissions during periodic inspection and testing: a) recording on periodic inspection reports b) using recommendations depending on severity c) issuing a notice of potential hazards. 4.14.3 Using appropriate recommendations based on the severity of the non-compliance, defect of omission: a) satisfactory b) unsatisfactory.

Learning outcome 5

Be able to carry out initial verification of electrical installations as detailed in as detailed in I.S. 10101

Topics	Content elements
5.1 Carry out safety assessment and safe isolation of an electrical	5.1.1 Select and use appropriate tools and equipment to undertake safe isolation for initial verification: a) appropriate personal protective equipment (PPE)

Topics	Content elements
system in preparation for inspection and testing	b) barriers and signage c) proving unit d) voltage indicator e) lock-off kit f) insulated tools. 5.1.2 Safe isolation procedure in preparation for initial verification: a) supplies b) circuits/systems.
5.2 Carry out inspections in accordance with I.S. 10101	5.2.1 Inspect electrical systems and equipment as part of an initial verification: a) inspect an electrical installation in accordance with I.S. 10101 b) complete inspection documentation relevant to an initial verification.
5.3 Select the test instruments/scale and accessories in preparation for tests as part of an initial verification	5.3.1 Instruments to be selected Instruments/scale: a) continuity: ohms b) insulation resistance: meg-ohms c) polarity: ohms for dead test/voltage for live test d) earth fault loop impedance: ohms e) RCD operation: ms f) multi-function test instrument: various units as above. 5.3.2 Test instrument accessories: a) test leads b) test probes c) test adapters d) test clips.
5.4 Carry out appropriate tests on an electrical installation	5.4.1 Tests on an electrical installation in accordance with I.S. 10101 procedures: a) continuity of protective conductors and ring final circuit conductors b) insulation resistance c) detection of erroneous connections between circuits d) polarity e) source earth fault loop impedance (Z_e) f) system earth fault loop impedance (Z_s) g) RCD operation h) functional testing. 5.4.2 Record results of tests on suitable documentation in accordance with I.S. 10101.
5.5 Evaluate test results to verify they comply with values given in approved publications	5.5.1 Publications and information to reference when confirming if test results are acceptable: a) I.S. 10101 b) manufacturer's documentation c) design specification d) supplier's details.

Topics	Content elements
5.6 Complete appropriate documentation as part of an initial verification	5.6.1 Complete documentation as part of an initial verification: a) as required by I.S. 10101 b) as required by statutory requirements i. Commission for Regulation of Utilities (CRU) ii. Safety supervisory body.

Learning outcome 6

Be able to carry out periodic inspection and testing of electrical installations as detailed in I.S. 10101

Topics	Content elements
6.1 Carry out safety assessment and safe isolation of an existing electrical system in preparation for periodic inspection and testing	6.1.1 Select and use appropriate tools and equipment to undertake periodic verification: a) appropriate personal protective equipment (PPE) b) barriers and signage c) proving unit d) voltage indicator e) lock-off kit f) insulated tools. 6.1.2 Complete safe isolation procedure in preparation for periodic verification: a) supplies b) circuits/systems.
6.2 Carry out inspections in accordance with I.S. 10101 for periodic inspection and testing	6.2.1 Inspect electrical systems and equipment as part of periodic inspection and testing: a) Inspect electrical installation in accordance with I.S. 10101 b) Complete inspection documentation relevant to periodic inspection and testing c) Apply suitable measures for any omission, defect or non-compliance i. recommendations
6.3 Select the test instruments/scale and accessories in preparation for tests as part of periodic inspection and testing	6.3.1 Instruments to be selected Instruments/scale: a) Continuity: ohms b) Insulation resistance: meg-ohms c) Polarity: ohms for dead test/voltage for live test d) Earth fault loop impedance: ohms e) RCD operation: ms f) Multi-function test instrument: various units as above 6.3.2 Test instrument accessories: a) Test leads b) Test probes c) Test adapters d) Test clips.
6.4 Carry out appropriate tests on an electrical installation suitable for periodic inspection and testing	6.4.1 Tests on an electrical installation in accordance with I.S. 10101 procedures: a) Continuity of protective conductors and ring final circuit conductors b) Insulation resistance c) Detection of erroneous connections between circuits d) Polarity

Topics	Content elements
	e) Source earth fault loop impedance (Z_e) f) System earth fault loop impedance (Z_s) g) RCD operation h) Functional testing. 6.4.2 Record results of tests on suitable documentation in accordance with I.S. 10101.
6.5 Evaluate test results to verify they comply with values given in approved publications	6.5.1 Publications and information to reference when confirming if test results are acceptable: a) I.S. 10101 b) Condition report recommendations.
6.6 Complete appropriate documentation as part of periodic inspection and testing	6.6.1 Documentation to be completed as part of periodic inspection and testing: a) as required by I.S. 10101 b) as required by statutory requirements i. Commission for Regulation of Utilities (CRU) ii. Safety supervisory body.

Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to **www.cityandguilds.com** or click on the links below:

Centre handbook: quality assurance standards

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

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

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

Centre assessment: quality assurance standards

This document sets out the minimum common quality assurance requirements for our qualifications that feature centre-assessed components.

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

Access arrangements: when and how applications need to be made to City & Guilds
This provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre document library** also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

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

City & Guilds

For almost 150 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

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

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