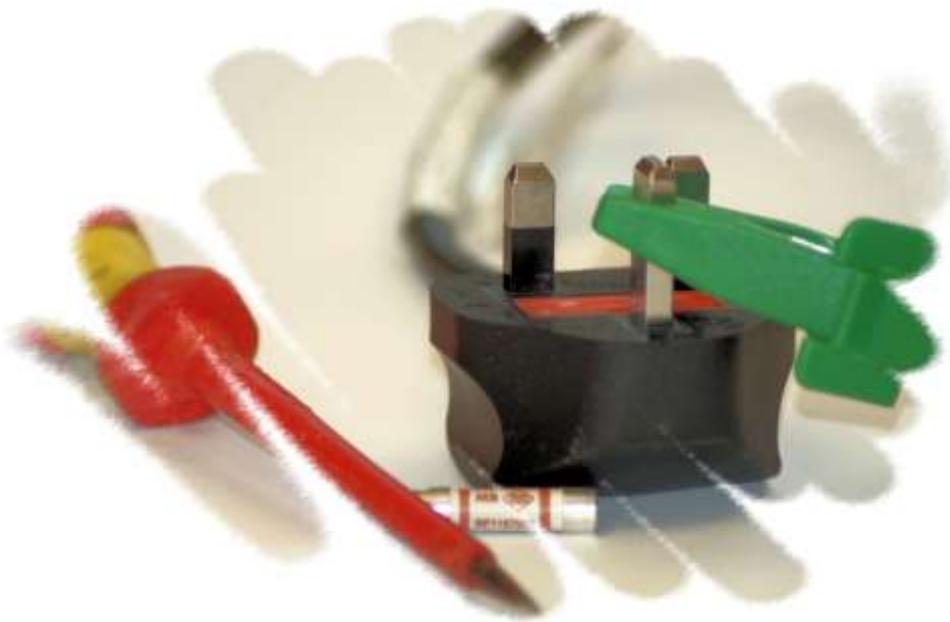


# City & Guilds Level 3 Award in the In-Service Inspection and Testing of Electrical Equipment (2377-77)

Version 1.2 (November 2020)



Qualification Handbook

## Qualification at a glance

<b>Industry area</b>	Building Services Engineering
<b>City &amp; Guilds number</b>	2377
<b>Age group approved</b>	18+
<b>Entry requirements</b>	None
<b>Assessment</b>	Online Multiple Choice Test Practical Assignment
<b>Grading</b>	Pass/fail
<b>Approvals</b>	Automatic approval from 2377-22 and -32
<b>Support materials</b>	Qualification handbook Assignment pack Sample onscreen assessment IET e-learning materials via our SmartScreen platform Learning Assistant
<b>Registration and certification</b>	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds number	Accreditation number	Total GLH	TQT
City & Guilds Level 3 Award in the In-Service Inspection and Testing of Electrical Equipment	2377-77	603/6790/8	35	40

Version and date	Change detail	Section
Version 1.0	Initial version	All
Version 1.1	Added link to access arrangements and special considerations document	Appendix 1
Version 1.2	Amended test specification	Assessment

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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 aimed at those with responsibilities for the maintenance of electrical equipment and for those undertaking practical inspection and testing of electrical equipment. It allows those with the responsibility for the testing and inspection of electrical equipment to gain a qualification suitable to their job role.
What does the qualification cover?	The qualification allows candidates to learn, develop and practise the skills required to inspect and test items of electrical equipment in line with the latest edition of the Code of Practice for In-Service Inspection and Testing of Electrical Equipment. If you already work as an electrician it will add another string to your bow and can help you move up in the industry.
What opportunities for progression are there?	Learners completing the qualification will have the ability to carry out mandatory responsibilities within the workplace depending on their prior electrical knowledge.
Who did we develop the qualification with?	This product has been developed in collaboration with the major stakeholders within the Electrotechnical industry – the primary being the IET.

## Structure

To achieve the **Level 3 Award in the In-Service Inspection and Testing of Electrical Equipment**, learners must achieve **mandatory** components 701 and 702.

### City & Guilds Level 3 Award in the In-Service Inspection and Testing of Electrical Equipment

City & Guilds unit number	Unit title	Assessment Method	GLH
<b>Mandatory</b>			
701/702	In-service inspection and testing of electrical equipment	Knowledge test and practical assignment	35

## Total Qualification Time

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

TQT is comprised of the following two elements:

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

Title and level	GLH	TQT
City & Guilds Level 3 Award in the In-Service Inspection and Testing of Electrical Equipment	35	40

## 2 Centre requirements

### Approval

If your Centre is approved to offer the City & Guilds Level 3 Award in the In-service Inspection and Testing of Electrical Equipment (PAT) (2377-22/32) you will receive automatic approval to run the City & Guilds Level 3 Award in the In-service Inspection and Testing of Electrical Equipment (2377-77).

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

#### Physical resources

Centres must adhere to the most recent version of the IET Code of Practice for In-Service Inspection and Testing of Electrical Equipment published by the Institute of Engineering and Technology (IET) when delivering this qualification.

The candidate should also have access to the following equipment:

- Equipment test instruments
- A minimum of one Class 1 (e.g. coffee machine, toilet hand-dryer), one Class 2 (e.g. desk light, hot-air gun) and one Class II FE (e.g. laptop power supply, computer monitor) pieces of equipment.
- Basic electrician's toolkit.

#### 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 at least 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, e.g. tutor and assessor or internal quality assurer, but cannot internally quality assure their own assessments.

### Continuing professional development (CPD)

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

## Quality Assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance, and City & Guilds is responsible for external quality assurance.

Internal quality assurance is essential to ensuring that the assessment of evidence for units is of a consistent and appropriate quality. Those performing the internal quality assurance role must be occupationally knowledgeable and possess the skills necessary to make quality assurance decisions.

External quality assurance for the qualification will be provided by City & Guilds external quality assurance process. External quality assurers (EQAs) are appointed by City & Guilds to approve centres and to monitor the assessment / 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.

To carry out their quality assurance role, EQAs must have appropriate occupational and verifying knowledge and expertise. City & Guilds EQAs attend training and development designed to keep them up-to-date, facilitate standardisation between verifiers and share good practice.

The role of the EQA is to:

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

## Learner entry requirements

City & Guilds does not set entry requirements for this qualification. However, centres must ensure that candidates have the potential and opportunity to gain the qualification successfully. It is expected that candidates attempting the qualification should be familiar with electrical systems and hazards of electricity in order to satisfactorily complete the qualification.

Candidates who are holders of an ECS card, JIB electrician grade card, or have successfully completed an NVO based electrotechnical apprenticeship or technical certificate to Level 3, should be familiar with the electrical systems and hazards electricity can bring.

Without evidence of formal qualifications, candidates must be able to demonstrate adequate prior knowledge and expertise to ensure they have the potential to successfully gain the qualification. Centres are required to conduct a practical test to evaluate the candidate's ability to undertake electrical inspection and testing in a competent manner for the inspection and testing qualification.

## Age restrictions

City & Guilds cannot accept any registrations for candidates under 18 as these qualifications are not approved for under 18s.

## 3 Delivering the qualification

### Initial assessment / induction

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

- if the candidate has any specific training needs
- support and guidance they may need when working towards their qualification
- the appropriate type and level of qualification.

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

### Support materials

The following resources will be available for this qualification:

Description	How to access
Sample assessment	City & Guilds website
IET e-learning materials	SmartScreen
Qualification handbook	City & Guilds website
Assignment pack	City & Guilds website
Learning Assistant	Learning assistant

## 4 Assessment

### Summary of assessment methods

Candidates must:

- successfully complete the **online multiple-choice knowledge test (2377-701)**
- successfully complete the **practical assignment (2377-702)**

### Online knowledge test

The online multiple-choice test is delivered through our online e-evolve platform. The tests are available on demand. For further information booking the tests or the e-evolve platform, please see our dedicated webpage [here](#).

The sample test is available as a password protected document on the **City & Guilds website**. The password is available from the Walled Garden Catalogue.

### Practical assignment

The practical assignment covers Learning Outcome 8 of Unit 701/702. See page 18. Instructions on conducting this part of the assessment are included in the Assignment pack.

The assignment contains three tasks:

Task 1 – inspect and test an item of Class I equipment.

Task 2 – inspect and test an item of Class II equipment (Class II incorporating unearthed metal, Class II without unearthed metal **or** Class II FE).

Task 3 – complete appropriate documentation.

The assignment is available as a password protected document on the **City & Guilds website**. The password is available from the Walled Garden Catalogue.

### Grading

The online knowledge test is graded pass or fail and the practical assignment is graded pass or fail. Candidates must achieve a pass for **both** components 701 and 702 to achieve the qualification.

### Enquiries about results

The services available for enquiries about results include a review of marking and feedback report. Requests must be submitted within the specified period after the publication of results for individual assessments. For further details of enquiries about results services, please visit the *Appeals* section of the City & Guilds website.

## Malpractice

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

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

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

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

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

## Assessment Strategy

### Test specifications

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

**Assessment type:** Online multiple choice test

Assessment Conditions: Open book and invigilated

Grading: Pass/Fail

Grade boundaries: The pass mark is set at 80%

2377-77 Duration: 1 hour 45 minutes			
Unit 701	Outcome	Number of questions	%
	1 Understand the definitions used within the IET Code of Practice for In-Service Inspection and Testing of Electrical Equipment	4	8
	2 Understand the statutory and non-statutory requirements relevant to the management and maintenance of electrical equipment	6	12
	3 Understand the electrical units of measurement associated with in-service inspection and testing of electrical equipment	3	6
	4 Understand the equipment construction classes and methods of protection within an electrical installation and how these relate to the provision of protection against electric shock	8	16
	5 Understand the procedures for the in-service inspection and testing of electrical equipment	8	16
	6 Understand how to carry out combined inspection and testing	18	36
	7 Understand the information that needs to be recorded following in-service inspection and testing of electrical equipment	3	6
	<b>Total</b>	<b>50</b>	<b>100</b>

Permitted resources:

Please note that the online knowledge test is **open book**. Learners should have access to the following materials/equipment:

- IET Code of Practice for In-Service Inspection and Testing of Electrical Equipment 5<sup>th</sup> edition.
- a non-programmable calculator.

## 5 Units

### Structure of units

These units each have the following:

- City & Guilds reference number
- Title
- Unit aim
- Learning outcomes, which are comprised of a number of assessment criteria
- Endorsement by a sector or other appropriate body
- Information on assessment

<b>Endorsement by a sector or regulatory body:</b>	This product is in collaboration with the major stakeholders within the Electrotechnical industry – the primary being the Institute of Engineering and Technology (IET).
<b>Aim:</b>	The aim of this unit is to enable the candidate to undertake practical inspection and testing of electrical equipment.
<b>Assessment type:</b>	Online knowledge test (701) and practical assignment (702)

### Learning outcome

The learner will:

1. understand the **definitions** used within the IET Code of Practice for In-Service Inspection and Testing of Electrical Equipment

### Assessment criteria

The learner can:

1. identify what is meant by the **definitions** contained within the Code of Practice
2. identify **definitions** from the descriptions given in the Code of Practice

### Range

#### Definitions

As used in the code of practice

### Learning outcome

The learner will:

2. understand the **statutory** and **non-statutory** requirements relevant to the management and maintenance of electrical equipment

### Assessment criteria

The learner can:

1. specify the requirements of **statutory** obligations and **non-statutory** standards and guidance in relation to maintenance of electrical equipment
2. identify premises that are within the scope of the **statutory** and **non-statutory** documents.
3. identify the guidance given by the Health and Safety Executive relating to electrical equipment
4. explain the legal requirement to maintain electrical equipment in a safe condition
5. state the reasons for inspecting and testing electrical equipment and systems
6. identify the scope of the code of practice for the in-service inspection and testing of electrical equipment

## Range

### Statutory

The Health and Safety at Work Act, The Management of Health and Safety at Work Regulations, The Provision and Use of Work Equipment Regulations, The Electricity at Work Regulations, The Workplace (Health, safety & welfare) Regulations, Rented Sector legislation, legislation surrounding the supply of goods for sale and hire.

### Non-statutory

BS7671, IET Code of Practice for In-Service inspection and testing of electrical equipment, HSE Guidance

## Learning outcome

The learner will:

3. understand the electrical units of measurement associated with in-service inspection and testing of electrical equipment

## Assessment criteria

The learner can:

1. identify SI **units of measurement** in relation to electrical equipment inspection and testing
2. identify the multiples and sub multiples of SI **units**

## Range

### Units of measurement

Ohm (Resistance), Watt (Power), Hertz (Frequency), Ampere (Current), Volt

### Units

Mega, kilo, milli

## Learning outcome

The learner will:

4. understand the equipment construction classes and methods of protection within an electrical installation and how these relate to the provision of protection against electric shock

## Assessment criteria

The learner can:

1. state the **classification** of equipment construction
2. identify relevant construction and identification marks
3. state how electric shock occurs
4. state how protective measures in an installation relate to the protection of connected equipment (i.e. Automatic Disconnection using fuses, circuit breakers and RCDs)
5. state how **equipment construction** protects against electric shock
6. explain the **impact** of conductor resistance on the effectiveness of protective measures
7. identify reasons for requiring the use of RCDs

## Range

### Classification

Class I, Class II, Class II FE, Class III, ES1, ES2 and ES3.

### Equipment construction

Basic Protection (insulation)

Fault protection (Automatic Disconnection and Additional Protection (RCDs), SELV, ES1, RLV, electrical separation.

### Impact

CSA, length, disconnection times

## Learning outcome

The learner will:

5. understand the procedures for the in-service inspection and testing of electrical equipment

## Assessment criteria

The learner can:

1. identify the different **types** of electrical test
2. state the **factors** which determine the frequency of inspecting and testing
3. explain how to carry out risk assessments based on the factors identified
4. specify what needs to be considered when carrying out a **formal visual inspection**

## Range

### Types

User checks – including items which the user should check before use

Formal visual inspection and testing

### Factors

The environment, the users handling, equipment construction, the equipment type

### Formal visual inspection

- preliminary inspection procedures
- suitability of electrical equipment for the environment (including IP coding)
- suitability of the electrical equipment for its intended use
- evidence of care and correct use of the equipment and connecting cable or lead
- isolation of the equipment from the supply prior to inspection including:
  - i. isolating of certain items of equipment (IT, uninterruptible power supplies UPS)
  - ii. safe isolation procedures
  - iii. requirements for isolation and switching-off for mechanical maintenance
  - iv. Emergency switching
- adequacy of the fixed installation to supply the electrical appliance:
  - i. damaged/overloaded accessories (socket outlets)
  - ii. advise on the need to have fixed installation regularly inspected
- requirements for inspecting connections (e.g. plugs, sockets, fused-connection units)

- checks on the general condition of the equipment and connecting cable or lead (overheating etc)
- particular requirements of cables, leads and extension leads including the correct cross-sectional area (CSA) in mm<sup>2</sup>
- Checking for fake equipment and equipment not constructed to appropriate standards (e.g. genuine CE Mark, BS 1363 plugs), understanding approvals marks.

### Learning outcome

The learner will:

6. understand how to carry out combined inspection and testing

### Assessment criteria

The learner can:

1. identify tests that are suitable for the different types and classifications of in-service equipment
2. identify fake or inappropriate equipment
3. identify the range of test instruments that can be used for testing electrical equipment
4. explain the need for test instruments and accessories to be accurate and in good working order
5. understand how to safely isolate a supply before working on equipment
6. understand the difference between switching and isolation
7. calculate the resistance of the flexible cable conductors and protective conductors
8. specify how to carry out **protective conductor continuity testing**
9. specify how to carry out insulation resistance testing
10. understand the application of the protective conductor/touch current test
11. specify how to carry out polarity checks
12. specify how to carry out functional checks
13. describe the requirement for testing RCDs
14. specify the requirements for testing equipment lead sets
15. understand requirements for equipment that has a high protective conductor current
16. interpret results that come from testing
17. specify the **actions** to be taken with damaged or faulty equipment

### Range

#### Protective conductor continuity testing

Using the high and low current test methods

#### Actions

Calibration, test instrument records

### Learning outcome

The learner will:

7. understand the information that needs to be recorded following in-service inspection and testing of electrical equipment

## Assessment criteria

The learner can:

1. explain the purpose of in-service inspection and testing **documentation**
2. state the benefits of keeping records

## Range

### Documentation

- an equipment register
- an equipment formal visual and combined inspection and test record
- equipment labels

## Learning outcome

The learner will:

8. be able to inspect and test items of electrical equipment

## Assessment criteria

The learner can:

1. inspect and test items of electrical equipment, connected to the installation by any means
  - a. Class I
  - b. Class II incorporating unearthed metal
  - c. Class II without unearthed metal
  - d. Class II FE
2. complete appropriate documentation
  - a. A4.1 Equipment register
  - b. A4.2 Equipment formal visual and combined inspection and test record
  - c. Label

## Appendix 1 Sources of general information

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

### *City & Guilds Centre Manual*

This document 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
- Examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records.

### *Our Quality Assurance Requirements*

This document explains the requirements for the delivery, assessment and awarding of our qualifications. All centres working with City & Guilds must adopt and implement these requirements across all of their qualification provision. Specifically, this document:

- Specifies the quality assurance and control requirements that apply to all centres
- Sets out the basis for securing high standards, for all our qualifications and/or assessments
- Details the impact on centres of non-compliance.

Our Quality Assurance Requirements document encompasses the relevant regulatory requirements of the following documents, which apply to centres working with City & Guilds:

- Ofqual's General Conditions of Recognition

### *Access Arrangements and Special Considerations*

This document 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.

## Appendix 2    **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>

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

## City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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