

ICTQual AB



Qualification Specification

ICTQual AB Quality Control in Electrical Systems



Website
www.ictqualab.co.uk

Email:
support@ictqualab.co.uk

ICTQual AB's

Quality Control in Electrical Systems

Contents

ICTQual Quality Control in Electrical Systems 1

About ICTQual AB's..... 2

Course Overview..... 2

Certification Framework.....4

Entry Requirements.....4

Qualification Structure5

Centre Requirements5

Support for Candidates 7

Assessment7

Unit Descriptors 8 to 17

Qualification Specification about

ICTQual AB Quality Control in Electrical Systems

About ICTQual AB's

ICTQual AB's is a distinguished awarding body based in the United Kingdom, dedicated to fostering excellence in education, training, and skills development. Committed to global standards, ICTQual AB's provides internationally recognized qualifications that empower individuals and organizations to thrive in an increasingly competitive world. Their offerings span diverse industries, including technical fields, health and safety, management, and more, ensuring relevance and adaptability to modern workforce needs.

ICTQual AB's delivers high-quality educational solutions through a network of Approved Training Centres worldwide. Their robust standards and innovative teaching methodologies equip learners with practical knowledge and skills for personal and professional growth. With a mission to inspire lifelong learning and drive positive change, ICTQual AB's continuously evolves its programs to stay ahead of industry trends and technological advancements.

Course Overview

This qualification is designed to provide learners with comprehensive knowledge and practical understanding of quality control principles and techniques within electrical systems. The course covers essential areas such as inspection methods, compliance monitoring, fault identification, diagnostic testing, and the application of safety and performance standards. Learners will explore how to assess electrical installations and equipment for conformity with technical specifications and operational standards. Emphasis is placed on developing the skills required to evaluate system integrity, record findings accurately, and contribute to the continuous improvement of electrical processes and installations. The programme is structured to support the implementation of industry-aligned standards and operational objectives, enabling learners to identify risks, report non-conformities, and support corrective measures in a professional and compliant manner.

Course Aims:

The aims of the ICTQual Certificate in Quality Control in Electrical Systems are to:

- Establish a foundational understanding of electrical quality assurance procedures.

- Develop the competence to perform inspections of electrical systems and components.
- Promote adherence to technical and safety standards in all quality-related tasks.
- Enable accurate documentation, analysis, and communication of inspection results.
- Support ongoing quality improvement and risk management in electrical operations.

Learning Objectives:

Upon successful completion of this qualification, learners will be able to:

- Explain the principles and importance of quality control in electrical systems.
- Interpret electrical schematics and specifications during inspections.
- Apply appropriate testing tools and procedures to assess electrical compliance.
- Identify defects, hazards, or deviations from standards in electrical work.
- Document findings and contribute to quality assurance and corrective action planning.

Target Audience:

This course is designed for professionals and students in the field of electrical engineering, as well as individuals involved in the design, installation, maintenance, and inspection of electrical systems. It is also beneficial for quality control professionals seeking to specialize in the electrical engineering domain.

Certification Framework

Qualification title	ICTQual Quality Control in Electrical Systems
Course ID	QC0002
Grading Type	Pass / Fail
Competency Evaluation	Coursework / Assignments / Verifiable Experience
Assessment	<p>The assessment and verification process for ICTQualAB's qualifications involves two key stages:</p> <p>Internal Assessment and Verification:</p> <ul style="list-style-type: none"> ✓ Conducted by the staff at the Approved Training Centre (ATC) to ensure learners meet the required standards through continuous assessments. ✓ Internal Quality Assurance (IQA) is carried out by the centre's IQA staff to validate the assessment process. <p>External Quality Assurance:</p> <ul style="list-style-type: none"> ✓ Managed by ICTQualAB's verifiers, who periodically review the centre's assessment and IQA processes. <p>Verifies that assessments are conducted to the required standards and ensures consistency across centres</p>

Entry Requirements

The ICTQual Quality Control in Electrical Systems course welcomes participants from diverse backgrounds who meet specific entry requirements aimed at ensuring a conducive learning environment and optimal engagement.

- A bachelor's degree in Electrical Engineering, Electronics Engineering, or a related field is required. For those without a degree, relevant professional experience in electrical systems may be considered on a case-by-case basis.
- Fundamental understanding of electrical circuits, principles of electricity, and electrical components. Basic knowledge of quality management principles and practices. Familiarity with relevant industry standards and regulations
- Work experience is not mandatory, prior work experience in electrical engineering, quality control, or a related field will enhance the student's understanding and application of course concepts. Experience with quality assurance processes or involvement in electrical system design, installation, or maintenance will be advantageous.
- Since the course is conducted in English, proficiency in the English language is essential to comprehend course materials, participate in discussions, and complete assessments effectively.
- Basic technical skills, including proficiency in using computers, conducting data analysis, and understanding mathematical concepts, are beneficial for successfully completing the course requirements.

Qualification Structure

This qualification comprises 10 mandatory units. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units	
Unit Ref#	Unit Title
QC0002-01	Key components and activities of quality control in electrical systems
QC0002-02	Objectives and Process of Quality Control in Electrical Systems
QC0002-03	Destructive Testing (DT) and Non-Destructive Testing (NDT) in Electrical
QC0002-04	Quality Control Tools in Electrical
QC0002-05	Industry Standards Relevant To Electrical Systems
QC0002-06	Regulatory Compliance
QC0002-07	Benefits of Effective Quality Control in Electrical
QC0002-08	Challenges in Quality Control in Electrical
QC0002-09	Importance of Feedback in Quality Control Electrical
QC0002-10	Components and Benefits of Iterative Quality Control Processes in Electrical Systems

Centre Requirements

To ensure quality training delivery, centres must adhere to the following standards:

1. Centre Approval

- ✓ Centres must be formally approved by ICTQual AB's before delivering this qualification.
- ✓ Approval involves a review of facilities, policies, and staff qualifications.

2. Qualified Staff

- ✓ **Tutors:** Must hold a minimum Level 4 qualification in Electrical Engineering, Quality Control, or a related technical discipline. They must also possess industry experience in electrical systems inspection, installation, or testing.
- ✓ **Assessors:** Must hold a recognized assessor qualification (e.g., CAVA, AVRA) or equivalent)
- ✓ **Internal Quality Assurers (IQAs):** Must hold a recognized IQA qualification (e.g. Level 4 Award in the IQA and Level 4 Certificate in Leading the IQA) and experience to oversee assessment standards.

3. Learning Facilities

Centre must offer:

- ✓ Private study areas and internet-enabled workspaces (for blended or physical delivery)
- ✓ Academic and pastoral support for learners
- ✓ Administrative support must be available to manage enrolment, tracking, and learner queries efficiently

4. Health and Safety Compliance

- ✓ All training facilities must comply with health and safety regulations.

- ✓ Centres must conduct regular risk assessments for practical activities.

5. Learning Resources

- ✓ **Course Materials:** Approved textbooks, study guides, and digital content must align with the qualification standards.
- ✓ **Assessment Tools:** Templates and guidelines must be provided to ensure standardized evaluation processes.
- ✓ **E-Learning Support:** Centres offering online or blended learning must implement an effective Learning Management System (LMS).

6. Assessment and Quality Assurance

- ✓ Centres must ensure assessments meet ICTQual AB's competency standards.
- ✓ Internal quality assurance (IQA) must be conducted to maintain consistency.
- ✓ External verifiers from ICTQual AB's will review assessment and training practices.

7. Learning Support

- ✓ **Qualification Guidance:** Support for coursework and assignments.
- ✓ **Career Pathway Assistance:** Information on progression opportunities in sustainability and energy sectors.
- ✓ **Accessibility Support:** Accommodations for learners with disabilities or language barriers.

8. Policies and Compliance

Centres must uphold the following policies in accordance with ICTQual AB's standards:

- ✓ Equality, Diversity, and Inclusion Policy.
- ✓ Health and Safety Policy.
- ✓ Safeguarding and Learner Protection Policy.
- ✓ Complaints and Appeals Procedure.
- ✓ Data Protection and Confidentiality Policy.

9. Reporting Requirements

- Centres must provide ICTQual AB's with regular reports on learner registrations, progress, and certification outcomes.
- Assessment records must be maintained for external auditing and quality assurance purposes.

Support for Candidates

Centres should ensure that materials developed to support candidates:

- ✓ Facilitate tracking of achievements as candidate's progress through the learning outcomes and assessment criteria.
- ✓ Include information on how and where ICTQual AB's policies and procedures can be accessed.
- ✓ Provide mechanisms for Internal and External Quality Assurance staff to verify and authenticate evidence effectively.

This approach ensures transparency, supports candidates' learning journeys, and upholds quality assurance standards.

Assessment

This qualification is competence-based, requiring candidates to demonstrate proficiency as defined in the qualification units. The assessment evaluates the candidate's skills, knowledge, and understanding against the set standards. Key details include:

1. Assessment Process:

- ✓ Must be conducted by an experienced and qualified assessor.
- ✓ Candidates compile a portfolio of evidence that satisfies all learning outcomes and assessment criteria for each unit.

2. Types of Evidence:

- ✓ Observation reports by the assessor.
- ✓ Assignments, projects, or reports.
- ✓ Professional discussions.
- ✓ Witness testimonies.
- ✓ Candidate-produced work.
- ✓ Worksheets.
- ✓ Records of oral and written questioning.
- ✓ Recognition of Prior Learning (RPL).

3. Learning Outcomes and Assessment Criteria:

- ✓ **Learning Outcomes:** Define what candidates should know, understand, or accomplish upon completing the unit.
- ✓ **Assessment Criteria:** Detail the standards candidates must meet to demonstrate that the learning outcomes have been achieved.

This framework ensures rigorous and consistent evaluation of candidates' competence in line with the qualification's objectives.

Unit Descriptors

QC0002-01-Key Components and Activities of Quality Control in Electrical Systems

This unit introduces the core elements that make up an effective quality control system in electrical work. Learners will explore inspection checklists, documentation practices, testing processes, and regular maintenance routines. The unit helps learners understand how each component works together to ensure safety, efficiency, and performance in electrical systems.

Learning Outcome:	Assessment Criteria:
1. Understand the fundamental elements comprising quality control in electrical systems	<div>1.1 Explain the purpose and function of inspection procedures in a quality control process for an electrical installation.</div> <div>1.2 Identify and describe at least three distinct testing methodologies used to verify the quality of electrical components.</div> <div>1.3 Outline the key information that must be recorded in documentation to effectively track a quality control activity.</div> <div>1.4 Describe the sequential steps involved in taking corrective action following the identification of a quality defect.</div> <div>1.5 Differentiate between preventative actions and corrective actions in the context of electrical quality control.</div> <div>1.6 Summarize how the four key elements (inspection, testing, documentation, corrective actions) form a cohesive quality control system.</div>
2. Identify the critical activities involved in maintaining and enhancing the quality of electrical components, installations, and systems	<div>2.1 List and describe at least five critical activities essential for maintaining the quality of an existing electrical system.</div> <div>2.2 Explain how preventative maintenance schedules contribute to the long-term quality and reliability of electrical components.</div> <div>2.3 Identify the role of supplier audits in enhancing the quality of components before they are installed.</div> <div>2.4 Describe the process of a periodic performance review for an electrical system and its value in enhancing quality.</div> <div>2.5 Explain how continuous professional development of technicians is a critical activity for enhancing quality standards.</div>

QC0002-02-Objectives and Process of Quality Control in Electrical Systems

This unit explains why quality control is important and what it aims to achieve in electrical systems. Learners will study the steps of a typical quality control process, such as planning, testing, recording, and corrective action. The unit helps learners understand how quality goals are met and monitored in real workplace situations.

Learning Outcome:	Assessment Criteria:
1. Define the objectives of quality control specific to electrical systems	<div>1.1 Define the term 'quality control' in the specific context of electrical systems.</div> <div>1.2 Explain why safety is the paramount objective of quality control in electrical systems.</div> <div>1.3 Describe the relationship between quality control and the reliability of an electrical system.</div> <div>1.4 Provide examples of how compliance with standards directly contributes to system quality.</div> <div>1.5 Distinguish between the objectives of quality control and the objectives of quality assurance.</div>
2. Describe the systematic process of quality control in electrical systems	<div>2.1 Outline a five-stage process for a quality control system in an electrical project.</div> <div>2.2 Explain the importance of establishing clear, measurable quality criteria at the planning stage.</div> <div>2.3 Describe the various types of control measures that can be implemented during the installation phase.</div> <div>2.4 Provide a specific example of how feedback from a control measure can be used for continuous improvement.</div> <div>2.5 Justify the need for a systematic, rather than ad-hoc, approach to quality control.</div> <div>2.6 Describe the role of regular audits in maintaining the integrity of the quality control process.</div>

QC0002-03- Destructive Testing (DT) and Non-Destructive Testing (NDT) in Electrical

This unit looks at the difference between destructive and non-destructive testing methods. Learners will understand how DT can involve damaging a sample to test its limits, while NDT checks the condition of equipment without causing harm. The unit covers examples like insulation resistance tests, thermal imaging, and visual inspections.

Learning Outcome:	Assessment Criteria:
1. Differentiate between destructive and non-destructive testing methods	<div>1.1 Define Destructive Testing (DT) and Non-Destructive Testing (NDT).</div> <div>1.2 Identify a DT method and an NDT method used on electrical cables.</div> <div>1.3 Explain the core distinction between DT and NDT with regard to the component's integrity after the test is performed.</div> <div>1.4 Provide an example of a scenario where only NDT would be a viable option.</div> <div>1.5 Provide an example of a scenario where DT is the most appropriate method despite its consequences.</div> <div>1.6 Summarize the primary trade-offs of using DT versus NDT in electrical system quality assessment.</div>
2. Analyze the applications, advantages, and limitations of DT and NDT techniques	<div>2.1 Analyze the application of DT in testing electrical insulation materials and list two of its key advantages.</div> <div>2.2 Evaluate the limitations of NDT when assessing the long-term stress tolerance of a new electronic circuit board.</div> <div>2.3 Discuss the economic advantages of NDT over DT in a large-scale manufacturing environment.</div> <div>2.4 Describe a specific NDT technique, such as thermal imaging, and explain its application and a significant limitation.</div> <div>2.5 Assess the role of DT in product development and R&D for new electrical components.</div>

QC0002-04- Quality Control Tools in Electrical

In this unit, learners will explore the tools used to carry out quality checks, including multimeters, insulation testers, clamp meters, and data loggers. Learners will also be introduced to simple quality tools like checklists, diagrams, and fault logs to help record and improve work quality.

Learning Outcome:	Assessment Criteria:
1. Explore various quality control tools and techniques applicable to electrical systems.	<div>1.1 Identify and briefly describe three different quality control tools or techniques.</div> <div>1.2 Explain how a statistical process control (SPC) chart could be used to monitor the quality of a production line for circuit breakers.</div> <div>1.3 Describe the steps of performing a root cause analysis for a recurring fault in a power distribution system.</div> <div>1.4 Compare between an internal quality audit and an external quality audit.</div> <div>1.5 Explain how a Pareto chart can be used to prioritize quality control efforts in a project.</div>
2. Apply appropriate quality control tools to identify defects and improve processes	<div>2.1 Given a set of performance data for a power supply, apply a statistical analysis technique to identify potential defects.</div> <div>2.2 Create a simple fishbone (Ishikawa) diagram to analyze the root causes of an electrical system failure.</div> <div>2.3 Select the most appropriate quality control tool to assess the consistency of wiring connections on a control panel and justify your choice.</div> <div>2.4 Demonstrate the use of a flowchart to document and improve an electrical component installation process.</div> <div>2.5 Explain the results of a quality audit to recommend process improvements.</div> <div>2.6 Use a check sheet to systematically collect data on common defects in an assembly line.</div>

QC0002-05-Industry Standards Relevant to Electrical Systems

This unit introduces important standards such as BS 7671 (IET Wiring Regulations) and other international codes. Learners will understand how standards guide design, installation, testing, and inspection work. The unit also explains how following standards helps prevent risks and meet legal requirements.

Learning Outcome:	Assessment Criteria:
1. Interpret industry standards established by organisations like IEEE, IEC, and NEC	<div>1.1 Identify the primary purpose of the IEEE, IEC, and NEC standards in the electrical industry.</div> <div>1.2 Given a specific excerpt from an industry standard, describe its meaning and application to a design problem.</div> <div>1.3 Explain the difference between a mandatory standard (like NEC) and a voluntary one.</div> <div>1.4 Describe how an electrical system designed to meet IEC standards might differ from one designed for NEC standards.</div> <div>1.5 Explain the consequences of failing to adhere to relevant industry standards.</div> <div>1.6 Identify the specific industry standard that governs the installation of a ground fault circuit interrupter (GFCI).</div>
2. Apply relevant industry standards to ensure compliance, safety, and quality	<div>2.1 Apply the relevant section of the National Electrical Code (NEC) to determine the appropriate wire size for a given circuit load.</div> <div>2.2 Choose and justify the correct IEEE standard for testing a new high-voltage transformer.</div> <div>2.3 Create a checklist based on IEC standards to verify the safety and compliance of an electrical panel installation.</div> <div>2.4 Develop a brief safety protocol for a work operation that incorporates relevant industry standards.</div> <div>2.5 Demonstrate how to reference and cite a specific standard correctly in a project design document.</div>

QC0002-06-Regulatory Compliance

Learners will explore the laws and regulations that affect electrical work. The unit covers legal duties for safety, inspections, reporting, and certification. Learners will understand the importance of following compliance rules to avoid penalties and keep people safe.

Learning Outcome:	Assessment Criteria:
1. Identify regulatory requirements and legal frameworks applicable to electrical systems	<div>1.1 List at least four examples of regulatory bodies or government agencies that create legal frameworks for electrical systems.</div> <div>1.2 Explain how environmental regulations, such as those related to hazardous materials (RoHS), apply to electrical equipment.</div> <div>1.3 Identify the specific regulatory requirements for working with high-voltage systems.</div> <div>1.4 Describe a legal consequence for a company that fails to comply with electrical safety regulations.</div> <div>1.5 Distinguish between a regulatory requirement and an industry-specific guideline.</div>
2. Develop strategies to achieve and maintain regulatory compliance	<div>2.1 Formulate a five-step strategy for a company to achieve initial regulatory compliance for a new electrical product.</div> <div>2.2 Design a system for a project team to continuously monitor changes in relevant regulations.</div> <div>2.3 Propose a training program for technicians to ensure they are up-to-date on compliance requirements.</div> <div>2.4 Describe the role of a compliance officer or team in maintaining regulatory adherence.</div> <div>2.5 Explain the importance of third-party certification and testing in a compliance strategy.</div> <div>2.6 Develop a protocol for documenting and auditing compliance activities.</div>

QC0002-07-Benefits of Effective Quality Control in Electrical

This unit shows learners how good quality control helps reduce faults, prevent accidents, improve system performance, and lower costs. Learners will look at real examples where quality control helped fix problems early and protect users.

Learning Outcome:	Assessment Criteria:
1. Evaluate the benefits of implementing effective quality control measures	<div>1.1 Provide a quantitative example of how improved reliability from effective quality control leads to a financial benefit.</div> <div>1.2 Explain the direct relationship between quality control and the reduction of unscheduled downtime.</div> <div>1.3 Analyze how enhanced safety from quality control measures reduces risk and liability.</div> <div>1.4 Describe a scenario where a commitment to quality control leads to increased customer satisfaction and loyalty.</div> <div>1.5 Evaluate how quality control practices can lower overall project costs by reducing rework and waste.</div>

QC0002-08-Challenges in Quality Control in Electrical

In this unit, learners will identify common problems in maintaining quality, such as equipment failure, time pressure, poor documentation, and lack of training. The unit helps learners think of ways to overcome these challenges using planning and teamwork.

Learning Outcome:	Assessment Criteria:
1. Recognise common challenges in quality control efforts.	<div>1.1 Identify and describe the challenge posed by component variability from multiple suppliers.</div> <div>1.2 Explain how a specific environmental factor, such as high humidity, can act as a challenge to quality control.</div> <div>1.3 Discuss the quality control challenges introduced by rapid technological advancements in fields like IoT.</div> <div>1.4 Describe the obstacle of limited budget or time in implementing a comprehensive quality control plan.</div> <div>1.5 Recognize the challenge of human error in assembly and installation processes.</div>
2. Develop strategies to address and overcome challenges	<div>2.1 Propose a strategy to mitigate the risk of component variability from suppliers.</div> <div>2.2 Design a quality control protocol to address the impact of a specific environmental factor.</div> <div>2.3 Develop a plan for upskilling technicians to manage quality control for new technologies.</div> <div>2.4 Outline a method for conducting risk analysis to proactively identify and address potential quality challenges.</div> <div>2.5 Describe a strategy for communicating the importance of quality control to a team to reduce human error.</div> <div>2.6 Explain how a formal feedback loop can be used to overcome recurring obstacles.</div>

QC0002-09-Importance of Feedback in Quality Control Electrical

This unit explains how feedback from inspections, tests, and team members helps improve quality control processes. Learners will explore how to give and receive feedback professionally and use it to make better decisions.

Learning Outcome:	Assessment Criteria:
1. Understand the significance of feedback mechanisms	<div>1.1 Define a feedback mechanism and explain its purpose in a quality control process.</div> <div>1.2 Describe at least three methods for collecting data on system performance or defects.</div> <div>1.3 Explain how the analysis of feedback data can inform future design decisions.</div> <div>1.4 Justify the importance of effective communication of feedback to all stakeholders.</div> <div>1.5 Explain how feedback from a customer service department can be a vital part of quality control.</div>
2. Apply feedback mechanisms to drive improvement	<div>2.1 Given a set of failure reports, apply a feedback analysis method to identify a recurring problem.</div> <div>2.2 Propose a closed-loop feedback system for a manufacturing process that automatically adjusts settings based on quality data.</div> <div>2.3 Demonstrate how to create a simple report that summarizes feedback and proposes a solution to a specific issue.</div> <div>2.4 Explain how feedback from post-installation inspections can lead to improvements in a future project's planning phase.</div> <div>2.5 Describe how a lessons learned session at the end of a project serves as a key feedback mechanism.</div>

QC0002-10-Components and Benefits of Iterative Quality Control Processes in Electrical Systems

Learners will learn about continuous improvement and how regular checks, updates, and feedback cycles can make quality control stronger over time. The unit teaches that repeating and improving steps helps electrical systems remain safe and efficient for longer periods.

Learning Outcome:	Assessment Criteria:
1. Identify the components of iterative quality control processes	<div>1.1 List and describe the four primary components of an iterative quality control process.</div> <div>1.2 Explain the purpose of the 'planning' phase in an iterative cycle.</div> <div>1.3 Describe the types of activities that occur during the 'evaluation' phase.</div> <div>1.4 Give a specific example of an 'adjustment' that might be made after the evaluation of an electrical system's performance.</div> <div>1.5 Identify the main difference between a linear and an iterative quality control process.</div>
2. Evaluate the benefits of iterative quality control processes	<div>2.1 Explain how an iterative process can lead to more optimized performance than a single, one-off quality check.</div> <div>2.2 Explain the relationship between an iterative process and the concept of continuous improvement.</div> <div>2.3 Analyze how iterative quality control reduces the risk of major project failures.</div> <div>2.4 Describe how an iterative process can be used to adapt to new technologies or changing standards.</div> <div>2.5 Discuss the benefit of an iterative approach in a scenario where project requirements are not fully defined at the outset</div> <div>2.6 Provide a real-world example of how an iterative process improved the quality of an electrical product over time.</div>

ICTQual AB

Yew Tree Avenue, Dagenham,

London East, United Kingdom RM10 7FN

+447441398083

Support@ictqualab.co.uk | www.ictqualab.co.uk

[Visit Official Webpage](http://www.ictqualab.co.uk)

