

ICTQual AB



Qualification Specification

ICTQual AB Certificate in NDT of Concrete Structures



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ICTQual AB's

Certificate in NDT of Concrete Structures

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Qualification Specification about

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About ICTQual AB's

ICTQual AB 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

The **ICTQual AB Certificate in NDT of Concrete Structures** stands as a globally recognized benchmark of competence in this highly specialized field. Tailored specifically for the unique properties of concrete, this certification rigorously validates a professional's ability to execute advanced testing techniques, accurately interpret complex diagnostic data, and enforce stringent quality assurance and safety standards.

Beyond technical proficiency, holding this certificate represents a profound commitment to excellence and sustainability. As the construction industry increasingly shifts its focus toward extending the lifespan of existing structures and minimizing environmental impact, certified NDT professionals are positioned at the forefront of this movement. Whether certifying brand-new constructions or safeguarding historic monuments, this qualification empowers professionals to make data-driven decisions that ensure regulatory compliance, build public trust, and preserve vital infrastructure for generations to come.

Course Aims

The primary aims of this qualification are to:

- Promote the highest standards of safety and structural integrity in the construction industry through non-destructive methodologies.
- Equip industry professionals with specialized, globally recognized expertise tailored specifically for concrete environments.
- Drive forward industry standards regarding sustainability and proactive infrastructure preservation.
- Foster a deep understanding of, and commitment to, both local and international regulatory compliance in concrete construction and inspection.

Course Objectives

Upon successful completion of this certification, professionals will be able to demonstrate competence in:

- **Executing Precise Testing:** Conducting accurate and specialized NDT tests on various concrete structures without compromising their physical integrity.
- **Data Interpretation:** Adeptly analyzing and interpreting the findings from complex NDT assessments.
- **Proactive Problem Solving:** Identifying potential structural anomalies and issues early, facilitating timely maintenance and repairs that extend the lifespan of the structure.
- **Quality Assurance:** Implementing and ensuring rigorous quality assurance and safety standards across concrete projects.
- **Regulatory Compliance:** Ensuring all testing and maintenance procedures strictly adhere to governing local and international construction regulations.

Targeted Audience

This certification is designed for professionals committed to safeguarding infrastructure and advancing construction standards. The ideal audience includes:

- **Aspiring and Structural Engineers** looking to specialize in concrete diagnostics and maintenance.
- **Seasoned Concrete Inspectors** seeking global recognition and validation of their NDT expertise.
- **Project Managers** overseeing large-scale concrete infrastructure and construction projects.
- **Quality Assurance & Quality Control (QA/QC) Professionals** responsible for ensuring building safety and regulatory compliance.

Certification Framework

Qualification title	ICTQual AB Certificate in NDT of Concrete Structures
Course ID	T0016
Total Qualification Time	20 Hours
Guided Learning Hours	10 Hours
Grading Type	Pass / Fail
Competency Evaluation	Coursework / Assignments / Verifiable Experience
Assessment	The assessment and verification process for ICTQual AB's qualifications involves two key stages: Internal Assessment and Verification: ✓ 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. External Quality Assurance: ✓ Managed by ICTQual AB's verifiers, who periodically review the centre's assessment and IQA processes. Verifies that assessments are conducted to the required standards and ensures consistency across centres

Entry Requirements

Entry requirements for an ICTQual Certificate in NDT of Concrete Structures may vary depending on the institution offering the program. However, typical entry requirements for such a course may include:

- ✓ Candidates must be at least 18 years old.
- ✓ A background in engineering, construction, or a related field is typically required. This ensures candidates have the foundational knowledge of construction materials and principles.
- ✓ While specific years of experience may vary, candidates often benefit from having practical experience in non-destructive testing (NDT) or concrete inspection.
- ✓ Participants should have basic literacy and numeracy skills. This is important as the course materials, including the training manual and assessment, require reading, comprehension, and basic mathematical understanding.
- ✓ Since the course is in English, participants should have proficient English language skills to engage with course materials effectively, participate in discussions, and complete written assignments.

Qualification Structure

This qualification comprises 6 mandatory units, totalling 02 Credits. Candidates must successfully complete all mandatory units to achieve the qualification.

Mandatory Units	
Unit Ref#	Unit Title
T0016-01	Introduction to Concrete Technology
T0016-02	Fundamentals of Non-Destructive Testing (NDT)
T0016-03	Specific NDT Techniques for Concrete Structures
T0016-04	Quality Assurance and Standards
T0016-05	Safety and Ethics in NDT
T0016-06	Project Management and Reporting

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 formal academic or vocational qualification in Non-Destructive Testing (NDT), Civil Engineering, Materials Science, or a closely related technical discipline, at a level equal to or higher than the qualification being taught. Tutors must have a minimum of 3 to 5 years of verifiable, hands-on professional experience conducting non-destructive testing and structural diagnostics specifically on concrete assets.
- ✓ **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 Non-Destructive Testing (NDT), Civil Engineering & Materials Science 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

T0016-01- Introduction to Concrete Technology

This foundational unit explores the essential principles of concrete material science, including its composition, curing processes, and inherent properties. Learners will investigate common deterioration mechanisms such as carbonation, rebar corrosion, and structural cracking. Mastering these concepts is critical for professionals to accurately assess structural health, identify vulnerabilities, and effectively interpret diagnostic data during non-destructive testing.

Learning Outcome:	Assessment Criteria:
1. Understanding Concrete Composition: Gain knowledge of the materials used in concrete and their properties.	1.1 Identify the primary materials required to create a standard concrete mixture. 1.2 Describe the physical properties of fine and coarse aggregates used in concrete. 1.3 Explain the basic function of cement and water in the binding process. 1.4 Assess how different water-to-cement ratios impact the overall strength of a concrete mix.
2. Behavior of Concrete: Learn about how concrete behaves under different conditions and over time.	2.1 Explain the curing process and why it is critical for concrete durability. 2.2 Identify common environmental factors that cause concrete to degrade over time. 2.3 Describe visible physical defects in concrete, such as cracking, scaling, and honeycombing. 2.4 Evaluate a given concrete scenario to determine the likely cause of surface deterioration.
3. Role of NDT in Concrete Assessment: Understand the importance of non-destructive testing (NDT) in evaluating concrete quality and integrity.	3.1 Define the concept of non-destructive testing (NDT) specifically for concrete structures. 3.2 Explain the main advantages of using NDT methods instead of destructive testing. 3.3 Identify the common reasons why an inspector would choose to perform NDT on an existing structure. 3.4 Select an appropriate NDT approach to evaluate a specific structural concern without causing damage.

T0016-02- Fundamentals of Non-Destructive Testing (NDT)

This unit introduces the core principles and physical theories underlying non-destructive testing methodologies. Learners will evaluate the advantages and limitations of various NDT approaches compared to traditional destructive testing. The curriculum emphasizes equipment calibration, baseline measurement establishment, and the critical role of NDT in proactively maintaining infrastructure integrity without compromising the physical condition of the asset.

Learning Outcome:	Assessment Criteria:
1. Principles of NDT: Learn the basic principles and methodologies of non-destructive testing techniques.	1.1 Describe the basic physical principles behind common non-destructive testing methods used on concrete. 1.2 Identify the standard equipment and tools required to carry out fundamental NDT methodologies. 1.3 Explain the standard methodology for preparing a concrete surface before conducting a test. 1.4 Select the appropriate NDT method based on a specific, routine concrete inspection requirement.
2. Wave Propagation: Understand how waves (such as sound waves or electromagnetic waves) interact with concrete to detect defects.	2.1 Describe how ultrasonic sound waves travel through solid and flawed concrete materials. 2.2 Explain how electromagnetic waves interact with internal features like metal reinforcement or air voids. 2.3 Identify the changes in wave signals or readings that indicate the presence of an internal defect. 2.4 Record wave transmission readings accurately using simulated or standard NDT equipment.
3. Interpretation of Test Results: Develop skills in interpreting NDT results to identify defects and assess concrete condition.	3.1 Identify common internal concrete defects, such as voids or cracks, using standard NDT reading outputs. 3.2 Differentiate between expected baseline readings and abnormal data in routine concrete assessments. 3.3 Analyze a provided set of NDT test results to assess the overall structural condition of a concrete element. 3.4 Produce a clear and accurate summary report detailing the findings of a specific NDT assessment.

T0016-03- Specific NDT Techniques for Concrete Structures

This unit delivers practical knowledge on specialized NDT methods tailored for concrete. Learners will study the operation and data interpretation of techniques including Ultrasonic Pulse Velocity (UPV), Rebound Hammer testing, Ground Penetrating Radar (GPR), and Half-Cell Potential mapping. The focus is on selecting the appropriate technique to accurately detect voids, delaminations, and internal steel reinforcement corrosion.

Learning Outcome:	Assessment Criteria:
1. Ultrasonic Testing (UT): Master the use of sound waves to detect internal flaws and measure thickness in concrete.	1.1 Describe the basic principles of using sound waves to measure concrete thickness and detect internal flaws. 1.2 Calibrate and correctly operate Ultrasonic Testing (UT) equipment on a prepared concrete sample. 1.3 Record and interpret UT readings to successfully identify the presence of an internal anomaly.
2. Ground Penetrating Radar (GPR): Learn to use electromagnetic radiation to evaluate concrete condition and detect embedded objects.	2.1 Explain how Ground Penetrating Radar uses electromagnetic radiation to locate hidden objects like steel rebar. 2.2 Conduct a basic GPR scan on a concrete surface following standard operating and safety procedures. 2.3 Analyze a GPR output display to determine the approximate depth and location of an embedded element.
3. Impact-Echo Testing: Understand the analysis of acoustic responses to identify defects like voids or delaminations.	3.1 Describe how acoustic responses are generated, captured, and measured during an Impact-Echo test. 3.2 Perform a practical Impact-Echo test on a concrete element to check for potential voids or delaminations. 3.3 Interpret the basic frequency output from an Impact-Echo test to evaluate the depth of a suspected defect.

4. Rebound Hammer Test: Gain proficiency in measuring concrete strength through surface hardness.

- 4.1 Outline the surface preparation requirements and environmental limitations for conducting a Rebound Hammer test.
- 4.2 Execute a Rebound Hammer test accurately on a concrete surface to measure its surface hardness.
- 4.3 Calculate the estimated compressive strength of the concrete using the collected rebound values and standard conversion charts.

T0016-04- Quality Assurance and Standards

This unit examines the critical importance of quality assurance and regulatory compliance within concrete inspection. Learners will navigate key international and local industry standards governing NDT practices. The coursework focuses on implementing rigorous quality control protocols, ensuring equipment accuracy, validating test results, and maintaining compliance to guarantee the reliability and global acceptance of structural assessments.

Learning Outcome:	Assessment Criteria:
1. Standards and Regulations: Understand national and international standards and regulations governing NDT in concrete structures.	1.1 Identify key national and international standards that govern NDT practices for concrete structures. 1.2 Explain the legal and professional importance of complying with recognized NDT standards during an inspection. 1.3 Locate specific regulatory requirements for a given concrete testing scenario using standard industry guidelines. 1.4 Describe the potential consequences of failing to adhere to established safety and testing regulations on a construction site. 1.5 Apply appropriate regulatory guidelines to outline a compliant NDT procedure for a standard concrete project.
2. Quality Assurance Practices: Learn techniques to ensure quality and safety in concrete construction projects through rigorous inspection and testing.	2.1 Define the role of quality assurance in maintaining safety and structural integrity during concrete construction. 2.2 Outline the standard steps required to implement a rigorous inspection and testing plan on a site. 2.3 Perform a routine quality check on NDT equipment to ensure accurate calibration before beginning a test. 2.4 Evaluate a set of concrete inspection records to confirm that all required quality assurance protocols were followed. 2.5 Propose basic corrective actions when a concrete NDT inspection reveals a failure to meet required quality standards.

T0016-05- Safety and Ethics in NDT

This unit highlights the paramount importance of occupational health, safety, and professional ethics during NDT operations. Learners will identify site-specific hazards, implement appropriate risk assessments, and utilize essential personal protective equipment. Additionally, the unit reinforces ethical responsibilities, ensuring inspectors report structural anomalies honestly and objectively, prioritizing public safety and professional integrity above all other project considerations.

Learning Outcome:	Assessment Criteria:
1. Safety Protocols: Understand and adhere to safety protocols while performing NDT tests on concrete structures.	1.1 Identify the primary health and safety hazards associated with performing non-destructive testing on active construction sites. 1.2 Select the correct Personal Protective Equipment (PPE) required for conducting specific NDT procedures safely. 1.3 Conduct a basic, documented risk assessment of a concrete testing area prior to beginning any inspection work. 1.4 Demonstrate safe manual handling and secure equipment operation during a practical NDT assessment.
2. Ethical Considerations: Learn about the ethical responsibilities of NDT professionals, including accuracy, integrity, and confidentiality of inspection results.	2.1 Describe the core ethical responsibilities of an inspector regarding the honesty and accuracy of structural test results. 2.2 Explain the critical importance of maintaining client confidentiality and securely storing sensitive inspection data. 2.3 Evaluate a workplace scenario involving a potential conflict of interest to determine the correct, ethical course of action. 2.4 Produce a factual and objective summary report that accurately reflects raw diagnostic data without external bias or manipulation.

T0016-06- Project Management and Reporting

This unit equips learners with the skills necessary to manage NDT projects from initial planning to final documentation. Topics include resource allocation, stakeholder communication, and timeline management. Furthermore, learners will develop proficiency in compiling comprehensive, structured technical reports that clearly translate complex diagnostic data into actionable maintenance recommendations for engineers, clients, and regulatory authorities.

Learning Outcome:	Assessment Criteria:
1. Project Planning: Develop skills in planning NDT inspections, including scheduling and resource management.	1.1 Identify the key personnel, equipment, and resources required to complete a standard NDT concrete inspection. 1.2 Create a practical project schedule for an NDT assessment, including realistic timeframes for site access and testing. 1.3 Explain the importance of communicating and coordinating with site management prior to beginning an inspection. 1.4 Allocate specific testing tasks to appropriate team members based on their individual skills and project requirements.
2. Reporting and Documentation: Learn to prepare clear and comprehensive inspection reports, documenting findings and recommendations for stakeholders.	2.1 Describe the essential sections that must be included in a professional and compliant NDT inspection report. 2.2 Compile raw NDT data and site observations into a clear, structured format suitable for client review. 2.3 Draft practical and actionable maintenance recommendations based on the verified findings of a concrete inspection. 2.4 Produce a final, comprehensive inspection report that clearly communicates technical results to non-technical stakeholders.

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