# Overview of the role

## Carrying out specialist testing methods to detect imperfections in manufactured components.

**Contents**



# Standard in development
# L3: Non-destructive technologies engineering technician
# Version 1.1

## Title of occupation

Non-destructive technologies engineering technician

## UOS reference number

ST0288

## Core and options

No

## Level of occupation

Level 3

## Occupational maps data

**Route:** Engineering and manufacturing
**Pathway:** Engineering, Manufacturing, Process and Control
**Cluster:** Quality Improvement and Project Control Technician

## Typical duration of apprenticeship

24 months

### Target date for approval

08/05/2024

### Resubmission

No

### Would your proposed apprenticeship standard replace an existing framework?

No

### Does professional recognition exist for the occupation?

Yes

## Regulated occupation

### Is this a statutory regulated occupation?

No

## Occupation summary

This occupation is found across the engineering sector including aerospace, motorsport, power generation and distribution, manufacturing, railways, automotive, oil and gas (on and offshore), marine and construction. Employers vary in size from small to large. Non-destructive technology (NDT) is an engineering, science-based profession. NDT involves non-intrusive measurement or inspection of assets including plant, machines, materials, welds and components, to verify their integrity.

NDT contributes to sustainability and reduces environmental impact. NDT reports, and data feedback can improve an items' design, assuring it is manufactured without unacceptable flaws. When in service, NDT assures that items are not fractured or degraded to unacceptable levels. NDT identifies optimum operating conditions and predict remaining useful life of in-service plant. NDT can lower manufacturing costs, by reducing waste and using less materials. A component's life in service can be safely extended by NDT, benefitting the environment.

NDT Engineering technicians work in sites where NDT takes place. This includes airports, construction sites, manufacturing facilities, civil engineering, water and gas distribution, refineries and nuclear power plants.

The broad purpose of the occupation is to ensure the asset is fit for purpose. NDT Technicians organise and co-ordinate the NDT activity. They test equipment, establish resources needed and assess the asset's condition. They collect samples, conduct NDT tests and analyse the outputs. NDT technicians' complete documentation, write reports and also coach and support other team members.

In their daily work, an employee in this occupation interacts with other NDT engineering technicians and NDT operatives. They also interact with external customers and auditors. They typically report to an NDT Engineer or Operations Director.

An employee in this occupation will be responsible for completing their duties in line with organisation procedures and standards. They must comply with health and safety, environmental, sustainability, and engineering regulations and guidance including specific NDT requirements. Where applicable, they may have to wear personal protective equipment and follow workplace safety rules such as safely handling hazardous materials. They work under limited direct supervision, ensuring the quality and accuracy of their own work and the work of others. They must ensure work is completed safely within agreed timescales, and within budgets. They must work professionally and in an ethical manner.

## Typical job titles

**Condition monitoring (cm) inspector** **Condition monitoring (cm) technologist** **Condition monitoring (cm) tester** **Non-destructive technology (ndt) inspector** **Non-destructive technology (ndt) technician** **Non-destructive technology (ndt) technologist** **Non-destructive technology (ndt) tester** **Quality engineer** **Radiographer** **Radiographic interpreter** **Reliability technician** **Welding inspector**

### Are there any statutory/regulatory or other typical entry requirements?

No

## Occupation duties

| DUTY | KSBS |
|---|---|
| **Duty 1** Plan and coordinate non-destructive technology (NDT) work to meet stakeholders' requirements. | K1 K2 K3 K4 K5 K6 K7 K9 K10 K12 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K26 K27 K29 K30<br>S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S22<br>B1 B2 B3 B5 |
| **Duty 2** Test equipment, identifying faults and taking action as needed. | K1 K2 K4 K6 K9 K10 K11 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K24 K26 K29 K30<br>S1 S2 S3 S4 S5 S6 S7 S9 S10 S11 S13 S14 S15 S16 S21 S22<br>B1 B2 B4 B5 |
| **Duty 3** Establish resources required to ensure customer and site compliance against defined acceptance criteria. For example, accept all cracks to a certain length, and in a particular position, then report other findings in a technical report. | K1 K2 K3 K4 K5 K6 K7 K8 K9 K12 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K26 K29 K30<br>S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S13 S14 S15 S17 S18 S20 S22<br>B1 B2 B3 B4 B5 |

| DUTY | KSBS |
| --- | --- |
| **Duty 4** Receive, read, and interpret engineering data and documentation. | K12 K13 K30<br>S8 S20 S22<br>B2 B5 |
| **Duty 5** Evaluate and facilitate the stakeholders' specific NDT requirements via documented instructions. Conduct any preparatory work. For example, referring to relevant standards, specifications and regulations. | K1 K2 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K15 K16 K17 K18 K19 K20 K21 K23 K24 K25 K26 K27 K28 K29 K30<br>S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S12 S13 S14 S15 S17 S18 S20 S22<br>B1 B2 B3 B4 B5 |
| **Duty 6** Assess the condition of the asset, component or material for compliance with stakeholders' requirements acceptance criteria. Identify and fix issues with the asset, component or material, re-testing as needed. Report any defects and irregularities. | K1 K2 K5 K6 K7 K8 K9 K10 K13 K14 K16 K17 K18 K19 K20 K21 K24 K26 K27<br>S4 S5 S6 S7 S9 S11 S12 S13 S14 S15<br>B1 B2 B3 B4 |
| **Duty 7** Collect NDT samples, record measurement points, monitoring intervals and operational state. | K1 K6 K7 K8 K9 K10 K11 K13 K14 K16 K17 K18 K19 K20 K21 K22 K23 K24 K26 K27 K28 K29 K30<br>S5 S6 S9 S11 S12 S13 S14 S15 S16 S17 S18 S22<br>B1 B2 B5 |
| **Duty 8** Conduct NDT testing and checks using testing, measuring or monitoring equipment on materials and components. | K1 K6 K8 K9 K10 K11 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K26 K27 K28 K29 K30<br>S4 S5 S6 S7 S9 S11 S12 S13 S14 S16 S18 S21 S22<br>B1 B2 B4 B5 |
| **Duty 9** Interrogate the results and data obtained during the testing and monitoring of the items subjected to investigations. | K1 K8 K9 K10 K11 K13 K14 K16 K17 K18 K19 K20 K21 K22 K23 K24 K25 K26 K27 K30<br>S4 S9 S11 S12 S13 S14 S15 S16 S22<br>B2 B3 B5 |
| **Duty 10** Complete documentation for NDT task. For example, test report, risk assessments, equipment service records, adverse incident reports, technical investigations, equipment appraisals. | K1 K2 K6 K8 K9 K10 K11 K24 K25 K26 K28 K29 K30<br>S17 S18 S19 S21 S22<br>B2 B3 B4 B5 |
| **Duty 11** Complete written reports for NDT work. For example, regulatory reports and technical investigations. | K1 K2 K8 K9 K10 K11 K24 K25 K26 K28 K29 K30<br>S17 S18 S19 S21 S22<br>B2 B3 B4 B5 |
| **Duty 12** Inform stakeholders of work status and results. For example, internal and external customers. | K1 K2 K8 K9 K10 K11 K19 K21 K24 K25 K26 K27 K29 K30<br>S4 S5 S6 S9 S14 S17 S18 S19 S20 S21 S22<br>B2 B3 B4 B5 |

| DUTY | KSBS |
| --- | --- |
| **Duty 13** Conduct NDT technical performance reviews. For example, asset checking compliance checks, internal or external quality audits. | K1 K2 K6 K8 K10 K11 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K26 K27 K28 K29 K30 S4 S5 S6 S7 S9 S11 S12 S13 S14 S18 S19 S20 S21 S22 B1 B2 B3 B5 |
| **Duty 14** Support and coach members of the NDT team. | K1 K4 K6 K10 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K25 K26 K27 K28 K29 K30 S5 S6 S7 S9 S10 S11 S12 S13 S14 S17 S18 S20 S21 S22 B1 B2 B4 B5 |

# KSBs

## Knowledge

**K1**: The non-destructive technologies (NDT) engineering function and role of the NDT technician. Limits of autonomy and reporting channels.
**K2**: Planning, organising, workflow and time management techniques.
**K3**: Principles of identifying, organising, and using resources and how they impact cost, quality, safety, security and the environment.
**K4**: Principles of planning, preparing for, and applying inspections, tests and monitoring on materials, products, plant or machinery using non-destructive technology.
**K5**: Contextual information: purpose and requirements prior to applying non-destructive technology on specific products, plant or machinery relevant to the specific industry.
**K6**: Awareness of health and safety regulations, relevance to the occupation and the technician's responsibilities. Health and Safety at Work Act – responsibilities. Control of Substances Hazardous to Health (COSHH). Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations (RIDDOR). Manual handling. Types of hazards. Near miss reporting. Due diligence. Personal Protective Equipment (PPE). Situational awareness. Slips, trips and falls. Working in confined spaces. Working at height. Lone working. Electrical safety and compliance. Noise regulation. Legionella. Display Screen Equipment. Ionising and non-ionising radiation (IRR 19). Electromagnetic radiation.
**K7**: Risk assessments and safe systems of working.
**K8**: Environment and sustainability regulations and guidance relevance to the occupation and the technician’s responsibilities. Environmental Protection Act. Types of pollution and control measures; noise, smells, spills, and waste. Sustainability. Efficient use of resources. Environmental permits. Waste management. Waste Electrical and Electronic Equipment Directive (WEEE). Recyclable materials and waste disposal procedures. Net zero commitment.
**K9**: Project management techniques and phases: project planning and execution to completion, costs, budgets, resources, quality, safety, security, and the environment.
**K10**: Quality assurance: awareness of quality management standards policy, principles and practices, relevance to the occupation and the technician's responsibilities.
**K11**: Mathematical techniques and scientific and engineering principles: calculations using formulae, ratios, SI units and trigonometry.
**K12**: International and national standards for engineering representations, drawings, graphical information and datasets.
**K13**: Technological development and innovation in the engineering sector. Industry 4.0. IT networking, new materials and Artificial intelligence (AI).

**K14**: Inspection, test, or monitoring procedures applicable to the non-destructive technology: what they are, how to prepare and utilise them.
**K15**: Techniques and processes for maintenance and storage of tools, materials, and equipment.
**K16**: Techniques and processes for selecting, configuring, operating, and using tools and equipment.
**K17**: National and international standards applicable to the test or monitoring method: ISO 17359, EN 4179, ISO BS EN: 16810 or BS EN 15495:2007.
**K18**: Non-destructive technologies: methods and techniques.
**K19**: Principles of collecting and analysing information, and reporting on the application of NDT methods and techniques on equipment, parts, assemblies, and sub-assemblies.
**K20**: Materials science: material types, manufacturing processes, in-service conditions, defect types, defect mechanisms and growth rates.
**K21**: Component, equipment, and material failure: consequences, risks to life and the environment.
**K22**: Types, uses and limitations of non-destructive technology tests, for analysis and measurements.
**K23**: Continuous improvement principles and techniques.
**K24**: Team working principles.
**K25**: Supervisory techniques and principles: leading and motivating, performance evaluation, mentoring, delegating, and solving routine daily problems.
**K26**: Equality Act. Equity, diversity, and inclusion in the workplace. Unconscious bias.
**K27**: Verbal communication techniques: matching style to audience. Barriers in communication and how to overcome them. NDT engineering terminology.
**K28**: Written communication techniques: report writing, data collection and presentation, and image acquisition.
**K29**: Digital and information technology: Management Information Systems (MIS), spreadsheets, presentation, word processing, email, virtual communication and learning platforms. Awareness of General Data Protection Regulation (GDPR). Cyber security.
**K30**: Workplace training and development activities: continual professional development (CPD)

## Skills

**S1**: Identify, organise, and use resources to complete inspections, tests or monitoring on materials, products plant or machinery for the non-destructive technology.
**S2**: Plan, prepare for, and apply inspections, tests, or monitoring on materials, product plants or machinery using non-destructive technology.
**S3**: Use project management techniques throughout project phases. For example, project justification, planning, analysis, execution, and conclusions.
**S4**: Implement quality control procedures.
**S5**: Comply with health and safety regulations and procedures. Apply safe systems of work.
**S6**: Identify and document risks and hazards in the workplace. Advise on and apply control measures.
**S7**: Comply with environmental and sustainability regulations and procedures. Segregate resources for re-use, recycling, and disposal of waste. Use resources efficiently. Apply sustainability principles.
**S8**: Read and interpret engineering drawings. For example, weld or component configuration.
**S9**: Identify and report on progress of work, and issues or concerns of the non-destructive technology method.
**S10**: Apply maintenance practices and techniques for tools, materials, and equipment. For example, clean, lubricate, replace parts.
**S11**: Select, configure, use, and operate tools and equipment.
**S12**: Apply and review inspection and monitoring procedures.

**S13**: Perform non-destructive technology methods in line with national and international standards applicable to the test or monitoring method. For example, ISO 17359, EN 4179 and ISO BS EN: 16810 Standards.
**S14**: Apply non-destructive technology methods and techniques. For example, vibration analysis, ultrasonics, radiography, thermography, eddy current.
**S15**: Identify problems and apply analytical tools to identify causes and solutions. For example, root cause analysis. Review the effectiveness of methods deployed, actions and results.
**S16**: Collect and interpret technical or analytical information or datasets from performed non-destructive technology tests.
**S17**: Apply team working principles including provide information, guidance, or training to colleagues or stakeholders.
**S18**: Apply, equity, diversity, and inclusion procedures.
**S19**: Write technical reports.
**S20**: Communicate verbally with colleagues and stakeholders.
**S21**: Use information technology. For example, for document creation, communication, and information management. Comply with GDPR and cyber security.
**S22**: Carry out and record learning and development activities.

### Behaviours

**B1**: Prioritise and promote health and safety.
**B2**: Take responsibility for work.
**B3**: Adapt to changing work demands.
**B4**: Collaborate within teams, across disciplines and external stakeholders supporting social inclusion in the workplace.
**B5**: Committed to continuous professional development.

## Qualifications

### English and Maths

Apprentices without level 2 English and maths will need to achieve this level prior to taking the End-Point Assessment. For those with an education, health and care plan or a legacy statement, the apprenticeship's English and maths minimum requirement is Entry Level 3. A British Sign Language (BSL) qualification is an alternative to the English qualification for those whose primary language is BSL.

### Does the apprenticeship need to include any mandated qualifications in addition to the above-mentioned English and maths qualifications?

Yes

### Other mandatory qualifications

Level 2 NDT Dye penetrant testing (non-complex) or

Level: 2

Additional information: This is a non-complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT in Magnetic particle inspection (non-complex) or

Level: 2

Additional information: This is a non-complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Visual testing (non-complex) or

Level: 2

Additional information: This is a non-complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 Weld inspector (non-complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 CM Lubrication management and analysis (Field) (non-complex) or

Level: 2

Additional information: This is a non-complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 CM Lubrication management and analysis (Laboratory) (non-complex)

Level: 2

Additional information: This is a non-complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Eddy current testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Infra-red thermographic testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Radiographic testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Ultrasonic testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Ultrasonic phased array testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Ultrasonic time of flight diffraction testing (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 NDT Alternating current field measurement (ACFM) (complex)

Level: 2

Level 2 CM Acoustic emission Cat 2 (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 CM Vibration analysis Cat 2 (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 CM Infra-red thermography Cat 2 (complex) or

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

Level 2 CM Ultrasound Cat 2 (complex)

Level: 2

Additional information: This is a complex NDT testing method. Qualifications are based on national and international standards and the levels highlighted are different to Ofqual levels.

## Professional recognition

This standard aligns with the following professional recognition:

- Engineering Council for Engineering Technician (EngTech)

## Consultation

## Progression Routes

ST0369 Non-destructive testing engineer (degree) L6
ST0292 Nuclear welding inspection technician L4

## Supporting uploads

**Mandatory qualification uploads**
ST0288_standard_hard_sift_evidence_Regarding the UK NDT Apprenticeship schemes.pdf
ST0288_standard_off-the-job-type-2-evidence_IB Compact rationale for mandating NDT_ CM_ WI qualifications 14.06.2024.docx
**Mandated degree evidence uploads**
**Professional body confirmation uploads**

## Involved employers

Rolls-Royce, GB Inspection Systems, Tata Steel, E.ON Technologies, NFW NDT, RWE Generation UK, Serco, Intertek, Amec Foster Wheeler, Lavender International NDT, Argyll-Ruane Ltd, Doosan Babcock Ltd, Aegleteq Ltd, EDF Energy, Ultramag Inspection Services Ltd, National Grid, Mistras, NDT Ltd (Sheffield), Applus RTD UK Ltd, Oceaneering International Services, The National Skills Academy (nuclear), University of Northampton, Semta, Institute of Mechanical Engineers, The British Institute of NDT

## Subject sector area

4.1 Engineering