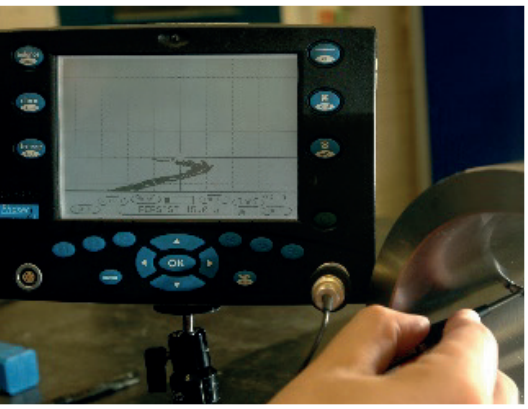
Non-Destructive Technologies Technician – **On-Programme Competency Development**

Apprenticeships

Document: AA022 • Issue 3 • June 2025





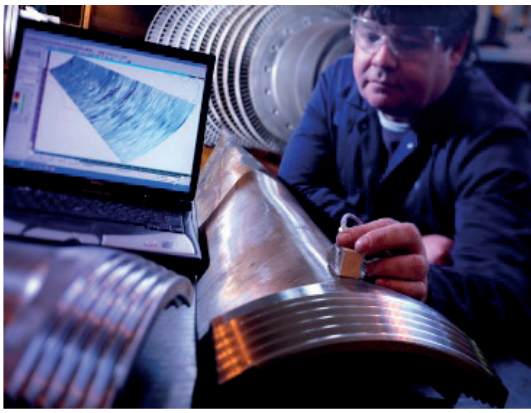
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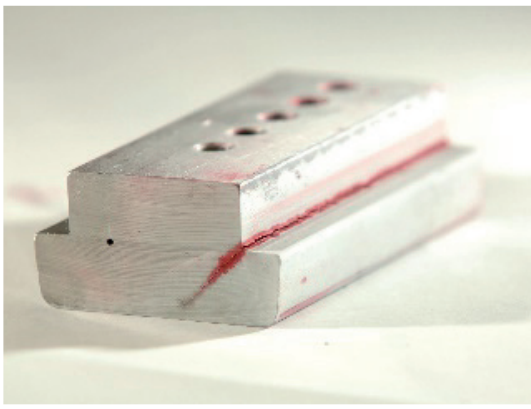
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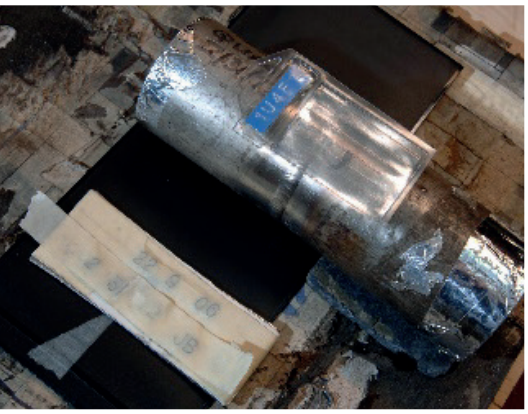
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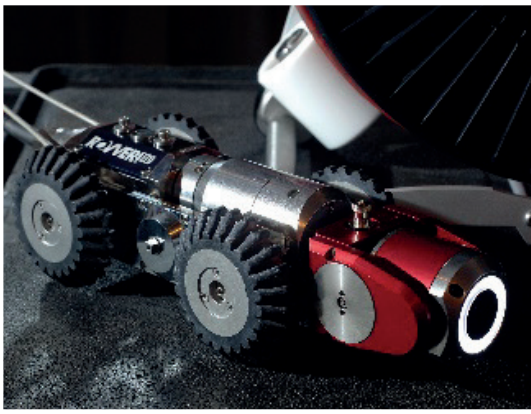
Assessment











Requirements and responsibilities for all those involved in the Non-Destructive Technologies Technician Apprenticeship

Supported by lead employer

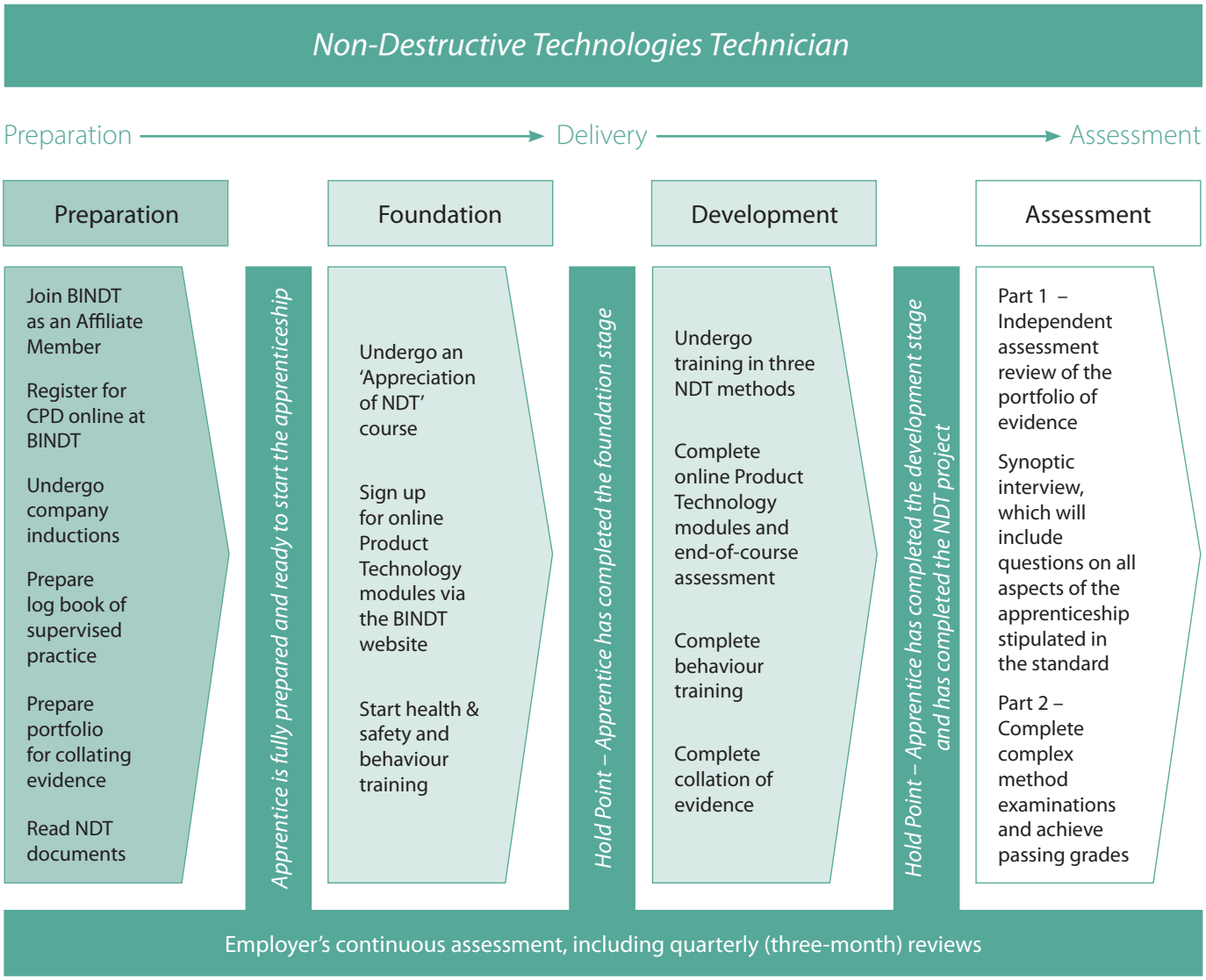
Rolls-Royce

BINDT THE BRITISH INSTITUTE OF NON-DESTRUCTIVE TESTING

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Overview of the Apprenticeship Scheme – Schematic



1. Introduction

This document explains the rationale for the development of the Non-Destructive Technologies Technician (NDTT) apprenticeship. It describes the process of how the scheme has been developed and, most importantly, it defines the responsibilities of those participating in the scheme.

Non-destructive testing (NDT) is a mechanism used by engineers to detect defects in materials and structures, either during manufacturing or while in service. Typically, they will use ultrasound, radiography, magnetic particle, eddy current, dye penetrant, infrared thermography and visual methods. These methods are available when the employer chooses which to include within the apprentice's programme.

Condition monitoring is a mechanism for either continually or periodically monitoring the condition, stability, effectiveness and output of plant, structures or machinery under the applicable working conditions, over short, medium or prolonged operation as appropriate, in order to establish normal response by measurement and to alert local engineering support when abnormal behaviour, response or output develops. Typical methods include vibration analysis, acoustic emission, lubrication management, thermography or ultrasound.

2. Apprenticeship Rationale

Every day, more than 25,000 inspections are carried out in factories and on site in the UK to detect defects and damage in a huge range of products, plant and structures; it is estimated that there are more than 120,000 NDT inspectors and over 10,000 CM practitioners operating worldwide.

The portability of personal NDT certification that has been commercially available and internationally recognised for decades created concerns for employee retention among employers. This, along with the relatively high costs of related training courses and associated assessment processes, resulted in reduced recruitment and limited support for any learning outside of the narrow, specific applications in which the employer was directly engaged. This was in contrast to a government vision for a young, flexible workforce, capable of adapting to uncertain future demand for manufactured products or services and being more aware of wider commercial, environmental and sustainable operations, including a shift to renewable forms of energy and servicing the associated plant and infrastructure.

The uptake in NDT apprenticeships over the last nine years has successfully rebalanced what was a skewed age demographic that had resulted in a reliance on older NDT inspectors nearing the age of retirement and thus averted a potential crisis in the supply of able-bodied inspectors.

A recent review of the original apprenticeship standard that alluded to a broader Engineering Technician with specialism in NDT methods, techniques, technologies and equipment builds on desirable outcomes that prevailed almost a decade ago, which were captured by a Trailblazer group that supported and was in turn supported by the BINDT Education and Professional Development Committee.

Whilst mostly still relevant, shifting government emphasis and vision, coupled with an analysis of the delivery and effectiveness of past initiatives, warranted a change in form, content and duration across a broad swathe of apprenticeships, including NDT apprenticeships.

The agreed outcomes in respect of tangible changes were as follows:

- A reduced duration of apprenticeship that now spans 24 months
- A reduced burden on apprentices and their employers
- Adjustment of the content and phasing of apprenticeship delivery, gateway and end-point assessment (EPA) stages in order to simultaneously achieve the most desirable mandatory vocational qualification and completion of the funded apprenticeship.

Other benefits in undertaking the NDTT apprenticeship include:

- Setting a high mandatory standard at the beginning of the apprenticeship, which includes wide-ranging engineering, health & safety and knowledge, skills and behaviours
- Offering considerable assistance with funding for training and examinations
- Providing incentives for taking prospective apprentices straight from school at the age of 16-18.

3. Apprenticeship Development

In terms of the process, the apprenticeship is split into three distinct sections: development of the 'NDT Standard'[1], development of the 'Assessment Plan'[2] and managing an apprentice through the apprenticeship scheme.

3.1 Non-Destructive Technologies Technician Apprenticeship Standard

The NDTT Apprenticeship Standard is a mandatory concept document that has been approved by the Minister of State for the Department for Business, Innovation & Skills and the Department for Education. The standard contains details of the knowledge, skills and behaviours that must be achieved during the apprenticeship. Also implicit within the standard is that knowledge, skills and behaviours omitted from the standard cannot be made mandatory and are unlikely to be funded. The NDTT Apprenticeship Standard has been established by a development group, which includes representatives from NDT inspection organisations and NDT users in the industry that included the lead employer and other employers who were consulted during the review process.

3.2 Assessment Plan

The NDT Assessment Plan is a mandatory document that is monitored and approved by the Office of Qualifications and Examinations Regulation (Ofqual) and ultimately approved by the Minister of State for the Department for Business, Innovation & Skills and the Department for Education. The Assessment Plan details 'What', 'By whom' and 'How' the output from the apprenticeship will be assessed. The assessment is split between three separate activities:

Part 1

- A document review, which will assess the portfolio of evidence (course attendance, test results, examination results, certificates and employer's reports), log book of experience, project report, continuing professional development (CPD) compliance, BINDT membership and anything else that is germane to the success of the apprenticeship; and
- An end-point interview covering technical considerations not captured by the mandatory qualifications nor directly evidenced in the portfolio, such as health & safety, environmental considerations, communication skills and behaviours.

Each of the seven themes outlined in the standard and their associated descriptors/exemplars are graded at either 'fail', 'pass' or 'distinction'.

Part 2

Theory and practical examinations in the third (complex) method with a result of less than 70% in any one element require a resit of that examination element, with up to two resits allowed to achieve certification, although only one of those will be funded via the apprenticeship.

Failure to achieve a result of 70% within the permitted number of resits for any one or more examination element(s) constitutes a fail in Part 2 of the EPA. The ultimate achievement of a result of 70% or greater in all four examination elements, within the limits on resits, constitutes a pass in Part 2 of the EPA.

There is no 'distinction' grade for Part 2 of the EPA.

Overall Apprenticeship Outcome

The overall apprenticeship grade is determined by the following rules:

- A fail in any one element from the full set in Parts 1 and 2 of the EPA results in a failed apprenticeship
- Any combination of 'pass' and 'distinctions' among the set of elements in Part 1 of the EPA combined with a 'pass' result for Part 2 of the EPA results in an apprenticeship 'pass' grade
- A 'distinction' in all elements of Part 1 of the EPA combined with a 'pass' result for Part 2 of the EPA results in an apprenticeship 'distinction' grade.

3.3 Managing the Apprenticeship

Notwithstanding the ongoing direct face-to-face support from the apprenticeship provider, all of the necessary guidance for apprentices and employers is provided within this document or detailed in a suite of documents available in the apprenticeship document download tab under the 'Education & Training' tab on the BINDT website.

4. Apprentice's Responsibilities

4.1 Preparation

Affiliate Membership of BINDT – The apprentice should register online with BINDT as an Affiliate Member of the British Institute of NDT (free membership). This will bring considerable benefits to the apprentice in terms of information and learning materials. In addition to the information provided online, the apprentice will have access to two of the Institute's monthly periodicals, *Insight* and *NDT News* (online copies). Being an Affiliate Member of BINDT is highly recommended.

Continuing Professional Development – At the same time as registering online to become an Affiliate Member of BINDT, the apprentice should also register to create and maintain an online record of CPD. This will enable them to maintain an employment/training/qualification paper trail, which is a requirement for the maintenance and periodic revalidation of certification and maintenance of the optional Engineering Technician grade of registration with the Engineering Council. Registering online for CPD is highly recommended.

Log of experience – It will be necessary for the apprentice to keep an up-to-date log in order to satisfactorily evidence supervised industrial application of the selected NDT methods as necessary for achievement of the related mandatory qualification. The log should be recorded on appropriate forms, filled in on a daily basis and counter-signed by the supervisor and is a mandatory requirement for NDT certification.

The end-point assessment will review the extent of experience gained for each NDT method during the apprenticeship. For the purpose of this apprenticeship, experience may include:

- Carrying out the method(s) under supervision
- Working closely with a suitably experienced inspector who is inspecting a weld, component or material, etc
- Working within a team carrying out the method(s)
- Fast-tracked training at a training centre
- Supervised practice at a training school
- Calibrating equipment
- Checking the parameters of equipment, such as probe angles, beam spread or magnetic flux, etc
- Carrying out any other activities of the method identified in the syllabus.

If the apprentice is attempting more than one method at the same time within the apprenticeship, it is recognised that there are some common themes, such as product technology, that run through all methods and therefore allowances (a reduction of time) in experience is allowed for.

The supervisor for on-the-job training (experience) will ensure that the apprentice keeps a daily log of experience and initials each entry to authenticate compliance.

Evidence Portfolio – It will be necessary for the apprentice to maintain an evidence portfolio for collating attendance certificates, examination results and other documents. Maintaining a portfolio of evidence is a mandatory requirement.

Apprenticeship Guidance Documents – These documents have been prepared by the NDT Trailblazer Development Group and are intended to offer guidance to the apprentice and the employer regarding the choice of NDT methods that need to be undertaken during the apprenticeship. The apprenticeship guidance documents[3] can be found on the BINDT website in the apprenticeship document download section.

Engineering Council's Documentation – Apprentices who successfully achieve a 'pass' or 'distinction' grade for the apprenticeship may use the evidence of achieving certain apprenticeship outcomes evident within either the portfolio of evidence or during the observational end-point assessment interview (OEPAI) to immediately facilitate or expedite a free application for Engineering Council registration at Engineering Technician grade. In any event, the same information with any additional evidence required may be utilised in a later application that unfortunately will be chargeable at that later point.

Codes of Conduct – The apprentice will need to understand and conform to the BINDT and UK-SPEC codes of conduct[4]. Both of these documents can be downloaded from the apprenticeship section of the BINDT website.

Employer's Units of Competence (EUCs) – These documents are Appendices 1 to 12 of this document but are filed individually for ease of use. The purpose of the employer's units of competence[3] is to provide guidance as to what each NDT method and other related activities include in terms of competency requirements. These documents can be downloaded from the apprenticeship section of the BINDT website.

Gantt Chart (work plan) – At the beginning of the apprenticeship, working with the employer, the apprentice should prepare a simple Gantt chart (work plan) of the intended apprenticeship programme. The work plan will detail what training and examinations will take place and when they will occur, as well as any other training modules. The work plan can be flexible and modifiable but needs to take into account the necessity of experience associated with each of the NDT Level 2 methods. Preparing a Gantt chart at the beginning of the apprenticeship is highly recommended.

4.2 Foundation Stage

During the foundation stage of the apprenticeship, which will last for the first three months, the apprentice is expected to gain a basic understanding of the knowledge, skills and behaviour requirements and will cover NDT methods, product technology, health & safety and behaviours. The apprentice, under the direction of the employer, will choose the three NDT methods they will undertake during the apprenticeship.

During the foundation stage, if the apprentice is a new recruit, they will also be involved in company employment processes, such as inductions, registrations, issue of documentation and issue of personal protective equipment (PPE), etc.

The apprentice must complete the foundation stage before they will be allowed to progress to the development stage.

4.3 Development Stage

The development stage will last from the end of the foundation stage and extend to within two months of the end-point assessment when the gateway requirements detailed in the next section have been achieved.

Within this phase of the apprenticeship and in addition to other supplementary training and assessment designed to deliver additional knowledge, skills and behaviours, the apprentice will secure qualification and certification at Level 2 in two of the following non-complex NDT methods:

- Dye penetrant testing
- Magnetic particle inspection
- Visual testing
- Welding inspection
- Lubrication management and analysis (field)
- Lubrication management and analysis (laboratory).

Furthermore, the apprentice will need to have completed the qualification process (only) necessary to become eligible for examinations leading directly to certification in the one complex method selected during the foundation stage.

During the development stage, the knowledge, skills and behaviours detailed in the Apprenticeship Standard must be achieved.

4.4 Gateway

The achievement of the above NDT method qualifications, including all of the necessary industrial supervised experience periods, health & safety training and instruction, employer behavioural assessments and expected level of competence on the job, along with the required level of business and environmental awareness, signals gateway through to the end-point assessment process. The apprenticeship main provider will detail the duration of experience periods that are necessary for the apprentice to become eligible for certification in the selected mandatory qualifications.

4.4.1 Desirable Behaviours

Other desirable behaviours beyond those listed as mandatory within the standard are as follows:

Leadership – Provide direction, implement plans and motivate people.

Teamwork – To effectively manage a team and to support others where appropriate.

Courage – Be willing to make independent decisions and be respected and understood when doing so.

Delivery – To consistently manage things through to timely completion.

Respect – Have respect for the abilities of others, particularly those working under their direction.

Influence – Have a positive impact and be able to proactively influence others in multiple contexts.

Compassion – Have empathy for the predicaments of others, particularly junior staff.

Ethics – To act with maturity, honesty, integrity and responsibility[4].

Clear focus – Avoid distractions and be a good communicator.

Environmental awareness – Undertake safe working practices for self and others.

Personal responsibility – Take responsibility as an individual and as a team member.

Behaviours will be assessed in the workplace by the employer and at the end-point assessment by the independent assessment organisation.

4.4.2 Activities to be Carried out Within the Last Three Months of the Development Stage:

- Complete the log book of supervised experience; and
- Assemble the portfolio of evidence, which will include, but not be limited to, the project report, training records, examination results notices, certificates of competence, certificates of attendance and any other useful information about achievements during the apprenticeship.

4.5 Preparing for the End-Point Assessment

Once the apprentice has agreed with the main provider that gateway requirements have all been satisfied, the former shall post the electronic records that constitute the complete apprenticeship portfolio on the ACE360 platform, where it can be accessed by the selected End-Point Assessment Organisation (EPAO). Once the portfolio of evidence has been received, the independent assessment organisation will offer an assessment date to the apprentice.

The format of the end-point assessment will be:

- Review of the portfolio of evidence (apprentice not present); and
- Synoptic observational end-point assessment interview, which will cover all aspects of the apprenticeship with a focus, but not exclusively, on those knowledge, skills and behaviours not covered by the mandatory qualifications, including other supplementary knowledge and skills requirements identified in the standard.

5. Employer's Responsibilities

This section explains the legal and technical responsibilities of the employer when employing an apprentice.

5.1 Pay and Conditions

There are minimum, and in some cases mandatory, requirements for determining the pay and conditions of the apprentice.

5.1.1 Paying the Apprentice

You must pay apprentices at least the minimum wage rate. The national minimum wage calculator (which can be accessed online at: www.gov.uk/take-on-an-apprentice/pay-and-conditions-for-apprentices) works out the exact amount that you have to pay an employee.

5.1.2 Conditions

Apprentices usually work for at least 30 paid hours a week and must work more than 16 hours. You must pay your apprentice for time spent training or studying for a relevant qualification, whether while at work or at a college or training organisation. You must offer apprentices the same conditions as other employees working at similar grades or in similar roles. This includes:

- Paid holidays
- Sick pay
- Any benefits you offer, for example childcare voucher schemes
- Any support you offer, for example coaching or mentoring.

5.1.3 Apprentices and Redundancy

You cannot usually make an apprentice redundant simply because you cannot afford to pay them, for example if your company runs out of work. This is because you have a contract to train them. You should get legal advice if you think you might have to make an apprentice redundant or want to end the apprenticeship early for another reason. If you have to make an apprentice redundant, then you are expected to make every effort to find another employer to take over the apprenticeship; BINDT, the professional body, will assist you in achieving this. If you are unsure whether you can commit to a full apprenticeship but would still like to hire an apprentice, you can use an apprenticeship training agency.

Apprenticeship agency fees are usually the minimum wage for the apprentice plus a management fee. The agency supervises the apprentice's learning, including their training and assessment. If you end the apprenticeship early (for example, you cannot afford to carry on employing the apprentice), the agency will find them another work placement. Contact the National Apprenticeship Service for more information on using an apprentice training agency (National Apprenticeship Service – Tel: +44 (0)800 015 0600).

5.1.4 Apprenticeship Agreement

You must sign an apprenticeship agreement with your apprentice. This gives details of what you agree to do for the apprentice, including:

- How long the apprenticeship is planned for
- The training you will give them
- Their working conditions
- The qualifications they are working towards
- Employer's company rules and disciplinary procedures.

You can write your own apprentice agreement or download an apprenticeship agreement template, accessed at: www.gov.uk/take-on-an-apprentice/apprenticeship-agreement

5.2 Managing the Apprenticeship

The apprenticeship covers a 24-month period in which the apprentice will be focused on learning, training and qualification without deviating to other activities, such as work or administration duties. Assuming you do not employ the apprentice through a training agency, you will need to manage the apprenticeship in the following manner.

5.2.1 Starting an Apprenticeship

- Check the apprenticeships framework for an apprenticeship in your industry and at a suitable level
- Register your interest in employing an apprentice with the National Apprenticeship Service, a prospective main provider or simply follow your company's own procedures for recruiting new staff
- Find a main provider that will manage apprenticeships for your industry. They will handle much of the administration for your apprentice's training, qualification and assessment
- Check your eligibility for any direct grant (for example employing an apprentice between the ages of 16 and 18 years inclusive) and discuss with your main provider or apply directly to the government apprenticeship website

- Advertise your apprenticeship – Your main provider will do this for you through apprenticeship vacancies. You can track your vacancies by registering as an employer. You may also wish to advertise your apprenticeship on the BINDT website and/or in one of its publications
- After selecting your apprentice, make an apprenticeship agreement with them.

5.2.2 Identification of Key Personnel

Before the commencement of the apprenticeship, there will be a need to identify and share contact details of key personnel. As a minimum, the list of key personnel will include:

- Employer's representative
- Main provider's representative
- Independent assessment body's representative
- Professional body's representative (BINDT)
- The apprentice's mentor
- The apprentice's supervisor for on-the-job training
- The apprentice.

5.2.3 Initial Considerations

Before the apprentice begins the apprenticeship, you should fulfil the following requirements:

- Carry out company inductions, enrolments and processes
- Issue PPE
- For each apprentice, apply for the appropriate forms and guidance documents from BINDT (the professional body), which will include:
  - Forms for recording supervised industrial experience (applying NDT method(s))
  - Apprentices' guidance documents (available on the document download page of the website[3])
  - Information sheet: How to join BINDT as an Affiliate Member
  - Information sheet: How to register for online CPD
- Select a main provider
- Through the main provider, select an end-point assessment organisation
- Select three NDT methods, including at least one complex method
- Prepare an apprenticeship Gantt chart or work plan.

5.2.4 Ongoing Activities and Commitments

If some of the following requirements are difficult to achieve, particularly if you are a small- to medium-sized enterprise (SME), then consult your main provider, which can provide assistance:

- Ensure that the apprentice has joined BINDT as an Affiliate Member
- Ensure that the apprentice registers for online CPD
- Facilitate courses and examinations throughout the apprenticeship
- Provide tuition to achieve English and maths qualifications, if required
- At three months from the apprenticeship start date, carry out the end-of-foundation-stage review and impose a hold point if the review is not satisfactory
- Carry out quarterly (three-monthly) appraisals and complete the appropriate check sheet (Appendix 17)
- Require corrective actions if the appraisals raise any non-compliances.

In a supportive way, you should also consider providing or facilitating:

- On-the-job coaching and learning
- Off-the-job learning
- Online learning and support

- Workbooks
- Mentoring and line management support
- Specific training for individuals.

5.2.5 Preparing for the End-Point Assessment

- Two months before the end of the apprenticeship, determine that the apprentice has completed all of the requirements for gateway to the end-point assessment process and is on course to meet all other requirements stipulated in the NDTT Apprenticeship Standard, including having kept their online CPD up to date
- Ensure that the apprentice has completed the following list of activities and that all appropriate documents are sent to the independent assessment organisation:
  - The apprentice has achieved all of the knowledge, skills and behaviours identified in the standard
  - The apprentice has achieved a minimum of 70% for each examination element of the two selected non-complex Level 2 methods
  - If the apprentice intends taking up the offer for free registration at Engineering Technician level with the Engineering Council, ensure that the apprentice has completed the UK-SPEC matching form
  - The apprentice has completed the apprenticeship completion document (see Appendix 15)
  - The apprentice and supervisor for on-the-job training have completed the log book of signed supervised experience records
  - The apprentice has collated the portfolio of evidence in a form that can be posted on the ACE360 platform via the main provider.

6. The Mentor

A mentor is a friendly professional colleague or consultant who guides a less experienced person by building trust and modelling positive behaviours. An effective mentor understands that their role is to be dependable, engaged, authentic and tuned into the needs of the apprentice. The concept of mentoring is simple, but successful implementation can be challenging. Characteristics of effective mentoring include the ability and willingness to:

- Value the apprentice as a person
- Develop mutual trust and respect
- Maintain confidentiality
- Listen both to what is being said and how it is being said
- Help the apprentice solve their own problem, rather than give direction
- Focus on the apprentice's development and resist the urge to produce a clone.

7. Training Organisation (Main Provider)

A main provider is an organisation that is regulated, funded, approved and listed on the Apprenticeship Provider and Assessment Register (APAR) by the Department for Education (DfE) in addition to being regulated and monitored by government agencies such as Ofsted. Main providers will provide all apprenticeship training that their organisation is independently capable of delivering or subcontract any apprenticeship training that their organisations cannot provide.

In the case of NDT training and BS EN ISO 9712-compliant certification mandatory qualifications, training providers must be approved as Approved Training Organisations (ATOs) for training and/or as Authorised Qualifying Bodies (AQBs) for examinations by an accredited Certification Body as defined in ISO/IEC 17024. BINDT is a UK-accredited Certification Body with appropriate scope of authorisation for these activities.

In the case of BS EN 4179, training and assessment organisations are known as either Inside Agencies or Outside Agencies and fall under the administration and control of the UK National Aerospace NDT Board (UK NANDTB), in collaboration with BINDT, who provide auditing services for those specific entities in order to assure the necessary recognition and oversight.

Most employers work in partnership with main providers to deliver their apprenticeship programme. If you so wish, a main provider will help you:

- Identify the right apprenticeship for your business requirements
- Recruit an apprentice
- Develop a training plan that reflects both the apprentice's needs and your needs
- Review and test the progress of an apprentice and provide feedback
- Provide training to support the apprentice with off-the-job learning and the knowledge elements of the programme.

A main provider usually holds the apprenticeship delivery contract, which is managed by the DfE.

You can find the most suitable main provider for your business by thinking about:

- Your business area and the job role of the programme (and potential frameworks and levels)
- The size and scope of the programme (numbers, geography and age groups)
- Whether you will integrate your in-house training materials into the programme.

8. The Independent Assessment Organisation

- Organisations can only be selected to undertake the independent end-point assessment of apprentices if they have legal entity status and are approved by Ofqual.
- Employers will select their preferred EPAO.
- The main training provider will then contact the end-point assessment organisation on behalf of the employer.

The independent assessment organisation will have had no involvement in the development of the apprentice. The end-point assessment will be conducted by two suitably qualified and trained interviewers (assessors). They will be Engineering Council registrants at IEng or CEng grade of registration and shall have substantial experience in NDT. The independent assessment organisation will take all reasonable steps in their selection of interviewers to ensure that potential conflicts of interest are avoided and any reasonable adjustments to the assessment process are applied as and where appropriate.

The independent assessment organisation will assess the apprentice's outcomes at the end of the apprenticeship by:

- Carrying out a review of the portfolio of evidence assessment; and
- Carrying out a synoptic assessment interview of all of the knowledge, skills and behaviour outcomes. The synoptic observational end-point assessment interview will cover all aspects of the apprenticeship with a focus, but not exclusively, on those knowledge, skills and behaviours not covered by the mandatory qualifications, including other supplementary knowledge and skills requirements identified in the standard.

Further details of the portfolio of evidence assessment and synoptic OEPAI can be seen in the Assessment Plan.

After the documentation review and the synoptic assessment interview, the independent assessment organisation will make a decision as to whether the apprentice has been successful in Part 1 of the EPA process and, if so, whether to award a 'pass' or a 'distinction' against the various aspects of the seven themes outlined in the Apprenticeship Standard.

In Part 2 of the EPA process, the criterion for awarding a 'pass' against the mandatory qualifications elements is to achieve an overall examination result of 70% or above.

The overall apprenticeship grade is then determined by the following rules:

- A 'fail' result in any one element of the EPA Parts 1 and 2 constitutes a 'fail' result for the apprenticeship.
- Any combination of 'pass' or 'distinction' grades, where applicable, in the full set of elements of Parts 1 and 2 constitutes a 'pass'.
- A 'distinction' grade in every element of the full set of elements of Part 1 and a 'pass' in Part 2 of the EPA constitutes a 'distinction'.

9. The Professional Body

The professional body for NDT, CM, diagnostic engineering and all other materials and quality testing disciplines in the UK is BINDT.

BINDT will offer support and advice to all those involved in NDT apprenticeship schemes, including the apprentice, the employer, the main provider and the independent assessment body. Some useful email addresses are listed below.

Information and advice on:

Apprenticeships – **apprenticeships@bindt.org**

Website, CPD and publications – **info@bindt.org**

BINDT membership – **membership@bindt.org**

Training and certification – **pcn.enquiries@bindt.org**

General advice – **info@bindt.org**

The contact telephone number for BINDT is: +44 (0)1604 438300.

BINDT will issue apprentices with an apprenticeship pack at the beginning of the apprenticeship.

10. External Quality Assurance

External quality assurance is provided by Ofqual, which will audit and monitor BINDT in its position as EPAO, on all aspects of its understanding, quality control and effective delivery of end-point assessments for NDT apprentices.

In particular, the standard, consistency, impartiality, availability and performance of assessors will be closely monitored.

Additionally, internal audit will be necessary and evidenced in order to inform the external auditors and evidence compliance with the Non-Destructive Technologies Technician Apprenticeship Standard and Assessment Plan.

11. Occupational Competence of Key Officers

It is recommended that anyone involved in the assessment of vocational achievement undergoes training. An example of this training is 'Level 3 Certificate in Assessing Vocational Achievement' (https://shorturl.at/aNZZY).

The assessors and advisors referred to in this section include:

- The independent assessment organisation interviewers (assessors)
- The professional body
- The main providers
- The employer
- The mentor
- The supervisor of on-the-job training (supervised practice)
- Company internal audit assessors
- Independent assessment organisation internal audit assessors.

Assessment must be carried out by competent assessors who must have, as a minimum, demonstrable knowledge and experience of non-destructive testing or the technical module they are assessing.

Personnel and organisations involved in the delivery of the NDTT apprenticeship are: the employer, main providers, the mentor, the supervisor of on-the-job training (supervised practice) and quality assurance assessors.

11.1 Independent Assessment Organisations

Independent assessment organisation interviewers (assessors) must be trained interviewers and have knowledge of NDT technical competence. This will be demonstrated by a relevant certificate of competence, technical qualification or by proven industrial experience of the technical areas to be assessed. Two assessors forming the judging panel will be registered with the Engineering Council at IEng level or above. The assessors must include someone with the knowledge, skills and experience of the mandatory qualifications being undertaken by the apprentice.

Assessors must also be fully conversant with the independent assessment organisation's assessment recording documentation used for scoring the portfolio of evidence and the principle of a synoptic end-point assessment interview, together with other relevant documentation.

11.2 The Professional Body (BINDT)

The professional institute is in a position to provide an extensive amount of information for further learning, online CPD, membership at affiliate grade and optional Engineering Council registration through its Professional Engineering Institution (PEI) committee. BINDT staff involved with both the apprenticeship and Engineering Council registration processes will be competent to offer advice and guidance.

11.3 Main Providers

Main providers must be on the DfE-approved training provider database (APAR).

Training organisations providing NDT training and/or certification, including employer-based training, must be approved by the professional institute (BINDT) as ATOs and, where applicable, as AQBs.

11.4 Employers

Employers must be familiar with quality plans, including Gantt charts (work plan) and the process by which they monitor progress and assign corrective actions. Employers must prepare an apprenticeship Gantt chart (work plan) that demonstrates how the apprentice will complete the apprenticeship in the given time. Employers must also provide resources and allocate time for on-site and off-site training.

11.5 Mentors

Mentors need not have any specific qualifications; the role requires more of a friendly face and being prepared to listen and offer advice. It is advised that the mentor does not have any other role within the apprenticeship. It is also advised that the mentor undertakes a one-day mentor's training course.

11.6 Supervisor of On-the-Job Training (Supervised Practice)

The supervisor of on-the-job training must be certificated to a minimum of NDT Level 2 in the method they are supervising. The supervisor needs to confirm that the on-the-job training has been carried out in a correct manner and the hours booked against supervised practice provide an accurate record.

Independent assessment organisations, employers and main providers will use the EUCs identified as Appendices 1 to 12 as a guide to knowledge and experience required by the competence. To avoid making this document overlong and unwieldy, the EUCs (Appendices 1 to 12) are filed as separate documents in the apprenticeship area of the BINDT website.

11.7 Company Internal Audit

Internal quality assurance (the internal audit) relates to measures put in place by the employer to verify that the processes and activities of the apprenticeship scheme are being carried out correctly and in a timely fashion.

An internal audit must be carried out by a competent auditor selected by the employer. The employer has overall responsibility for the internal audit.

11.8 Independent Assessment Organisation's Internal Audit Assessors

An internal audit of the independent assessment organisation will be carried out by competent auditors.

The internal auditors of the independent assessment organisation must be independent of the part of the organisation carrying out the assessment of the apprentices.

Internal auditors will be expected to regularly review their skills, knowledge and understanding and, where applicable, undertake continuing professional development to ensure that they are carrying out workplace quality assurance (internal audit) of assessment processes and practices to the most up-to-date procedures and standards.

Internal auditors will be expected to be fully conversant with the terminology used in the employer units of competence, NDT documentation and the UK-SPEC, against which the assessments and audits are to be carried out.

12. Glossary

Apart from the acronyms mentioned in this document, other acronyms have been added to provide the reader with useful information they may come across when reading other NDT documentation.

AQB	Authorised Qualifying Body
ATO	Approved Training Organisation
BINDT	British Institute of Non-Destructive Testing
CEng	Engineering Council, Chartered Engineer registration grade
CPD	Continuing Professional Development
CSD	BINDT Certification Services Department
DfE	Department for Education
Gantt	An illustration of a project schedule that was devised by Henry Gantt in 1910
IEng	Engineerin Council, Incorporated Engineer registration grade
IOSH	Institute of Occupational Safety and Health
NDT	Non-Destructive Technologies
NDTT	Non-Destructive Technologies Technician

13. References

Ref: 1 Non-Destructive Technologies Technician Apprenticeship Standard.

Ref: 2 Non-Destructive Technologies Technician Apprentice Assessment Plan.

Ref: 3 Employer's Units of Competence documents – See appendices below.

Ref: 4 BINDT and UK-SPEC codes of conduct. Available at: www.bindt.org/downloads/CP27.pdf / www.engc.org.uk/standards-guidance/guidance/statement-of-ethical-principles

14. Appendices

Appendices 1-12 inclusive can be found in the Apprenticeship Document Download section of the BINDT website.

Appendix 1 Employer's Units of Competence – Visual Testing NDT (*see separate document*)

Appendix 2 Employer's Units of Competence – Penetrant Testing NDT (*see separate document*)

Appendix 3 Employer's Units of Competence – Magnetic Particle Testing NDT (*see separate document*)

Appendix 4 Employer's Units of Competence – Ultrasonic Testing NDT (*see separate document*)

Appendix 5 Employer's Units of Competence – Radiographic Testing NDT (*see separate document*)

Appendix 6 Employer's Units of Competence – Eddy Current Testing NDT (*see separate document*)

Appendix 7a Employer's Units of Competence – Thermography Testing (Passive) NDT (*see separate document*)

Appendix 7b Employer's Units of Competence – Thermography Testing (Active) NDT (*see separate document*)

Appendix 8 Employer's Units of Competence – Management of Human Factors (Behaviours) (*see separate document*)

Appendix 9 Employer's Units of Competence – Sector-Specific Product Technology (*see separate document*)

Appendix 10 Employer's Units of Competence – Organisational Health, Safety & Environment (HSE) Requirements (*see separate document*)

Appendix 11 Employer's Units of Competence – Quality Assurance, Audit and Surveillance of NDT and Related Activities (*see separate document*)

Appendix 12 Employer's Units of Competence – Project Management with a focus on Non-Destructive Testing (*see separate document*)

Appendix 13 Description of NDT Methods

Appendix 14 A List of Other Technical and Safety Modules

Appendix 15 Apprenticeship Completion Checklist

Appendix 16 UK-SPEC Competency Matching Form for EngTech Registration

Appendix 17 Employer's Appraisal Checklist

Appendix 13

Description of NDT Methods

The apprentice will undertake safety-critical and complex training, both in a classroom environment and on site, which will include NDT Level 2 training in a minimum of three methods and which will comprise at least one complex method (mandatory) and a choice of any two other methods. Each method is described briefly below:

- **Visual testing:** Visual inspection, with or without optical aids, is the original method of NDT. Many defects are surface-breaking and can be detected by careful direct visual inspection. Optical aids include low-power magnifiers, microscopes, telescopes and also specialised devices such as borescopes, endoscopes and other fibre-optic devices for the inspection of restricted-access areas. These devices can also be used with television camera systems. Much of the success of visual inspection depends on the surface condition and the lighting arrangements. Surface preparation such as cleaning and etching is often used.
- **Ultrasonic testing:** Ultrasonic methods of NDT use beams of mechanical waves (vibrations) of short wavelength and high frequency, transmitted from a small probe and detected by the same or other probes. Such mechanical waves can travel large distances in fine-grain metal, in the form of a divergent wave with progressive attenuation. The frequency is in the range from 0.1 to 20 MHz and the wavelength is in the range from 1 to 10 mm. The velocity depends on the material and is in the range from 1000-6000 m/s. The technique detects internal, hidden discontinuities that may be deep below the surface. Transducers and coupling wedges are available to generate waves of several types, including longitudinal, shear and surface waves. Applications range from thickness measurements of thin steel plate to internal testing of large turbine rotors.
- **Radiographic testing:** Radiography uses X-rays or gamma rays to produce an image of an object on film. The image is usually natural size. X-rays and gamma rays are very short-wavelength electromagnetic radiation that can pass through solid material, being partly absorbed during transmission. Thus, if an X-ray source is placed on one side of a specimen and a photographic film on the other side, an image is obtained on the film of the thickness variations in the specimen, whether these are surface or internal. This is a well-established technique that gives a permanent record and is widely used to detect internal flaws in weldments and castings and to check for misconstructions in assemblies. The source of radiation is either an X-ray tube or a pellet of radioactive material emitting gamma radiation.
- **Eddy current testing:** In eddy current testing, a coil carrying an AC current is placed close to the specimen surface or around the specimen. The current in the coil generates circulating eddy currents in the specimen close to the surface and these in turn affect the current in the coil by mutual induction. Flaws and material variations in the specimen affect the strength of the eddy currents. The presence of flaws and so on is therefore measured by electrical changes in the exciting coil. Both voltage and phase changes can be measured, but some simpler instruments measure only the voltage changes. The strength of the eddy currents produced depends on the electrical conductivity of the specimen, the magnetic permeability (for a ferromagnetic specimen), the stand-off distance between the specimen and coil, the AC frequency used in the exciting coil and the dimensions of the coil and specimen.
- **Magnetic particle testing:** This method is used for the detection of surface and near-surface flaws in ferromagnetic materials and is primarily used for crack detection. The specimen is magnetised, either locally or overall, and, if the material is sound, the magnetic flux is predominantly inside the material. If, however, there is a surface-breaking flaw, the magnetic field is distorted, causing local magnetic flux leakage around the flaw. This leakage flux is displayed by covering the surface with very fine iron particles, applied either dry or suspended in a liquid. The particles accumulate at the regions of flux leakage, producing a build-up that can be seen visually, even when the crack opening is very narrow. Thus, a crack is indicated as a line of iron powder particles on the surface.
- **Penetrant testing:** This is a simple, low-cost method of detecting surface-breaking flaws such as cracks, laps, porosity, etc. To be detected, the flaw must reach the surface to be tested. Penetrant testing is one step up from visual inspection and offers many advantages, such as speed, large-area coverage and cheapness. It is usually a six-stage process:
  - Surface cleaning (degreasing, etc)
  - Application of a penetrant liquid (dipping, spray, brush)
  - Removal of excess penetrant (solvent, water)
  - Application of developer

- Inspection of the test surface (visual, television camera)
- Post-inspection cleaning (anti-corrosion solutions).

- **Infrared thermography testing:** Thermography is a technique of obtaining an image of the heat distribution over the surface of an object. The usual method is to use a special television camera with an infrared-sensitive detector and a lens that transmits infrared radiation. Such cameras can operate at normal video rates. Temperature variations in the subject are then displayed as shades of grey or can be converted into a pseudo-colour image. Temperature variations as small as 0.1°C can be detected. The two main fields of application are:
  - To look at the heat distribution in hot specimens, such as furnace walls, insulated structures, electronic circuits, etc, in a steady state – generally known as passive thermography; and
  - To provide a pulsed source of heat on one side of a specimen and examine the other side for non-uniformities in infrared emission that would correspond to internal inhomogeneities or large flaws – generally known as active thermography.

Appendix 14

List of Other Technical and Safety Modules

A list of other NDT modules and health & safety modules are listed below. This list is not exhaustive and provided that modules not listed are conceptually included in the standard, then they can be used as part of the requirement.

Technical

- Oxide thickness measurement
- Corrosion under insulation
- Detection of hydrogen cracking (induced cold cracking associated with welding)
- Detection of hydrogen cracking (associated with operating environments)
- Identification of dissimilar metals using X-ray fluorescence (XRF) portable equipment
- Detection of delaminating bonded joints
- Critical defect sizing
- Introduction to time-of-flight diffraction (TOFD)
- Introduction to phased array
- Introduction to thermal imaging
- Product technology (materials, defects and failure mechanisms)
- Bolt/shaft testing – the effects of mode conversion
- Understanding of condition monitoring
- Introduction to welding processes
- Introduction to material science
- Introduction to materials replication
- Introduction to computer-aided design (CAD)
- Manufacturing with engineering materials
- Principles of solid mechanics and dynamics
- Engineering polymers and ceramics
- Materials selection, processes and failure investigation
- Project management and individual project
- Microstructural engineering of materials
- Degradation and evaluation
- Level 3 certificate in assessing vocational achievement
- Hardness testing using portable equipment
- Remote visual testing using borescopes, video probes and other remote visual systems
- Effective communication and presentation skills
- Introduction to budgetary control

Health & Safety

- IOSH Managing Safely course
- Training in working at heights
- Training in confined space working
- Training in chemical handling
- Training in basic electrical safety
- Training in manual handling of objects
- Preparing risk assessments
- Preparing method statements
- Training in machinery safety
- First aid training
- Rope access training
- Working in a nuclear environment
- Defensive driving
- Basic radiation safety
- Safety awareness of using hazardous NDT consumables
- Personal Track Safety (PTS)

Appendix 15

Apprenticeship Completion Checklist

Apprentice/Apprenticeship details		
Apprentice's name:		
Apprentice's employer:		
Apprentice's PCN or EN 4179 number:		
BINDT membership number:		
Apprenticeship standard title:		
Apprenticeship assessment plan title:		
Date apprenticeship commenced:		
Date apprenticeship finished:		
Statement	**Answer Yes/No**	**Supporting details – Where to find the evidence**
I have completed two of the three NDT methods and passed the examinations		
I have learned all of the knowledge requirements identified in the standard		
I have acquired all of the skills requirements identified in the standard		
I have acquired all of the behaviours requirements identified in the standard		
I have fully completed the log book		
I have collated my portfolio of evidence		
I have completed my UK-SPEC matching form		
I have kept my online CPD up to date		
I have conformed to the BINDT and UK-SPEC codes of conduct		
I am ready for my end-point assessment		
Apprentice name:	Date:	Signature:
Employer:	Date:	Signature:

Appendix 16

UK-SPEC Competency Matching Form for EngTech Registration

The Competence and Commitment Standard for Engineering Technicians. *Engineering technicians must be competent throughout their working life, by virtue of their education, training and experience, to:*	**The examples given below are intended to help you identify activities you might quote to demonstrate the required competence and commitment for EngTech registration. These are not exhaustive. Moreover, you are not required to give multiple examples to demonstrate competence and commitment.** *Tell us about your career, education and training. Explain how the experience you have gained has made you more competent.*	**Fill in the boxes below with your own self-assessment.**
A Use engineering knowledge and understanding to apply technical and practical skills. *This includes the ability to:*	**The reviewers will be looking for evidence that you have the know-how to do the job and were able to go beyond the immediate requirements and use your initiative and experience to solve a problem or improve a process.**	
A1 Review and select appropriate techniques, procedures and methods to undertake tasks.	Describe: ■ An example of work you did that went well, the choices you made and the outcome; ■ Something in your work that you were involved in which didn't quite work and explain why; or ■ A technique, procedure or method you improved upon and explain why.	
A2 Use appropriate scientific, technical or engineering principles.	Drawing from your direct experience, this might be an explanation of how a piece of equipment, system or mechanism works.	
B Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services. *In this context, this includes the ability to:*	**Explain how you contribute to one or more of these activities.**	
B1 Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions.	Show an example of how you have used measurement, monitoring and assessment to: ■ Identify the source of a problem; ■ To identify an opportunity; or ■ To propose a solution.	

B2	Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety, security and environmental impact.	Illustrate how you make decisions about: ■ What information, material, component, people or plant to use; ■ How to introduce a new method of working; or ■ What precautions you took. Describe how you have contributed to best practice methods of continuous improvement, for example ISO 9000.	
C	**Accept and exercise personal responsibility.** *This includes the ability to:*	**Describe an experience or instance where you have had to accept personal responsibility for seeing a process through to completion within agreed targets.**	
C1	Work reliably and effectively without close supervision, to the appropriate codes of practice.	Your evidence should show how you identified and agreed what had to be done and to what standards on a typical project.	
C2	Accept responsibility for the work of self or others.	Your evidence could include: minutes of meetings; site notes and instructions; variation orders; programmes of work; specifications, drawing and reports; or appraisals. Activity not associated with your job can contribute to evidence.	
C3	Accept, allocate and supervise technical and other tasks.		
D	**Use effective communication and interpersonal skills.** *This includes the ability to:*	**You will need to show you can: contribute to discussions; make a presentation; read and synthesise information; or write different types of documents.**	
D1	Use oral, written and electronic methods for the communication in English of technical and other information.	Your evidence could include: letters; reports; drawings; emails; minutes, including of progress meetings; appraisals; work instructions; and other task planning and organising documents. Your application itself will be relevant.	
D2	Work effectively with colleagues, clients, suppliers or the public, and be aware of the needs and concerns of others, especially where related to diversity and equality.	Show examples of how this has occurred and your role at the time. Describe your role as part of a team. Describe a situation where you put your awareness into practice.	
E	**Make a personal commitment to an appropriate code of professional conduct, recognising obligations to society, the profession and the environment.**	**Your commitment will be to become part of the profession and uphold the standards to which all members subscribe. You need to show that you have read and understood your institution's code of conduct.**	
E1	Comply with the code of conduct of your institution.	The professional review involves demonstration of, or discussion of, your position on typical ethical challenges.	

E2	Manage and apply safe systems of work.	Provide evidence of applying current safety requirements, such as risk assessment and other examples of good practice you adopt in your work. You will need to show that you have received a formal safety instruction relating to your workplace (such as a CSCS safety test in the UK), or an update on statutory regulations. In the UK an example would be Control of Substances Hazardous to Health (COSHH) requirements.	
E3	Undertake engineering work in a way that contributes to sustainable development. *This could include an ability to:* ■ Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously.	Show examples of methodical assessment of risk in specific projects/ actions taken to minimise risk to society or the environment.	
E4	Carry out and record CPD necessary to maintain and enhance competence in own area of practice, including: ■ Undertake reviews of own development needs ■ Plan how to meet personal and organisational objectives ■ Carry out planned (and unplanned) CPD activities ■ Maintain evidence of competence development ■ Evaluate CPD outcomes against any plans made ■ Assist others with their own CPD.	This means demonstrating that you have actively sought to keep yourself up to date, perhaps by studying new standards or techniques, or made use of magazines, lectures organised by professional engineering institutions and other opportunities to network in order to keep abreast of change.	
E5	Exercise responsibilities in an ethical manner.	Give an example of where you have applied ethical principles as described in the statement of ethical principles on page 33 of the UK-SPEC. Give an example of where you have applied/upheld ethical principles as defined by your organisation or company, which may be in its company or brand values.	

Appendix 17

Employer's Appraisal Checklist

Apprentice being appraised:		
Question	**Answer Yes/No**	**Comment**
Is this the:		
Three-month appraisal?		
Six-month appraisal (hold point)?		
Nine- to 21-month appraisal?		If yes, please specify:
End-of-apprenticeship appraisal?		
Is the apprentice making satisfactory progress with the three NDT methods?		
Is the apprentice making satisfactory progress in attaining technical knowledge?		
Is the apprentice making satisfactory progress in acquiring the skills?		
Is the apprentice making satisfactory progress in understanding and demonstrating the behaviours?		
Is the apprentice making satisfactory progress in attaining knowledge of health & safety?		
Is the apprentice's progress at the right point on the Gantt chart?		
Is the apprentice's log book up to date?		
Is the apprentice maintaining a CPD record online?		
Please record any other comments you wish to make:		
Employer's name:		
Employer's company:		
Date:		
Signature:		



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