

## PCN/GEN/AERO A0 Issue 10 dated 1<sup>st</sup> January 2022

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## PCN QUALIFICATION AND CERTIFICATION OF NDT PERSONNEL FOR THE AEROSPACE MULTI-SECTOR

**Note:** Requirements contained in this document are supplementary to those contained in the current edition of the PCN General Requirements for Certification of Personnel Engaged in Non-Destructive Testing.

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## INTRODUCTION

This document covers the specific requirements for the PCN examination and certification of Level 2 and/or Level 3 personnel within the aerospace sector for the non-destructive testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds in the aerospace manufacturing, service, maintenance, and overhaul industries.

The documents listed under 'Appendices to this document' are supplementary to, and amplify for each NDT method, the provisions of this document. Any person requiring information concerning the content of PCN documents should visit [www.bindt.org](http://www.bindt.org) or email [pcn@bindt.org](mailto:pcn@bindt.org).

## APPENDICES TO THIS DOCUMENT

- Appendix A1 – Eddy current testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds
- Appendix A2 – Ultrasonic testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds
- Appendix A3 – Radiographic testing of aerospace materials, products, components, assemblies or sub-assemblies
- Appendix A4 – Radiographic testing of aerospace welds
- Appendix A5 – Magnetic particle testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds
- Appendix A6 – Liquid penetrant testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds
- Appendix Z1 – Examination syllabus compendium
- Appendix Z2 – Example examination questions

## NORMATIVE REFERENCES

ISO/IEC 17024	General requirements for bodies operating certification systems of persons
BS EN ISO 9712	General principles for qualification and certification of NDT personnel
ISO 18490	Vision requirements (aerospace)
EN 4179	Aerospace series – Qualification and approval of personnel for non-destructive testing, which is technically equivalent to AIA-NAS-410
AIA-NAS-410	Certification and qualification of non-destructive test personnel
CAP 747: GR No 23	Personnel certification for non-destructive testing of aircraft, engines, components and materials. <a href="https://publicapps.caa.co.uk/docs/33/CAP747_21JUL17_BM.pdf">https://publicapps.caa.co.uk/docs/33/CAP747_21JUL17_BM.pdf</a>

## RELEVANT PCN DOCUMENTS

Appendix E3 (to PCN/GEN) radiation safety

CP08: Approval of NDT training organisations

CP09: Requirements for Authorised Qualifying Bodies

CP17A: Recertification of PCN/AERO Level 3 through the credit system

CP19: Informal access to BINDT Authorised Qualifying Bodies by third parties

CP22: Grading of PCN practical examinations

CP25: Guidelines for the preparation of NDT procedures and NDT instructions in PCN examinations

CP27: Code of ethics for PCN certificate holders

PSL/04: PCN examination availability

PSL/08A: PCN documents – issue status

PSL/30: Log of pre-certification employment and experience

PSL/31: Information – use of the PCN logo

PSL/44/44A: Vision Requirements

PSL/49: PCN examination exemptions for holders of current valid certificates issued by other certification bodies

PSL/57A/AERO: Application form for INITIAL examinations

**All PCN documents are available for download from <http://www.bindt.org>**

## 1. SCOPE

- 1.1. This document and the associated appendices cover the specific requirements for the PCN qualification examination and certification of personnel performing non-destructive testing within the aerospace sector for the 'non-destructive testing of aerospace materials, products, components, assemblies or sub-assemblies and aerospace welds in the aerospace manufacturing, service, maintenance and overhaul industries' in order to provide qualification examinations and certification in compliance with ISO 9712. The PCN AERO scheme also claims recognition under EN 4179 as another "*recognised NDT qualification programme*" as validated by the UK NANDTB in document NANDTB/10. The requirements herein are intended primarily for employees of organisations seeking to comply with EASA Part 145 regulations but may also be utilised for Part 21 organisations and aerospace materials suppliers (subject to the requirements of the aerospace prime contractors) for training, experience and qualification examinations for personnel performing NDT in the aerospace manufacturing, service, maintenance and overhaul industries.
- 1.2. This series of documents is designed to provide comprehensive information for users of the third-party PCN certification Scheme. The complete list of published PCN documents can be found on the BINDT web portal using the document reference PSL/8A. PSL/8A is updated and republished every three months on the Institute's web site at [www.bindt.org](http://www.bindt.org), where the PCN document suite of documents are available for download free of charge. It is a requirement that all training and examination organisations are in possession of the latest revision of PCN documents; as such, they may register with the 'PCN Update Scheme' which guarantees that they will automatically receive copies of revised PCN documents upon their release.
- 1.3. It is intended, through publication of these documents, to provide PCN candidates, certificate holders and their employers with all relevant information. However, if further information or advice is required on any certification matter, please contact the Certification Services Department of BINDT on telephone number +44 (0)1604 438300, or email [pcn@bindt.org](mailto:pcn@bindt.org).

## 2. APPLICABILITY AND RECOGNITION

- 2.1. PCN Aerospace certification is awarded, following success in initial or revalidation processes and/or examinations, to personnel using NDT methods to test and/or accept materials, products, components, assemblies or sub-assemblies within the aerospace manufacturing, service, maintenance, and overhaul industries.
- 2.2. The UK Civil Aviation Authority (CAA) has issued guidance in publication CAP 747 GR No 23 for PCN aerospace sector certification.
- 2.3. The UK National Aerospace NDT Board (UK NANDTB) has published document NANDTB/10 – Policy on recognition of PCN aerospace certificates for NDT personnel operating under EASA Part 145.

### ***NANDTB/10 – Policy on recognition of PCN aerospace certificates for NDT personnel operating under EASA Part 145***

In accordance with the requirements within EN 4179, the NANDTB is entitled to recognise "*other NDT qualification programmes*", and in this regard the UK National Aerospace NDT Board recognises the PCN AERO scheme. This includes PCN Aero examinations conducted at overseas PCN aerospace approved Authorised Qualifying Bodies (AQBs) that are also approved Outside Agencies (OAs).

It remains the responsibility of the Nominated Level 3 (as defined in the UK CAA Generic Requirement number 23) to determine whether additional job-specific training and examination, covering the NDT processes and products utilised by the employer, is required. Note: CAA-defined 'Nominated Level 3' equates to EN 4179 'Responsible Level 3'.

## 3. COMPLIANCE

- 3.1. PCN Certification issued as a result of success in an examination defined herein complies with the European standard BS EN ISO 9712 and may be used by employers of Aerospace NDT personnel to satisfy the *qualification requirements* of the European standard EN 4179 where PCN AERO is acknowledged as a recognised scheme in terms of qualification.
- 3.2. When Personnel Certification for Non-Destructive Testing (PCN) is awarded, the employing organisation shall authorise those persons to which PCN certification has been issued, so that they may carry out non-destructive testing in the method, technique, and sector for which they hold certification.
  - 3.2.1. The employer authorisation shall be in accordance with the employer's Written Practice and shall be in addition to any PCN certification (see clause 4.1).
  - 3.2.2. An employer cannot authorise personnel for another employer.
  - 3.2.3. Individuals cannot qualify or authorise themselves. (If self-employed, the self-employed person shall be the employer, and shall act accordingly, for employer see 4.13.)

3.2.4. The employer shall be responsible in issuing the employees authorisation to operate, they shall satisfy themselves that those person(s) holding PCN Aerospace certification are competent to inspect products using the method and techniques for which PCN certification is held. Where a wider certification scope is used (PCN Aerospace) the employer shall be responsible for arranging a supplemental examination representative of the employer's processes and products where required. Such supplementary examinations shall be conducted through an approved Outside Agency.

#### 4. DEFINITIONS AND ABBREVIATIONS

The following definitions apply within this document and its appendices:

- 4.1. **Authorisation** – Written statement made by an employer confirming that an individual has met the applicable requirements of this specification and the company's written practice, where the employer has deemed the certified person competent to carry out NDT on its behalf.
- 4.2. **Operating Approval** – Written statement issued by the employer, based upon the scope of certification, authorising the individual to carry out defined tasks. Such authorisation can be dependent on the employer having provided job- or task-specific training.
- 4.3. **Authorised Qualifying Body (AQB)** – A body, independent of any single predominant interest, satisfying the criteria detailed in PCN document reference CP09 and authorised by the British Institute of NDT to prepare and administer PCN examinations to qualify NDT personnel. An Authorised Qualifying Body within the PCN Aero Scheme shall also be an approved Outside Agency and consequently may otherwise be referred to as *an Outside Agency*.
- 4.4. **Basic Examination** – Written examination, at Level 3, which demonstrates the candidate's knowledge of the materials science, process technology and types of discontinuity, the specific qualification and certification system, and the basic principles of NDT methods as required for Level 2.
- 4.5. **Category** – The specific application within the NDT method for which the individual is certificated. This may restrict the qualification to inspection using only specified techniques and particular equipment on stated materials, structures or geometries, for example ultrasonic testing of aerospace materials and components (excluding aerospace structures). Certified categories will be clearly indicated on the PCN record of certification.
- 4.6. **Certification** - A written statement by PCN that an individual has met the minimum requirements of both ISO 9712 and this document for the issue of PCN Aerospace certification in the appropriate NDT method examined. Certification does not include authorisation. The requirements for authorisation remain with the employer via an appropriate process as documented in the employer's written practice. PCN Certification may contribute to this process, but employers must consider any supplementary individual competence requirements.

The term 'certification' may only be used when the certification process complies with the requirements of ISO/IEC 17024, and the term 'authorisation' is used to denote a written statement by an employer that an individual has met specific requirements, which may include the need for additional training and/or qualification examinations before carrying out NDT for that employer.

- 4.7. **Certification Body** – The body that administers procedures for certification of NDT personnel in accordance with this document. With regard to this document, the certification body is the British Institute of NDT, which owns and administers the PCN Scheme in accordance with the requirements of ISO/IEC 17024.
- 4.8. **Closed-Book Examination** – An examination administered without access to any reference materials.
- 4.9. **Cognisant Engineering Organisation** – The engineering or NDT organisation of the prime contractor, Original Equipment Manufacturer (OEM) or end-user authorised to make NDT-related decisions and give NDT-related approvals.
- 4.10. **Direct Observation** – Direct observation is when the observer can come to the immediate aid of the trainee and remains within a distance that permits uninterrupted, unaided visual and verbal contact with the trainee or candidate.
- 4.11. **Direct Readout Instrument** – Instruments that physically display measurements in dimensional or electrical units (for example inches, millimetres or %IACS, etc.), either as digital readout or an analogue display, such as a scale/pointer configuration, and do not require special skills or knowledge to set up the instrument and do not involve adjusting signal displays such as gates, delays, gain, or phase to obtain measurements. For example, common direct readout instruments include basic ultrasonic thickness gauges without an oscilloscope display and eddy current coating thickness gauges.
- 4.12. **Documented** – the condition of being recorded in written or electronic form.
- 4.13. **Employer** – An organisation employing or contracting the services of one or more individuals who perform NDT. Self-employed persons are included in this definition.

- 4.14. **Evaluation** – a review, following interpretation of the indications noted during an NDT inspection, to determine whether they meet specified acceptance criteria or to determine the significance of indications.
- 4.15. **Examination Centre** – A location, approved by the British Institute of NDT, where qualification examinations are to be carried out strictly in accordance with the criteria detailed in PCN document reference CP09. An examination centre may be situated at an employer facility or at a BINDT Authorised Qualifying Body (AQB)'s premises. It remains the responsibility of the AQB to ensure that examination centres at employer facilities comply with PCN document CP09.
- 4.16. **Examiner** – An individual certificated to Level 3 in the method and sector for which he or she is to conduct, supervise and grade examinations and who is authorised by the British Institute of NDT. Defined in EN 4179 as a Level 3 certified to EN 4179 and designated by the Responsible Level 3 or NANDTB to administer all or part of the qualification and certification process, in the NDT method(s) in which the examiner is certified. **Note:** All examiners for PCN Aero examinations must be approved/authorised in advance by BINDT and appear on the AQB Scope of Certification.
- 4.17. **Experience** – Actual performance of an NDT method conducted in the work environment resulting in the acquisition of knowledge and skill. This does not include formal classroom training but may include laboratory and on-the-job training as defined by the employer's written practice.
- 4.18. **Formal Training** – An organised and documented program of learning activities designed to impart the knowledge and skills necessary to be qualified to this standard. Formal training may be a mix of classroom, practical and programmed self-instruction as approved by the Responsible Level 3, examiner or NANDTB.
- 4.19. **General Examination** – Written examination addressing the basic principles and theory of an NDT method at the appropriate level.
- 4.20. **Indication** – The response or evidence of a condition resulting from an NDT inspection that requires interpretation.
- 4.21. **Industrial NDT Experience** – Actual performance of an NDT method conducted in the work environment resulting in the acquisition of knowledge and skill. This does not include classroom or laboratory training but does include on-the-job training as defined by the employer's written practice, and which is also acceptable to the certification body.
- 4.22. **Instructor** – An individual designated or approved by BINDT and, where applicable, the Responsible Level 3 and/or NANDTB to provide training for NDT personnel.
- 4.23. **Interpretation** – The determination of whether indications are relevant or non-relevant.
- 4.24. **Main Method Examination** (as defined in ISO 9712) – Written examination, at Level 3, which demonstrates the candidate's general and specific knowledge and ability to write NDT procedures for the NDT method as applied for the industrial or product sector(s) for which certification is sought.
- 4.25. **Mature Candidate** – A candidate for PCN examination having at least five years' documented experience without significant interruption (see definitions) in the NDT method and sector for which certification is sought, who can provide evidence of completion of a course of training (covering the published PCN syllabus) which was of at least the duration required for qualification.
- 4.26. **Multiple-Choice Examination Question** – Wording of a question giving rise to four potential replies, only one of which is correct, the remaining three being incorrect or incomplete unless otherwise stated.
- 4.27. **National Aerospace NDT Board (NANDTB)** – An independent aerospace organisation representing a nation's aerospace industry that is chartered by the participating prime contractors and recognised by that nation's regulatory agencies to provide or support NDT qualification, examination and/or certification services in accordance with this document and section 4.4.2 of EN 4179.
- 4.28. **NDT Instruction** – A document detailing the NDT technique and testing parameters to be used for the inspection of a specific component, group of parts (for example 'aluminium extrusions' or 'steel brackets'), or assembly. These are sometimes referred to as 'technique sheets' or 'data cards'. Such work instructions are based on procedures defined in section 3.27 of EN 4179. ISO 9712 further states that the NDT instruction is a written description of all the precise steps to be followed in testing to an established standard, code, specification, or NDT procedure.
- 4.29. **NDT Method** – One of the disciplines of non-destructive inspection or testing (for example radiography) within which different techniques exist.
- 4.30. **NDT Procedure** – Document containing a written description of all essential parameters and precautions to be observed when conducting non-destructive testing on products in accordance with standards, codes, or specifications. An NDT procedure may involve the application of more than one NDT method or technique. Procedures are then used to develop NDT instructions, as defined above.

- 4.31. **NDT Technique** – A category within an NDT method, for example ultrasonic immersion testing or ultrasonic contact testing. Specific techniques within a method are defined by the cognisant NDT organisation, BINDT or the applicable NANDTB.
- 4.32. **NDT Training** (approved training) – An organised and documented programme of learning activities designed to impart the knowledge and skills necessary to achieve qualification through an appropriate examination and certification scheme. Formal training may be a mix of classroom, practical and/or programmed self-instruction meeting the requirements of the governing standards. For formal training towards PCN Aero certification the process shall consist of instruction of theory and practice in the NDT method in which certification is sought and which takes the form of training courses to a syllabus approved by the certification body for ISO 9712 certification. This is a minimum requirement but may be supplemented as deemed necessary by the applicable student's employer and EN 4179 responsible Level 3.
- Note:** Initial formal training must be conducted by a BINDT Approved Training Organisation (ATO), see 5.1.1.
- 4.33. **On-the-Job Training** – Training in the work environment to gain experience in learning instrument set-up, equipment operation, applying the process, and recognition, interpretation, and evaluation of indications under appropriate technical guidance.
- 4.34. **Operating Authorisation** – Written statement issued by the employer, based upon the scope of certification, authorising the individual to carry out defined tasks. **Such authorisation may be dependent on the provision of job-specific training and monitoring of competency on an ongoing basis by the employer in conjunction with a written practice.**
- 4.35. **Open-Book Examination** – Examination administered with access to specific reference material that is provided with or referenced in the examination.
- 4.36. **Outside Agency** – Independent company or organisation outside the employer that provides NDT services to implement the requirements of EN 4179, such as training and examination of NDT personnel. Consultants and self-employed individuals are included in this definition. For the purpose of this document an approved outside agency is one that is approved by a National Aerospace Board that is affiliated to the European Aerospace NDT Board Forum (ANDTBF). The UK NANDTB oversees the BINDT system for approval of Outside Agencies.
- 4.37. **Practical Examination** – An examination to allow for the demonstration and assessment of an individual's ability and practical skills in the conducting of NDT using the method(s) applicable to the certification being sought. The methods and specimens utilised should reflect the methods and component types relevant to the employer. A checklist/reporting format must be used, and observations and results documented.
- 4.38. **Prime Contractor** – An organisation having overall responsibility for design, control and delivery of a system, component or product.
- 4.39. **Qualification** – The skills, training, knowledge, examinations, experience, and visual capability required for the personnel to properly perform to a particular level.
- 4.40. **Qualification Examination** – Examination administered by the certification body or the authorised qualification body, which assesses the general, specific, and practical knowledge and the skill of the candidate.
- 4.41. **Responsible Level 3** – A Level 3 individual designated by the employer with the responsibility and authority to ensure that the requirements of EN 4179 are met and to act on behalf of the employer.
- 4.42. **Significant Interruption** – Absence or a change of work activity which prevents the certified individual from practising the duties corresponding to the level in the method and the sector(s) within the certified scope, for either a continuous period in excess of one year or two or more periods for a total time exceeding two years.
- Note:** Legal holidays or periods of sickness or courses of less than 30 days are not considered when calculating the interruption.
- 4.43. **Specific Examination** – Written examination to determine an individual's understanding of operating procedures, codes, standards, product technology, test techniques, equipment, specifications, and acceptance criteria relevant to the test method and level at which certification is sought. The determination of the applicable operating procedures, codes, standards, product technology, test techniques, equipment, specifications, and acceptance criteria shall be via consultation with the candidate's employer.
- 4.44. **Sub-Contractor** – An organisation responsible to the prime contractor for the manufacture or maintenance of aerospace products. For the purposes of this document, this includes suppliers and processors.

- 4.45. **Test Sample (Specimen)** – A part or image containing one or more known and documented natural or artificial discontinuities, flaws or conditions used in the practical examination to demonstrate the candidate's proficiency in an NDT method. Test samples can refer to actual hardware, fabricated test parts, or, when applicable, images of actual hardware such as radiographs.
- 4.46. **Written Practice (as required by EN 4179)** – A document that describes an employer's requirements and methodology for controlling and administering the NDT personnel qualification and certification process.
- 4.47. The following abbreviations are used in this document and its appendices:
- **BINDT:** British Institute of Non-Destructive Testing
  - **BRS:** Basic Radiation Safety
  - **ET:** Eddy Current Testing
  - **MT:** Magnetic Particle Testing
  - **NANDTB:** National Aerospace NDT Board
  - **NDT:** Non-Destructive Testing
  - **PCN:** Personnel Certification in NDT
  - **PT:** Penetrant Testing
  - **RPA:** Radiation Protection Advisor
  - **RPS:** Radiation Protection Supervisor
  - **RT:** Radiographic Testing
  - **UT:** Ultrasonic Testing

## 5. RESPONSIBILITIES

### 5.1. The British Institute of NDT (Certification Body)

- 5.1.1. The British Institute of NDT (BINDT) is accredited in accordance with ISO/IEC 17024, for the provision of qualification and certification of NDT personnel in accordance with this document and ISO 9712. The process is aligned with the qualification criteria of EN 4179, however third-party PCN Aerospace certification issued in accordance with the requirements of ISO 9712 is deemed 'wider scope' as defined in EN 4179 and therefore specific supplementary training and examinations may be required as determined by the Responsible Level 3.
- 5.1.2. BINDT is also responsible for implementing the general certification policy of the PCN Certification Management Committee (CMC), and the qualification policy and technical requirements defined by the UK NANDTB.

### 5.2. NDT Personnel

- 5.2.1. Responsibilities of NDT personnel for each level of certification are defined in the applicable standard(s), *i.e.*, BS EN ISO 9712 and EN 4179.
- 5.2.2. When the Level 3's duties include the processing and acceptance or rejection of products, proficiency in performing such tasks shall be demonstrated by a hands-on practical examination equivalent to Level 2. The UK NANDTB has ruled that, if equipment operation or acceptance of production hardware is required as a part of the Level 3's duties, an appropriate valid Level 2 certificate shall be held.

### 5.3. Employer

- 5.3.1. To utilise PCN Aero qualifications and/or certifications, employers shall evaluate the scope of the PCN qualification/certification and, where deemed necessary, the Responsible Level 3, shall arrange supplemental examinations representative of the employer's processes for both specific and practical examinations. Such supplementary examinations shall be conducted through an approved Outside Agency (see also 5.3.3 below).
- 5.3.2. The written practice shall be approved by the employer's Responsible Level 3, shall address the procedural details necessary for the employer to implement the NDT qualification and certification program and shall include, either directly or by reference, the details of the NDT qualification and certification process, including:
- 5.3.2.1. The levels of qualification and certification used by the employer
  - 5.3.2.2. Personnel duties and responsibilities

- 5.3.2.3. Training and experience requirements
- 5.3.2.4. Certification and recertification requirements
- 5.3.2.5. Records and record keeping requirements
- 5.3.2.6. Requirements for expiration, suspension, revocation, and reinstatement of certifications
- 5.3.2.7. A process for annual proficiency review.
- 5.3.2 The written practice and applicable NANDTB procedures shall be available for review by the employer's customer(s) and regulatory agencies. Further requirements regarding the contents of a written practice are detailed in EN 4179.
- 5.3.3 It remains the responsibility of the Responsible Level 3 to determine whether additional job-specific training and examination, covering the NDT processes and products utilised by the employer, shall be required.
- 5.3.4 All training and examinations that extend the scope of an individual's authorisation must be conducted under the control of an approved Outside Agency. Additional training associated with new equipment, new product lines, new operating practices, etc, is considered to be on the job training and does not fall under the UK NANDTB remit.
- 5.3.5 Personnel holding PCN AERO certification may be issued an EN 4179 authorisation by the employer subject to any additional training and examination as determined by the Responsible Level 3.

## 6. ELIGIBILITY FOR CERTIFICATION

The candidate shall fulfil the minimum requirements for vision and training prior to the qualification examination. The candidate shall fulfil the minimum requirements for industrial experience prior to certification.

### 6.1 Training

- 6.1.1 To be eligible for examination, the candidate shall provide documentary evidence of successful completion of a British Institute of NDT validated course of training at a BINDT ATO which covers the relevant part of the published NDT syllabus (CEN ISO/TR 25107). This shall be within the method, sector and at the level for which certification is sought.
- 6.1.2 For all levels, the candidate shall satisfactorily complete a course of theoretical and practical training recognised and approved by BINDT.
- 6.1.3 For Level 3 candidates, in addition to the minimum training given in Table 1, the preparation for qualification can be completed in different ways dependent on the scientific and technical background of the candidate, including attendance at other training courses, conferences or seminars, studying books, periodicals and other specialised printed or electronic materials.
- 6.1.4 The minimum duration of training undertaken by the candidate for certification shall be as defined in Table 1 for the applicable NDT method.
- 6.1.5 Training duration is based upon the candidate possessing adequate mathematical skills and a prior knowledge of materials and processes (product technology). If this is not the case, additional training shall be undertaken.
- 6.1.6 To determine all Level 3 training requirements, the ATO shall carry out a GAP analysis on the candidate in order to establish areas of weakness. All areas of weakness shall be included within a bespoke Level 3 training package provided by the ATO to the candidate, prior to any certification examination.
- 6.1.7 Training hours include both practical and theoretical courses.
  - 6.1.7.1 Direct access to Level 2 requires the total hours shown in Table 1 for Levels 1 and 2.
  - 6.1.7.2 Direct access to Level 3 requires the total hours shown in Table 1 for Levels 1, 2 and 3.
  - 6.1.7.3 When considering the responsibilities of a certified Level 3 and the content of Part C of the basic examination for Level 3 (see Table 4), additional training concerning other NDT methods may be necessary for those that do not currently meet the knowledge requirement. The pre-training course GAP analysis carried out by the ATO shall address the requirements listed within Table 4 Part C for knowledge of four NDT methods.
- 6.1.8 For PCN Aero, reductions in minimum training hours for Level 2 are not permitted. For Level 3, reductions in the form of exemptions for previous training or certification held are permitted as detailed in Table 1.



**Table 1: Minimum Duration of Training (Hours)**

NDT method	Level 1 hours	Level 2 hours	Level 3 hours
ET	40	48	48
PT	16	24	24
MT	16	24	32
RT	40	80	40
UT	40	80	40
BRS	16	N/A	N/A
RPS	N/A	24	N/A
Basic knowledge	(Direct access to Level 3 examination parts A, B and C)		80

**NOTE 1:** The 80 hours of training required for Level 3 basic qualification may be accrued through a combination of classroom training at a BINDT approved training organisation (minimum 50%), self-study and distance learning. However, accrued, candidates should record the training undertaken for presentation to PCN if requested.

For the Level 3 basic examination (see 7.5), reduction (exemptions) in training duration of up to 72 hours (maximum), may be granted based upon the candidate’s existing certification, and therefore previous training, see (a) and (b) below:

a) **Product Technology** – The candidate holds a certificate covering:

A multi-sector	possible reduction – 12 hours
Castings	possible reduction – 4 hours
Welds	possible reduction – 4 hours
Wrought products	possible reduction – 4 hours

b) **Level 2 general theory in four NDT methods, one of which shall be a volumetric method** The Level 3 candidate holds Level 2 certification in:

Four NDT methods	possible reduction – 60 hours
Three NDT methods	possible reduction – 45 hours
Two NDT methods	possible reduction – 30 hours
One NDT methods	possible reduction – 15 hours

## 6.2 Aerospace NDT Experience

- 6.2.1 The minimum duration of experience to be gained in the sector where the candidate is seeking certification shall be as given in Table 2. Possible reductions in industrial experience are given in clause 6.4 below. When the candidate is seeking certification in more than one method, the total time of experience shall be the sum of the experience required for each method, minus any permitted reduction, if applied.
- 6.2.2 Equivalent experience as detailed in EN 4179 is also permitted; the adequacy and equivalency of industrial experience shall meet or exceed the requirements of EN 4179 Table II and Table III or Table IIIA. This shall be determined and documented by the employer's Responsible Level 3 and the documented evidence shall be made available as part of the PCN Aero examination eligibility checking process. Applicants shall provide a completed PSL/30 and any other supporting documentation.
- 6.2.3 For Level 2 certification, the intent is that work experience consists of time as a Level 1. If the individual is being qualified directly to Level 2, with no time at Level 1, then the experience shall consist of the sum of the time required for Levels 1 and 2. No reduction in the period of experience shall be allowed.
- 6.2.4 Industrial NDT experience in the appropriate sector must be acquired prior to attempting the qualification examination.
- 6.2.5 Industrial NDT experience in the applicable NDT method shall be submitted to the AQB directly on form PSL/30 prior to any certification examination. In the event that a false statement is made concerning pre-certification experience, any certification awarded as a result shall be null and void.
- 6.2.1 The minimum duration of experience for certification shall be as defined in Table 2. Certain permitted reductions are detailed in section 6.4. However, under no circumstances is the amount of experience permitted to be reduced below that detailed in EN 4179 tables II, IIA and III (reproduced below).

**Table 2: Minimum Duration of Experience for Certification**

NDT Method	Experience (Hours)*		
	Level 1	Level 2	Level 3
ET, RT, UT	480 (3 months)	1440 (9 Months)	5760 (36 months)
MT, PT	160 (1 month)	480 (3 months)	3840 (24 months)
*Work experience in months is based on a nominal 40 hours/week, or the legal week of work. When an individual is working in excess of 40 hours per week, they may be credited with experience based on the total hours, but he/she <u>shall</u> be required to produce evidence of this experience.			

### 6.3 Level 3

- 6.3.1 Level 3 responsibilities require knowledge beyond the technical scope of any specific NDT method. This broad knowledge may be acquired through a variety of combinations of education, training and experience. Table 2 above details the minimum experience required for Level 3 candidates.
- 6.3.2 Level 3 candidates who have successfully completed a degree or diploma at a technical school or who have completed at least two years of engineering or science study at an accredited college or university, (proof of qualifications shall be required) may be eligible for a reduction in the amount of experience required up to a maximum value of 50% of the total experience values quoted in Table 2. Supporting evidence shall be documented and provided directly to the AQB prior to examination.
- 6.3.3 For Level 3 certification, the intent is that work experience consists of time as a Level 2. If the individual is being qualified directly from Level 1 to Level 3, with no time at Level 2, the experience shall consist of the sum of the times required for Level 2 and Level 3. No reduction in the period of experience shall be allowed.
- 6.3.4 Level 3 candidates shall have the required amount of NDT experience prior to taking any PCN certification examination.

### 6.4 Possible Reductions

- 6.4.1 ISO 9712 permits credit for work experience which may be gained simultaneously in two or more of the NDT methods as detailed below. However, such reductions shall not result in the experience hours falling below the minimum experience requirements detailed in EN 4179 Tables II, IIA and III. These tables are replicated below for information.

**EN 4179 TABLE II – MINIMUM EXPERIENCE REQUIREMENTS FOR LEVELS 1 AND 2**

Method	Experience Time in Hours		
	Level 1 (Trainee experience)	Level 2 with previous Level 1 certification	Level 2 without previous Level 1 certification
PT	130	270	400
MT	130	400	530
IRT	200	600	800
ST	200	600	800
ET	200	600	800
UT	200	600	800
RT Film or Non-Film	200	600	800
RT Film and Non- Film	220	780	1000

**EN 4179 TABLE IIA – RT EXPERIENCE REQUIREMENTS FOR TRANSITION TO FILM AND NON-FILM**

Additional Minimum Experience Time in Hours		
Current Level 1	Current Level 2	Current Level 1 to Level 2 Film and Non-Film
20	200	800

**EN 4179 TABLE III – MINIMUM EXPERIENCE REQUIREMENTS FOR LEVEL 3 IN COMMON METHODS**

College or University	Level 2 Experience
None	4 years
Two years of engineering or science study at a technical school, college, or university	2 years
3–4-year science or engineering undergraduate degree	1 year

6.4.2 The possible reductions in the duration of experience required are as described hereafter, provided that, when several reductions are applicable, the total reduction does not exceed 50% of the total experience duration required. Any reduction applied for requires verification/acceptance by BINDT.

When considering a possible reduction in the duration of experience, the certification body should take into consideration the following elements:

6.4.2.1 The quality of experience can be variable, and skills may be assimilated more quickly in an environment where the experience is concentrated and has a high degree of relevance to the certification sought.

6.4.2.2 When gaining experience simultaneously in two or more surface NDT methods, *ie* MT/PT, the experience gained in the application of one NDT method may be complementary to the experience gained in one or more other surface methods.

6.4.2.3 Experience in one sector of an NDT method for which certification is already held may be complementary to the experience in a different sector of the same NDT method.

6.4.2.4 The level and quality of education possessed by the candidate should also be considered. This is particularly the case for the Level 3 candidate, but it can also be applicable for other levels.

6.4.2 Credit for work experience may be gained simultaneously in two or more of the NDT methods covered by the international standard BS EN ISO 9712, with the reduction of total required experience as follows:

6.4.2.1 Two testing methods: reduction of total required time by 25%

6.4.2.2 Three testing methods: reduction of total required time by 33%

6.4.2.3 Four or more testing methods: reduction of total required time by 50%.

6.4.3 In all cases, the candidate shall be required to show that for each of the NDT method and sector combinations for which they seek certification, they have at least half (50%) of the experience required (see table 2), this shall never be less than one month in duration.

6.4.4 When the certification sought is limited in application (for example thickness measurement or automated testing), the experience duration may be reduced by up to 50% but shall not be less than one month.

6.4.5 Candidates must complete the full experience requirements prior to becoming eligible for examination.

**NOTE: Under no circumstances shall the applying of permitted ISO 9712 reductions result in minimum experience hours falling below the minimums mandated in EN 4179 Tables II, IIA and III which shall be regarded as the mandatory default minimums.**

## 6.5 Vision Requirements

6.5.1 PCN requires that all candidates meet the visual acuity requirements of ISO 18490 and are capable of distinguishing between the colours associated with the given NDT method in which certification is sought. The visual acuity and colour perception tests shall be recorded/documented. A current visual acuity/colour perception test record shall form part of the pre-examination eligibility checking process.

6.5.2 The visual acuity examination for all candidates shall assure that the applicant's near vision meets the requirements of ISO 18490 (Tumbling E).

6.5.3 For PCN certificate holders, the documented tests of visual acuity shall be carried out at least every 12 months.

6.5.4 For PCN certificate holders, the documented colour perception test shall be carried out at least every 60 months.

6.5.5 Colour vision shall be sufficient, so that the candidate can distinguish and differentiate contrast between the colours or shades of grey used in the NDT method concerned, as specified by the employer. Any limitations in colour perception shall be evaluated by the Responsible Level 3 prior to certification and must be approved in writing.

## **7. QUALIFICATION EXAMINATION**

### **7.1 Examination Application**

- 7.1.1 Initial enquiries to the BINDT Authorised Qualifying Body may be by telephone. Formal applications must be made on an application form (PSL/57A/AERO) available direct from BINDT or from the AQB. No examination appointment can be considered confirmed until a correctly completed application form (PSL/57A/AERO) has been received.
- 7.1.2 Application forms ask for specific details on experience and training to the published syllabus and must be signed to the effect that those details are correct. In the event of a false statement being discovered, any certification awarded as a result of the examination will be null and void.
- 7.1.3 Where applications are dependent upon the candidate having first been successful on an approved training course, then success must be supported by acceptable evidence of a successful completion of training course certificate (photocopies are acceptable at this stage). The British Institute of NDT may require candidates to present original copies, upon request.
- 7.1.4 Where marks from earlier examinations are to be included in the composite grade, the candidate must supply the relevant examination result notice (or, where unavailable, the date and scope of the examination and the AQB where the examination took place) showing the grades obtained. Failure to comply with this clause will result in a refusal to examine or the candidate shall return to initial applicant status.
- 7.1.5 The location of all BINDT's AQBs, the scope of examinations for which they are approved, and contact information is given on document PSL/4, copies are available at [www.bindt.org](http://www.bindt.org)
- 7.1.6 Provision is made wherever possible for candidates with a disability that may affect their ability to complete PCN examinations. For example, up to 25% additional time may be allowed in examinations for candidates suffering from dyslexia. The candidate is responsible for bringing his or her disability to the attention of the examining body.

### **7.2 Examination Equipment and Documentation**

- 7.2.1 The BINDT AQB will provide all necessary NDT equipment, although for ultrasonic and eddy current testing examinations, candidates may bring their own. Any item of apparatus brought by a candidate that is unreliable or rendered unserviceable during the examination shall be replaced by the candidate. Guidance on suitable equipment is available directly from the BINDT AQB.
- 7.2.2 Digital instrumentation capable of storing calibration details, formulae or data relevant to NDT must be deprogrammed prior to attempting any PCN practical examination using that instrument. The candidate will be required to demonstrate compliance and, in the event that the BINDT AQB is not satisfied that deprogramming is effective, the candidate may be required to use equipment provided by the AQB, or be refused examination.
- 7.2.3 All necessary reference standards will be provided by the BINDT AQB. During PCN examinations, candidates must not be in possession of any reference standards, other those provided by the AQB.
- 7.2.4 Provided security of examination materials can be guaranteed, candidates will be allowed the use of an AQB provided PC or lap-top computer in the NDT instruction and NDT procedure writing section of the PCN practical examination. On no account will the use of a candidate's own computer be permitted during a PCN examination, and, for reasons of security, candidates are not permitted to bring any form of computer, including hand-held devices into the examination facilities at a PCN AQB or examination centre. The provision of computers for candidate use is optional for any BINDT AQB.
- 7.2.5 The use of a pocket calculator is permissible in PCN examinations provided that it is of a type that does not permanently store programs, formulae, or data relevant to NDT.
- 7.2.6 Mobile telephones, audio, video, or other recording devices are not permitted in any PCN examination area.

### **7.3 Written Qualification Examination Content – Level 2**

The qualification examination consists of a general, a specific and a practical examination for a given NDT method as it is applied in the aerospace sector.

#### **7.3.1 General Examination**

- 7.3.1.1 The general examination is a closed-book examination consisting of 40 multi-choice answer questions covering the theory of the applicable method at the appropriate level.

7.3.1.2 The general examination includes only validated questions selected in an unpredictable way from the collection of general questions approved by the British Institute of NDT at the time of the examination.

7.3.1.3 The time allowed for the examination is 80 minutes, and the pass mark is 70%.

#### 7.3.2 Specific Examination

7.3.2.1 The specific examination for all levels is an examination where candidates have access to reference material authorised by the AQB. The reference material shall be restricted to copies of the specifications/standards/codes upon which the questions are based. The specific examination shall consist of a minimum of 30 questions covering the application of the NDT method to aerospace products in accordance with the determined reference material. At Level 2, a minimum of five of the questions shall address aerospace product technology.

7.3.2.2 The Aerospace-approved AQB/Outside Agency shall prepare the specific examination paper. The specific examination questions shall be created and based upon the **core** specifications listed in Appendix 1 plus any other specifications/standards advised by the candidate's employer or Responsible Level 3. The AQB shall determine, in consultation with the candidate's employer, whether additional specifications are to be used prior to preparation of the specific examination paper. Where the applicant or their employer advise additional specifications for inclusion then a minimum of 10 questions should be included from the **core** specifications given in Appendix 1.

Where no other specifications/standards are advised by the applicant or his/her employer the **core** specifications listed in Appendix 1 shall be used as the default option. These may be supplemented with questions created from other specifications/standards listed in Appendix 1.

7.3.2.3 The specific examination questions shall be appropriate to the NDT method and set at a level reflective of the level of certification sought.

7.3.2.4 Specific questions shall require the candidate to demonstrate understanding of the reference material provided, rather than merely finding the location of the defect. Specific questions may be multi-choice or require narrative answers. Should narrative questions carry more than one mark then the AQB shall have appropriate marking guidance for these questions.

7.3.2.5 The time allowed for the examination shall be calculated by allowing three minutes per question. Longer times may be allowed by the AQB depending upon the type and difficulty of the questions included in the paper. The pass mark is 70%.

#### 7.3.3 Radiation Safety

7.3.3.1 PCN certification in the radiographic method is valid only so long as the certificate holder also holds certification for either basic radiation safety or radiation protection. In the United Kingdom, this requirement is satisfied by holding PCN valid certification for radiation safety.

7.3.3.2 PCN provides guidance for radiographic certificate holders and candidates based in countries other than the UK.

7.3.3.3 If current radiation safety certification is not held, the candidate for radiographic certification will attempt the PCN basic radiation safety examination module at the time of the radiography examination.

7.3.3.4 Details of the PCN radiation safety examinations are given in Appendix E3.1 to the current edition of PCN/GEN.

#### 7.4 Practical Qualification Examination Content – Level 2

7.4.1 The practical examination consists of a demonstration of proficiency in NDT tasks that are typical of those to be accomplished in the performance of the candidate's duties. The practical examination is designed to ascertain the ability of the candidate to use a range of equipment and techniques, and to:

7.4.1.1 Make the required settings.

7.4.1.2 Operate the test equipment properly.

7.4.1.3 Test a number of specimens. The minimum number of specimens tested shall be as detailed in the relevant PCN Aero appendix or as determined by the candidate's Responsible Level 3 and the applicable written practice – whichever is the greater. There shall be sufficient samples to allow the candidate to demonstrate proficiency in all the techniques within the examination method relevant to the certification sought.

- 7.4.1.4 The test specimens attempted shall comprise aerospace materials, components and/or structures, as appropriate to the certification sought the practical exam specimens used shall be representative of the employer's product and shall test the candidate's ability to utilise the test methods and techniques as requested by the employer.
- 7.4.1.5 Record and to analyse the resultant information to the degree required according to written instructions or a code, standard, specification or a procedure.
- 7.4.2 Examination specimens shall contain known discontinuities (flaws) or conditions characteristic of those that occur during manufacturing or in service. They may be natural, artificial, or implanted.
- 7.4.3 The candidate shall not be familiar with the test sample(s) and the location of the defects located therein. For practical radiography, the test specimen will not necessarily contain discontinuities since these will be exhibited in the radiographs for interpretation.
- 7.4.4 Each examination specimen shall have a master report describing the disposition of mandatory reportable flaws or defects within the specimen, data file or image. The specimens shall be mastered and approved in accordance with BINDT document CP09.
- 7.4.5 All examination specimens and master records shall be controlled in terms of status, location, and security. For examination purposes test samples (specimens) shall be held secure from candidates.
- 7.4.6 The AQB shall have systems in place to determine how the candidate's attempts at practical specimens are suitably documented to allow for consistent examination marking. *Note: Evidence of meeting this requirement may take the form of part maps, drawings, sketches, written descriptions, etc.*
- 7.4.7 The candidate shall also demonstrate the ability to prepare a written instruction for the application of a specified NDT technique. This will be an open-book examination where the candidate is provided with the relevant standard, code, or specification, together with a copy of PCN document CP25.
- 7.4.8 The candidate will select the applicable NDT technique and determine the operating conditions related to a given code, standard or specification.
- 7.4.9 The total time allowed for the practical examination is as stated in the relevant PCN Aero appendix. Where the number of specimens attempted exceeds the minimum detailed in the relevant PCN Aero, as per 7.4.1.3 above, extra time is permitted based upon a calculation of time per specimen (pro-rata). The minimum pass mark is 70% per sample tested and 70% for the NDT instruction (failure to detect and report a reportable discontinuity in any one sample, or failure to produce an acceptable NDT instruction, will result in failure of this examination part).
- 7.4.10 For radiography candidates, the practical examination includes interpretation and reporting on radiographs of components and structures. The total time allowed for the radiographic interpretation part is four hours and the pass mark is 70%.
- 7.4.11 Exam results notices and/or certificate shall detail the specific test method and technique used for each practical specimen tested ensuring that all methods/techniques required by the customer are addressed in the examination – see Appendix 2 for guidance on test methods and techniques.

## 7.5 Qualification Examination Content – Level 3

- 7.5.1 Initial Level 3 candidates must hold PCN or EN 4179 Level 2 certification in the appropriate method. To be acceptable, EN 4179 examinations must have been completed at an approved Outside Agency.
- 7.5.2 In the basic examination the candidate shall demonstrate:
  - 7.5.2.1 In a closed-book examination, technical knowledge and understanding of materials science and technology, including production and in-service discontinuities – Part A.
  - 7.5.2.2 Knowledge and understanding of the qualification and certification system defined in this document – Part B. This shall be an open-book examination.
  - 7.5.2.3 In a closed-book examination, general knowledge and understanding of at least four methods at Level 2 standard chosen by the candidate from the ET, PT, MT, RT and UT methods. The four chosen methods shall comprise the principal method for which the certification is sought and three others, which must include at least one volumetric method (UT or RT) unless UT or RT is the principal method – Part C

**NOTE 5:** The basic examination shall be passed first and remains valid providing that the main method examination is passed within five years of the date of completing the basic examination.

- 7.5.3 The validated examination questions are selected in an unpredictable way from the collection of basic examination questions approved by the British Institute of NDT at the time of the examination. The number of questions set will be as defined in Table 4.

Table 4: Number of Basic Examination Questions (Multiple-Choice Type)			
Part	Examination	Number of questions	Duration
A	Materials technology and science, including typical defects in a wide range of products including castings welds and wrought products	30 multi-choice	60 minutes
B	Qualification and certification procedure in accordance with this document	10 multi-choice	20 minutes
C	15 general questions at Level 2 standard for each of four NDT methods, including at least one volumetric NDT method (UT or RT)	60 multi-choice	120 minutes

- 7.5.4 PCN Aerospace Level 3 main method examinations will consist of the following parts:

7.5.4.1 **(Part D)** General theory written examination testing the Level 3's knowledge to the test method for which certification is sought. A closed book examination consisting of validated examination questions selected from the collection of main method questions approved by the British Institute of NDT at the time of the examination.

7.5.4.2 **(Part E)** Specific theory open book written examination relating to the application of the NDT method prepared by the AQB. The default examination will include questions on codes, standards, or specifications listed within Appendix 1. At the employers request, additional codes, standards and or specifications may be included within the (Part E) certification examination.

7.5.4.3 **(Part F)** An open book practical written examination requiring the candidate to draft one or more NDT procedures within the relevant sector and method for certification sought.

- 7.5.5 When preparing PCN Aerospace open book examinations, the AQB and employer shall consider the following.

7.5.5.1 Three minutes arbitrary time per open book question should be allocated for the purpose of calculating "total examination time available to the candidate".

7.5.5.2 It is recognised by PCN that some examination questions may be answered in relatively quick time (1 minute) whereas other examination questions may require additional time for a suitable answer to be provided (5 minutes), however 7.5.5.3 confirms:

7.5.5.3 Questions will be written in such a way that on average it should take no longer than 3 minutes to answer any open book PCN Aerospace question, and that in all instances the standard, code, or procedure, to which the question refers will be provided to the candidate. The question will also contain the relevant standard, code, or procedure number to which the question refers, and where required (7.5.5.5 may be applied when justified by the AQB examiner).

7.5.5.4 Where additional questions are to be asked In line with the employer's Responsible level 3's requirement to have the candidate examined against employer specific codes, standards, or specifications, time allocated should be based upon three minutes arbitrary time per additional open book question in order to calculate the total examination time. However (7.5.5.5 may also apply when justified by both AQB examiner and employer responsible Level 3).

7.5.5.5 Where the AQB examiner or responsible Level 3 believes that the candidate requires additional reading time (in excess of 3 minutes) to provide suitable answers to open book examination questions, this shall be factored into the total examination time allocated. In all instances the candidate will be made aware of the total amount of examination time available to them in writing at the start of the examination based upon these requirements.

- 7.5.6 The minimum number of main method questions for parts D and E shall be as defined in Table 5.

Table 5: Number of Main Method Examination Element Questions			
Part	Examination	Number of questions	Duration
D	General	40 multi-choice questions	80 minutes
E	Specific	30 multi-choice questions – PCN Aerospace Default examination	90 minutes
		Minimum examination requirements - 30 multi-choice questions	See: 7.5.5 to 7.5.5.5
		A minimum of 10 questions shall be generated from the core standards listed within Appendix 1 herein in addition to any employer based specific codes, standards or procedure questions requested by the employer.	
F	Practical	Drafting of one or more NDT procedures	4 hours per procedure

## 7.6 Examination Exemptions

- 7.6.1 Candidates in initial PCN examinations are not required to attempt an examination part in which they have already achieved success during the process of gaining PCN certification, so long as the subject examination part has (or had) the same (or a greater) scope as that part for which an exemption is claimed, and the resultant certification remains valid.
- 7.6.2 Existing PCN Level 3 certificate holders who are attempting additional Level 3 examinations will be exempt from the whole of the basic examination and, if they hold valid certification at Level 3 covering the same method in a different sector, the part C1 (a general examination covering the Level 3 knowledge relating to the test method) shall also be exempt.
- 7.6.3 Level 3 candidates who hold PCN (or equivalent acceptable to BINDT) Level 2 certificates are exempt part or the whole of the Level 3 basic examination part B. The candidate must demonstrate a general knowledge at Level 2 of at least four NDT methods, including at least one relating to a volumetric NDT method (UT or RT).
- 7.6.4 For the purpose of claiming exemptions, certification issued by other independent NDT personnel certification bodies may be considered by the British Institute of NDT for equivalence (refer to PCN document PSL/49 for further information). An administrative charge will be made where the British Institute of NDT requires an evaluation of alternative certification.
- 7.6.5 If any candidate elects to claim an exemption (where entitled), the mark obtained in the examination, which leads to the issue of certification, under which such exemption is claimed, where the actual examination mark cannot be ascertained, a mark of 80% shall be used.
- 7.6.6 If any candidate elects to include within their examination any part or parts for which they may have been awarded an exemption, failure in any such part will cause the candidate to fail and no certification will be issued. The validity of any existing PCN certificates held by the candidate shall not be affected by such failure.
- 7.6.7 A candidate for radiography who claims an exemption in respect of Basic Radiation Safety (BRS) should note that PCN radiography certification is valid only so long as the holder holds current PCN BRS certification or other valid radiation safety certification recognised by the British Institute of NDT (see also Note 7).

## 7.7 Conduct of Examinations

- 7.7.1 All PCN examinations shall be conducted in examination centres established, approved and monitored by the British Institute of NDT, either directly or through an Authorised Qualifying Body. An examination centre may be established by an AQB at the employer's premises, but the employer shall not take part in the setting, conduct or grading of a PCN examination. Where the AQB also provides Responsible Level 3 and Level 3 services under an Outside Agency approval, such Level 3 personnel assigned to an employing entity shall be deemed to be employees of the AQB/OA for examination activities and not an employee of the external employer entity.



- 7.7.2 At the time of examination, the candidate shall have in their possession valid proof of identification and an official notification of the examination, which shall be shown to the examiner or invigilator upon demand.
- 7.7.3 Once an examination has commenced, candidates found in possession of equipment, materials or documents which, if used during a PCN examination, would be deemed to constitute cheating, will be considered to have cheated and the examination will be terminated.
- 7.7.4 Candidates proven to have cheated in a PCN examination will not be accepted as a candidate for any future PCN examination for a minimum period of 12 calendar months from the date of the examination in which cheating was established to have taken place. No examination results will be issued for those examination parts already completed and a letter will be sent to the candidate concerned and to the employer or sponsor explaining why the examination was terminated.

## 7.8 Grading of Examinations

### 7.8.1 General

- 7.8.1.1 The pass mark for each examination part is 70%.
- 7.8.1.2 To be eligible for certification, all candidates must achieve an average score of no less than 80%.
- 7.8.1.3 All examination scores shall be of equal weight in determining the average score. For example, where only specific and practical examination parts are administered for recertification, only those scores shall be factored into the average score.

### 7.8.2 Level 2

- 7.8.2.1 To be eligible for certification, the Level 2 candidate must pass the written general and specific parts, and shall detect all discontinuities, flaws or conditions specified as mandatory by the AQB during the practical examination.
- 7.8.2.2 The grading of the practical examination shall be in accordance with PCN document CP22.

### 7.8.3 Level 3

- 7.8.3.1 Level 3 candidate shall pass the basic and main method examinations in order to be considered eligible for certification.
- 7.8.3.2 **Basic Examination:** To be eligible for candidacy in the main method examination the candidate shall first obtain a grade of at least 70% in each of the examination parts A, B and C detailed in Table 4, and achieve an average score of no less than 80%.
- 7.8.3.3 **Main Method Examination:** To be eligible for certification, the candidate shall obtain a grade of at least 70% in each of the examination parts D, E and F detailed in Table 5, and achieve an average score of no less than 80%.

## 7.9 Re-examination (re-test)

- 7.9.1 A candidate who fails in an examination part (general, specific or practical) in an initial examination may be re-examined a maximum of two times in order to achieve a pass grade of 80%, provided the re-examination takes place not sooner than 30 days from the original examination and not later than one year after the original examination. The only exception to the 30-day rule is where further (supplementary) training is delivered to address areas of weakness identified in the initial examination. The training/examination body shall keep records of the supplementary training delivered. BINDT assigns responsibility for ensuring the suitability of the supplementary training to the AQB (or ATO) which may be reviewed during routine BINDT audits.
- 7.9.2 Failure to successfully complete an examination after two re-examination attempts shall revert the candidate to initial applicant status. For failed Level 3 candidates the basic examination need not be re-attempted provided further Level 3 certification is current.
- 7.9.3 For recertification examinations, based upon specific and practical modules only, the candidate shall achieve a pass grade of 70% for the specific module and 70% for each practical specimen attempted (and for Level 2 the written instruction). An overall composite score of 80% or greater is required.

- 7.9.4 Candidates who fail to achieve a composite pass grade of 80% are allowed two re-tests of the failed module (part). The re-tests shall take place not sooner than 30 days from the failed recertification examination and not later than one year after the failed recertification examination. The only exception to the 30-day rule is where further (supplementary) training is delivered to address areas of weakness identified in the failed recertification examination. The training/examination body shall keep records of the supplementary training delivered. BINDT assigns responsibility for ensuring the suitability of the supplementary training to the AQB (or ATO) which may be reviewed during routine BINDT audits.
- 7.9.5 For composite calculations where only one module was initially failed, the score from the original passed module shall be taken with the score for the re-examination module for the purpose of the overall composite calculation. Prior to attempting a re-sit of a failed examination, further (supplementary) training is required to address areas of weakness identified in the failed examination. The training/examination body shall keep records of the supplementary training delivered. BINDT assigns responsibility for ensuring the suitability of the supplementary training to the AQB (or ATO) which may be reviewed during routine BINDT audits.
- 7.9.6 A candidate who fails all allowed re-examination(s) shall apply for and take the initial examination according to the procedure established for new candidates (initial).
- 7.9.7 A candidate whose examination results have not been accepted for reason of fraud or unethical behaviour shall wait one year before re-applying for examination.

#### **7.10 Publication of Examination Results**

- 7.10.1 All candidates will be issued with a standard PCN examination results notice by the BINDT Authorised Qualifying Body, normally within 28 days of completion of examination, provided all examination fees have been paid.
- 7.10.2 A copy of the results notice will be sent to the organisation paying the examination and certification fees, and to the PCN Certification Records Office, which will issue certification to candidates fulfilling all prerequisites (training, experience, satisfactory vision, and success in the relevant examination) for certification.
- 7.10.3 Candidates who fail any part of the examination will be provided with brief reasons for failure on this notice.

### **8. CERTIFICATION**

- 8.1 Issue of PCN certification, in respect of a successful candidate, normally takes place within 14 days of the British Institute of NDT receiving the results notice from the BINDT Authorised Qualifying Body. However, where a candidate for certification has achieved a pass in all relevant examination parts but has not yet satisfied the pre-requisite experience and vision requirements, the issue of certification may be deferred for up to two years from the date of success in the PCN examination.

Once the PCN Certification Records Office is in possession of evidence that all prerequisites (training, experience, satisfactory vision, and success in the relevant PCN examination) have been satisfied, a PCN certificate stating the level and category awarded will be issued.

- 8.2 The PCN record of certification and/or corresponding wallet card bears:

- The forename and surname of the certified individual.
- The date of certification.
- The date upon which certification expires.
- The level of certification.
- The NDT method(s).
- The NDT techniques within the NDT method successfully attempted during the examination taken and as applicable to the certification issued.
- The industrial sector(s) concerned.
- The specific products the holder is qualified to test.
- A unique PCN identification number.
- The signature of the certified individual.

- A photograph of the certified individual in case of the wallet card.
- The PCN cold seal impressed over the photograph to avoid falsification of the wallet card; and
- The signature of an authorised officer of the British Institute of NDT.

**NOTE 6:** By issuing the certificate and/or the corresponding wallet card, the British Institute of NDT attests to the qualification of the individual but does not give any authority to operate. The employer (See 3.3) **shall** issue a written statement based upon the scope of certification, authorising the individual to carry out defined tasks. Such authorisation can be dependent on the employer having provided job- or task-specific training.

## 9. VALIDITY OF CERTIFICATION

- 9.1 The period of validity of the certification is five years from the date of certification indicated on the certificate, except where success in the recertification procedure occurs within the 56 days prior to expiry of the certificate, in which case the new certificate will expire five years after the expiry date of the certificate being revalidated.
- 9.2 It should be noted that some standards might require recertification at more frequent intervals. The PCN recertification procedure may be invoked at any time within the period of validity of the certificate. If the recertification procedure is completed prior to 56 days before expiry, the new certificate will be valid for five years from the completion of that recertification procedure.

### 9.3 PCN certification **shall** be invalid:

- 9.3.1 In any industrial sector which is not covered by the certificate (unless the holder successfully completes a supplementary examination for the industrial sector);
- 9.3.2 At the discretion of the British Institute of NDT after reviewing evidence of unethical behaviour (see CP27 – PCN Code of Ethics);
- 9.3.3 If examination or certification fees are not paid when due;
- 9.3.4 If the individual fails to satisfy the criteria for visual acuity and colour perception;
- 9.3.5 If a *significant interruption* (see definitions) takes place in the method for which the individual is certified;
- 9.3.6 From the date of issue of notification of failure in a PCN examination for recertification; and
- 9.3.7 In the case of certification for industrial radiography, if the period since the certificate holder has achieved success in a PCN (or recognised equivalent) radiation safety examination exceeds five years.

**NOTE 7:** PCN radiography certification is considered by BINDT to be valid in any country outside of the United Kingdom where the certificate holder has passed an examination on local radiation safety regulations, and provides to BINDT evidence of valid radiation safety certification issued by a recognised independent authority in that country (see also 7.6.7).

Verification of PCN certification is available at [www.bindt.org/PCN](http://www.bindt.org/PCN) provided the name or PCN number of the individual candidate is known.

## 10. RECERTIFICATION

### 10.1 General

- 10.1.1 It is the responsibility of the certificate holder to initiate the procedure required for recertification.
- 10.1.2 Complete and correct recertification applications **shall** be presented to PCN no sooner than six months and no later six weeks prior to the expiry date. As an exception, and based upon decision of BINDT, applications presented within 12 months after the date of expiration may be considered, but such applications will be subject to payment of an additional handling fee. Over this period, no exception is admitted and the candidate **shall** be considered an initial candidate for certification in the NDT method and level concerned.

### 10.2 Level 2

- 10.2.1 The recertification examination for Level 2 personnel shall comprise, as a minimum, practical and specific examinations equivalent to those required for initial qualification.
- 10.2.2 To be eligible for recertification, the candidate is required to achieve a grade of at least 70% for each examination part, and an overall average of 80%.

10.2.3 Applications for Level 2 recertification are to be submitted directly to the AQB on PCN form PSL/57A/AERO.

### 10.3 Level 3

10.3.1 The recertification examination for Level 3 personnel comprises examination parts E and F detailed in Table 5.

10.3.2 To be eligible for recertification, the candidate is required to achieve a grade of at least 70% for each examination part, and an overall average of 80%.

10.3.3 Applications for Level 3 recertification by examination are to be submitted directly to the AQB on PCN form PSL/57A/AERO.

10.3.4 As an alternative to a recertification examination comprising parts E and F, the Level 3 candidate for recertification may satisfy the structured credit system detailed in PCN document CP17A. Candidates whose application for recertification through the credit system is refused shall, in order to be recertified, attempt the recertification examination detailed above.

### 10.4 Re-examination (recertification)

10.4.1 In the event of failure in a PCN Aerospace recertification examination, where the individual fails to achieve a grade of at least 70% for each examination part, and an overall average of 80%, BINDT will immediately cancel the certificate concerned.

10.4.2 PCN shall issue a new record of certification that no longer shows the competence concerned and shall send this with an explanatory letter to the certificate holder requesting the return of the superseded record of certification.

10.4.3 The return of the superseded record of certification is a MANDATORY requirement, incumbent upon the candidate.

10.4.4 The cancellation of the certificate shall not affect the eligibility of the candidate to attempt the two permitted re-tests as detailed in clause 7.9.2.

10.4.5 Note for clarification: 'Examination parts' in this context refers to:

10.4.5.1 For Levels 1 and 2, parts are: the general, specific and practical examinations (three parts)

10.4.5.2 For the Level 3 basic examination, parts are: A, B and C (three parts)

10.4.5.3 For the Level 3 main method examination, parts are: Parts D, E and F (three parts)

10.4.6 A candidate failing all permitted re-examinations shall apply for and take the examination in accordance with the procedure established for new candidates (initial examination).

## 11. COMPLAINTS AND APPEALS

11.1 PCN certificate holders must recognise that personal integrity and professional competence are the fundamental principles on which their testing activities are founded (see also use and misuse of certificates). Accordingly, it is a condition of PCN certification that certificate holders shall undertake to comply with a code of ethics, which is published as PCN document reference CP27.

11.2 An aggrieved party in a dispute, which considers itself to have reasonable grounds for questioning the competency or ethical behaviour of a PCN-certificated individual or their employer, may petition the British Institute of NDT for withdrawal or cancellation of certification.

11.3 Such a petition must be accompanied by all relevant facts and, if it is the view of the British Institute of NDT that an adequate case has been presented, a full investigation of the circumstances under dispute will be initiated.

11.4 If the petition is substantiated to the satisfaction of the UK National Aerospace NDT Board (or a committee to which the Board has assigned responsibility for such matters), the certification may be cancelled, or recertification may be refused, for such period as the Board may decide, unless the holder of certification is successful in a further examination, the content of which will be decided by the Board or the responsible committee at an ordinary meeting.

11.5 Appeals against certificate cancellation, failure to certify or failure to renew may be made by the candidate or the employer upon application using PCN document CP21 to the Certification Management Committee (CMC).

11.6 The CMC may delegate the process of dealing with complaints and appeals to a properly constituted sub-committee.

## 12. CHANGE OF EMPLOYER

- 12.1 Change of employer shall not be cause for PCN BS EN ISO 9712 recertification. However, EN 4179 and NANDTB require that the certificate holder attempt specific and practical examinations as defined by the new employer's written practice and as determined by the new employer's Responsible Level 3. The required examinations shall be conducted through an approved Outside Agency.

## 13. SUPPLEMENTARY EXAMINATIONS

- 13.1 Holders of Level 2 certification described in Appendices A1, A2 and A3, who wish to add aerospace structures to an existing certificate for aerospace materials and components at the same level, will be required to attempt a supplementary examination comprising:
- 13.1.1 Calibration and functional checking of test equipment, testing two aerospace structure samples, and reporting the results in a prescribed manner in accordance with the code, specification or standard provided (this will include any calculations necessary for inspection sensitivities).
  - 13.1.2 For radiography (structures) only, read and report on a total of eight radiographs of aerospace structures.
- 13.2 Applications for supplementary examination are to be made direct to the AQB using PCN form PSL/57A/AERO. Applicants will be required to submit (to the examining AQB) log sheets showing continuity of employment and in the application of the method in the aerospace sector.
- 13.3 The pass mark for all supplementary examination parts will be 80%, and the time allowed will be four hours for ET and UT, and eight hours for RT.
- 13.4 Supplementary examinations may only be attempted 56 days or more prior to the expiry of the certificate to be supplemented.
- 13.5 This is to allow sufficient time for the publication of results and the re-test of failed supplementary examinations.
- 13.6 Re-tests of failed supplementary examinations will be allowed between 30 days and one year after the most recent attempt.
- 13.7 Where the candidate has been successful in gaining any supplementary certification technique(s) these shall be added to the current certification certificate, which shall be up-issued by PCN. However, the certification shall retain the expiry date of the original certificate. This is to maintain currency of the original examination modules to which the supplementary technique(s) are added.

## 14. CERTIFICATION AND EXAMINATION RECORDS

- 14.1 The British Institute of NDT will retain records of certification issued as a result of success in any PCN examination for a minimum period of 11 years.
- 14.2 An updated database of certificated personnel, which includes (amongst other things) the name, PCN identification number and scope of certification held by each individual, is maintained by the PCN Certification Records Office.
- 14.3 Where BINDT Authorised Qualifying Bodies retain examination records of successful and unsuccessful candidates for a period of 11 years from the date of the examination, audit of specific individual examination records, which are under the jurisdiction of the British Institute of NDT or its nominees, may be made in accordance with PCN document CP19.

## 15. USE AND MISUSE OF CERTIFICATES

- 15.1 The issue of a PCN certificate indicates that the holder has demonstrated an acceptable level of competence measured by means of the relevant examination conducted at a BINDT Authorised Qualifying Body in accordance with the prevailing requirements on the date indicated using a particular set of equipment on a specific product.
- 15.2 Certification holders and/or employers shall not imply any further degree of competence on the basis of the PCN certification held.
- 15.2.1 Employers shall satisfy themselves that the certificate holder is competent in accordance with their internal procedures/written practice, by providing the certificate holder authorisation to carry out NDT inspections on the employer's behalf.
  - 15.2.2 This could involve the monitoring of individual competency, on an ongoing basis by the employer, in conjunction with a written practice.

- 15.3 PCN certificate holders and/or their employers shall not use or refer to PCN certificates, nor the PCN logo, nor must they knowingly allow them to be used or referred to by a third party, in a manner that may be considered fraudulent or to bring the PCN Scheme into disrepute.
- 15.4 The full conditions of use of the PCN logo, or reference to PCN certification, are detailed in a separate document (PSL/31) available from the British Institute of NDT.
- 15.5 All certificated personnel are required to keep a register of complaints made against them within the scope of the certificate of competence (see also PCN document CP27 – Code of ethics for PCN certificate holders).
- 15.5.1 Failure to keep such a register or failure to enter valid complaints in it will be construed as a misuse of the certificate and appropriate penalties will be applied, see below.
- 15.5.2 The register of complaints must be made available to the British Institute of NDT on request.
- 15.6 The penalty for misuse of PCN certification in all cases is invalidation of the certificate. If the misuse was in the public domain, publication of the transgression may also be undertaken.
- 15.7 Any misuse, which appears to be an infringement of the law, will result in the matter being reported to the police.
- 15.8 Certificates are valuable documents which should be kept in a safe place. Any suspicion of forgery or misrepresentation must be reported to the British Institute of NDT.
- 15.9 Loss or theft of certificates shall be reported to the police and to the British Institute of NDT.
- 15.10 It is required that all PCN certificate holders maintain a log demonstrating continuity in the application of the NDT activity for which they are certificated. Examples of suitable pages for recording details of employment, continuity and surveillance are contained within PCN document CP16.
- 15.11 New employers presented with PCN certification should satisfy themselves that the certificate holder has been employed without *significant interruption* (see definitions) in work for which the certificate was granted.
- 15.12 It is strongly recommended that the employer request sight of the certificate holder's logbook.

## APPENDIX 1

### SPECIFICATIONS FOR PREPARATION OF SPECIFIC EXAMINATION PAPERS

The core documents are highlighted for each method and these are the key mandatory documents for sourcing questions. The other specifications listed should be used to supplement the examinations as appropriate to the examination scope and sectors for which the examination is being prepared and as deemed appropriate by the examination body. All documents used in examination preparation must be provided to examination candidates as reference material.

#### 1. Penetrant Inspection (PT)

##### 1.1. Level 2

- ASTM E 1316: Terminology for non-destructive testing examination
- **ASTM E 1417: Standard practice for liquid penetrant examination (core document)**
- **ASTM E 165: Practice for liquid penetrant examination (core document)**
- ASTM E 1209: Standard practice for fluorescent liquid penetrant testing using the water washable process.
- ASTM E 1210: Standard practice for fluorescent liquid penetrant testing using the hydrophilic post-emulsification process.
- **ASTM E 2297: Standard guide for use of UV-A and visible light sources and meters used in the liquid penetrant and magnetic particle methods (core document)**
- ASTM E 3022: Standard Practice for Measurement of Emission Characteristics and Requirements for LED UV-A Lamps Used in Fluorescent Penetrant and Magnetic Particle Testing

##### 1.2. Level 3 – As Level 2 plus the following:

- BS EN 3059: Non-destructive testing – Penetrant testing and magnetic particle testing – Viewing conditions.
- BS EN 3452-2: Non-destructive testing – Penetrant testing – Testing of penetrant materials
- BS EN 3452-3: Non-destructive testing – Penetrant testing – Reference test blocks
- BS EN 3452-4: Non-destructive testing – Penetrant testing – Equipment
- QPL-AMS-2644: Qualified products list
- SAE-AMS-2644: Inspection materials – Penetrants
- ISO 9712: General principles for qualification and certification of NDT personnel
- EN 4179: Aerospace series – qualification and approval of personnel for non-destructive testing

#### 2. Magnetic Particle Inspection (MT)

##### 2.1. Level 2

- ASTM E 1316: Terminology for non-destructive testing examination
- **ASTM E 1444: Standard practice for magnetic particle testing (core document)**
- **ASTM E 709: Guide for magnetic particle inspection (core document)**
- ASTM A 275: Standard practice for magnetic particle examination of steel forgings
- **ASTM E 2297: Standard guide for use of UV-A and visible light sources and meters used in the liquid penetrant and magnetic particle methods (core document)**
- ASTM E 3022: Standard practice for measurement of emission characteristics and requirements for LED UV-A lamps used in fluorescent penetrant and magnetic particle testing

##### 2.2. Level 3 – As Level 2 plus the following:

- BS EN 3059: Non-destructive testing – Penetrant testing and magnetic particle testing – Viewing conditions.
- BS EN 9934-2: Non-destructive testing – Magnetic particle testing – Detection media
- BS EN 9934-3: Non-destructive testing – Magnetic particle testing – Equipment
- BS 5044: Contrast aid paints used in magnetic flaw detection.
- AMS 2641: MPI vehicle

### 3. Radiography – Film (RT)

#### 3.1. Level 2

- ASTM E 94: Guide for radiographic examination
- ASTM E 999: Standard guide for controlling the quality of industrial radiographic film processing.
- **ASTM E1742: Standard practice for radiographic examination (core document)**
- **ASTM E 1030: Standard test method for radiographic examination of metallic castings (core document)**
- **ASTM E 1032: Standard test method for radiographic examination of weldments (core document)**
- ASTM E 1079: Calibration of transmission densitometers
- ASTM E 1316: Terminology for non-destructive testing examination
- ISO 17636-1: Non-destructive testing of welds – Radiographic testing – Part 1: X- and gamma-ray techniques with film
- ISO 19232-1: Non-destructive testing – Image quality of radiographs – Part 1: Determination of the image quality value using wire-type image quality indicators.
- ISO 19232-2: Non-destructive testing – Image quality of radiographs – Part 2: Determination of the image quality value using step/hole-type image quality indicators.
- ISO 19232-3: Non-destructive testing – Image quality of radiographs – Part 3: Image quality classes

#### 3.2. Level 3 – As Level 2 plus the following:

- BS EN 25580: Minimum requirements for radiographic illuminators for non-destructive testing
- ASTM E 1390: Standard specification for illuminators used for viewing industrial radiographs.
- ASTM E 1815: Standard test method for classification of film systems for industrial radiography
- ASTM E 2104: Standard practice for radiographic examination of advanced aero and turbine materials and components
- AMS 2175: Castings – Classification and inspection

### 4. Ultrasonic Inspection (UT)

#### 4.1. Level 2

- ASTM E 1316: Terminology for non-destructive testing examination
- **ASTM E 114: Standard practice for ultrasonic pulse-echo straight-beam contact testing (core document)**
- **ASTM E 587: Standard practice for ultrasonic angle-beam contact testing (core document)**
- ASTM E 164: Standard practice for contact ultrasonic testing of weldments.
- ASTM E 213: Standard practice for ultrasonic testing of metal pipe and tubing
- ASTM E 2700: Standard practice for contact ultrasonic testing of welds using phased arrays.
- ASTM E 580: Standard practice for ultrasonic testing of flat panel composites and sandwich core materials used in aerospace applications.
- **ISO 16810: Non-destructive testing – Ultrasonic testing – General principles**
- ISO 16811: Non-destructive testing – Ultrasonic testing – Sensitivity and range setting (core document)
- ISO 16823: Non-destructive testing – Ultrasonic testing – Transmission technique
- ISO 16827: Non-destructive testing – Ultrasonic testing – Characterization and sizing of discontinuities

#### 4.2. Level 3 - As Level 2 plus the following:

- BS EN 12668-3: Non-destructive testing – Characterisation and verification of equipment – Part 3: Combined equipment
- BS EN 583-3: Non-destructive testing – Ultrasonic examination – Part 3: Transmission technique
- BS EN 583-5: Non-destructive testing – Ultrasonic examination – Part 5: Characterisation and sizing of discontinuities
- ISO 2400: Non-destructive testing – Ultrasonic testing – Specification for calibration block No 1.
- ISO 7963: Non-destructive testing – Ultrasonic testing – Specification for calibration block No 2.
- AMS 2175: Castings – Classification and inspection



## 5. Eddy Current (ET)

### 5.1. Level 2

- ASTM E 1316: Terminology for non-destructive testing examination
- ASTM E 426: Standard practice for electromagnetic (eddy current) examination of seamless and welded tubular products, austenitic stainless steel and similar alloys.
- ASTM E 2884: Standard guide for eddy current testing of electrically conducting materials using conformable sensor arrays.
- ASTM E 3502: Standard practice for the examination of carbon steel welds using eddy current array.
- ASTM E 376: Standard practice for measuring coating thickness by magnetic field or eddy current (electromagnetic) testing methods
- ASTM E 2533: Standard guide for non-destructive testing of polymer matrix composites used in aerospace applications.
- **ISO 15549: Non-destructive testing – Eddy current testing – General principles (core document)**
- **ISO 15548-1: Non-destructive testing – Equipment for eddy current examination – Part 1: Instrument characteristics and verification (core document)**
- ISO 17643: Non-destructive testing – Eddy current testing of welds by complex-plane analysis

### 5.2. Level 3 – As Level 2 plus the following:

- ISO 15548-2: Non-destructive testing – Equipment for eddy current examination – Part 2: Probe characteristics and verification
- ISO 15548-3: Non-destructive testing – Equipment for eddy current examination – Part 3: System characteristics and verification

## APPENDIX 2

### GUIDANCE ON POSSIBLE TEST METHODS AND TECHNIQUES

The table below details the test methods and techniques as detailed by the UK NANDTB. These should be used as guidance in determining practical examination content and the correct preparation of results notices and examination qualification certificates.

Main methods as specified in EN 4179	Technique	Details (to be specified as applicable)
Penetrant Testing (PT)	F: Water wash	Manual
	F: Post emulsified	Manual
	Colour contrast solvent removable	Manual
Magnetic testing (MT)	Wet horizontal bench systems	CF, FF, T/B, coil
	Portable systems	Yokes
Ultrasonic testing (UT)	Contact testing A-scan display	PE, TT, PA
	Through transmission C-scan display	N/A
	Immersion C-scan display	N/A
	Thickness gauging	PE
	<b>Others</b>	
Radiography (RT)	X-ray using film	
	Gamma ray using film	
	Digital radiography (filmless)	
	Computerised radiography (filmless)	
	Interpretation	
	<b>Others</b>	
Eddy current (ET)	High frequency	Analogue, phase display
	Low frequency	Analogue, phase display
	Dual frequency	Phase display
	Dynamic (rotating)	Phase display
	<b>Others</b>	

## ANNEX A – PCN CERTIFICATION AND AUTHORISATION TO EN 4179

A1. PCN aerospace sector examinations are founded upon somewhat different criteria than other sectors within the PCN Scheme. The welding, castings and wrought products sector examinations concentrate principally upon non-destructive testing (NDT) associated with the manufacturing stage in the product cycle. Hence their sector-specific examination module product technology content and practical examination modules are primarily concerned with the defects and materials technology relevant to flaws occurring during the production of welds, castings, forgings, extrusions, etc.

A2. PCN aerospace examinations, by contrast, have practical modules relevant to the detection of in-service flaws such as fatigue cracks, stress-corrosion cracks, corrosion, etc. The Level 2 aerospace sector-specific product technology module is different in that it is principally concerned with the engineering and materials technologies appropriate to aerospace structures, methods of construction and aerospace regulatory authority requirements. Aerospace materials, for instance, may include non-metals, which could be affected by materials and processes associated with non-destructive testing.

A3. From the paragraphs above it will be apparent that PCN aerospace central (BS EN ISO 9712) certification is principally aimed at NDT personnel working in the fields of aircraft in-service inspection and overhaul, either at maintenance facilities (EASA part 145 approved organisations) or at aircraft or sub-assembly manufacturers and overhaulers. Nevertheless, the PCN certificate may be used by the employer as evidence of qualification meeting EN 4179 criteria, and the employer may issue an 'approval' to such personnel – where this is deemed appropriate by the UK NANDTB and where the employer's 'written practice' embodies such an approach.

A4. In certain circumstances, where the UK NANDTB deems that the standard PCN examination is not wholly appropriate to the employer's NDT processes, a PCN Authorised Qualifying Body may work with the employer to develop specific written and/or practical NDT qualification examinations that are entirely appropriate to the employer's NDT processes, in which case such examinations may be deemed by the UK NANDTB to satisfy EN 4179 qualification criteria and the employer may approve NDT personnel so qualified providing the employer's 'written practice' embodies such an approach. In such circumstances, a PCN BS EN ISO 9712/ISO 9712 certificate could still be awarded. For further information on this service, the employer should deal directly with the chosen PCN Authorised Qualifying Body.

A5. An employer may utilise an outside agency (for example, a PCN Authorised Qualifying Body) to develop a certification programme, train and examine NDT personnel and perform any other Level 3 function. An outside agency may qualify, but not certify personnel. The employer shall document the suitability of any outside source selected to perform any function to meet the requirements of EN 4179. This documentation shall be of sufficient detail to justify the outside agency's ability to perform the required Level 3 function(s).

## **ANNEX B – AEROSPACE PRODUCTS (DEFINITION OF)**

### **B1. Raw Products**

For NDT personnel working in companies which are supplying aerospace raw products such as basic castings, forgings, extrusions, etc, the most appropriate PCN certification can be obtained via relevant examinations in the casting and wrought product sectors. These examinations contain product technology questions and practical modules which are entirely relevant to this 'raw product' stage of manufacture, irrespective of whether the product is destined for use in an aircraft or an automobile. Acceptance standards may well be higher in the former case, but the origin of flaws in the product will be solely as a result of the process involved and unrelated to the end use of the item.

### **B2. Welds**

One exception to this is aerospace welds – Appendix A4. PCN certification in weld inspection would normally be via the welding sector examinations, but these are principally aimed at (in aerospace terms) very thick sections, for example 6 mm and above. Appendix A4 has therefore been published to cover welds normally used in aerospace, for example from thin-gauge (around 30 SWG) materials up to about 6 mm, and in relevant materials which are more commonly stainless steels or heat resisting alloys, rather than plain carbon steels. The sector-specific product technology examination module associated with Appendix 4 is the same as that in welding sector examinations (and therefore different to that in other aerospace appendices) to reflect the fact that it is related to a 'raw product' situation.

### **B3. Materials, Components and Structures – Terminology and Philosophy**

The PCN aerospace appendices for volumetric NDT methods define two basic categories of certification:

- (a) Materials and components.
- (b) Materials, components, and structures.

Some confusion has arisen with respect to these categories because of the words used. In essence, (a) is intended to apply to those NDT personnel engaged in manufacturing and/or overhauling 'components' (see below); (b) is intended to apply in those areas where the NDT personnel are responsible for examining the load-bearing structures of the airframe, either as a whole or as major sub-assemblies. This latter category of personnel may also be required to carry out NDT on 'components' where they are still fixed into, or only temporarily removed from the airframe.

The term 'components' is therefore intended to mean any type of more or less complex item which can range from a literal component, for example a wheel or a flying control rod assembly, to a complete sub-assembly such as an undercarriage unit, power plant or powered flying control unit, in other words, units or sub-assemblies which are not usually a part of the airframe load-bearing structure, and often not serviced by the user, but returned to the original supplier for repair, overhaul or modification.

The term 'structures' is intended to mean the primary, fixed, load-bearing part of the airframe, or major sub-assemblies such as vertical or horizontal stabilisers or flying control surfaces which may be removed from the airframe and sent elsewhere for repair or overhaul.

Materials is included in both categories because all components and structures are of course made from raw materials of one sort or another, for example plate, forgings, castings, etc. Inevitably, there is an occasional need for NDT to be applied to raw materials at a 'user' site. It is felt, therefore, that these NDT personnel need to demonstrate some basic knowledge of raw materials and their flaws. By comparison with NDT personnel certificated for NDT of 'raw materials' via the castings or wrought products sectors, PCN expects only a relatively superficial knowledge of manufacturing processes as part of the basic aerospace 'components' or 'components and structures' certification.

The aerospace liquid penetrant and magnetic particle testing certificates are not annotated as 'Materials and Components' or 'Materials Components and Structures'. This is because it has proved to be impracticable to distinguish between penetrant or magnetic particle methods applied to 'structures' as opposed to 'components' and/or 'materials', *ie* a localised penetrant or magnetic particle inspection technique (such as is commonly applied to detect local in-service flaws) is virtually the same whether applied *in situ* on an aircraft structure, or on a component on the bench.

As with the other methods, for penetrant or magnetic particle certification in respect of 'raw products', the route to NDT personnel certification detailed within PCN/GEN is usually more appropriate.

## **ANNEX C – ACCESS TO PCN EXAMINATION RECORDS FOR AUDIT PURPOSES**

All AQB's authorised by the British Institute of NDT (BINDT) to conduct PCN examinations have been initially and impartially audited by registered Lead Assessors and remain subject to continued audit and surveillance under the terms of PCN documents CP9 and CP10.

Indeed, BINDT and the PCN Scheme itself is regularly audited by the United Kingdom Accreditation Services (UKAS) against the provisions of ISO/IEC 17024 – General criteria for certification bodies operating certification of personnel.

One of the declared aims of the PCN Scheme is to eliminate the need for the costly and wasteful practice of subjecting AQB's to repetitive third-party audits which merely add to the cost and not to the value of certificated personnel. Indeed, this was the primary reason for the creation of the PCN Scheme, and for it seeking and gaining independent accreditation.

However, the UK NANDTB has recognised that the requirement to satisfy the QA procedures of customers, regulators and quality assurance bodies will occasionally generate a need for access to an AQB for reasons of establishing the credibility of an examination, and the Board has therefore agreed that:

- Industrial users of the PCN Scheme may occasionally require access at short notice to an AQB for reasons of establishing the credibility of an examination conducted in the past. The agreement to provide such access may be reviewed from time to time and formalised, withdrawn or altered as necessary.
- Regulators, employers of PCN certificated individuals or quality assurance authorities requiring access to examination material held at AQB for the purpose of establishing the suitability of the scheme will, subject to approval by BINDT in each case, be granted such access at all reasonable times.

Requests for such access to PCN examination material at a BINDT Authorised Qualifying Body or at the headquarters of the PCN Scheme itself should be made initially to the

Chief Executive Officer  
BINDT Certification Services  
Midsummer House  
Riverside Way, Bedford Road  
Northampton  
NN1 5NX  
United Kingdom

(Email: [pcn@bindt.org](mailto:pcn@bindt.org)).

## SUMMARY OF CHANGES

Issue number	Issue date	Summary of changes
5	01.04.2018	<ul style="list-style-type: none"> <li>• Clause 6.1.9 – responsibility for experience reductions.</li> <li>• Clause 7.9 – clarification on re-examination rules for re-tests (7.9.1/7.9.2).</li> </ul>
6	01.07.2018	<ul style="list-style-type: none"> <li>• Clause 4.47 – Ref to TT Removed.</li> <li>• Clause 6.1.10.1 – Ref to VT removed.</li> <li>• Clause 6.4.1.2 – Ref to VT removed.</li> <li>• Table 1: Ref to VT Removed.</li> <li>• Table 2: Ref to VT removed.</li> <li>• Table 2: Ref to TT removed.</li> </ul>
7	01/04/2019	Complete review and amendment to better align with EN 4179:2015.
8	01/02/2021	Minor amendments following AQB & CMC Review
9	24/02/2021	Further minor amendments following further review
10	01.01.2022	<p>Amendments following BINDT meeting with PCN AERO AQBs and trialling period.</p> <ul style="list-style-type: none"> <li>• Clause 6.4.5 removed – removing fast track experience option.</li> <li>• New clause 6.4.5 added.</li> <li>• Change in UT Core Docs</li> </ul> <p>Amendment to Appendix 1 standards list for Specific examinations</p> <p>Amendment to Level 3 main method examination requirements and the read across with dedicated appendix documents for “open and closed book” examinations. Sections 7.5.4 to 7.5.5.</p>