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

CONTENTS

INTRODUCTION

This document covers the specific requirements for PCN qualification and/or Level 2 or Level 3 certification of personnel engaged in Non-Destructive Testing of Aerospace Materials and Components, Aerospace Structures and Aerospace Welds.

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

APPENDICES TO THIS DOCUMENT:

Appendix A1	Eddy Current Testing of aerospace materials, components & structure
Appendix A2	Ultrasonic Testing of aerospace materials, components & structure
Appendix A3	Radiographic Testing of aerospace materials, components & structure
Appendix A4	Radiographic Testing of aerospace welds
Appendix A5	Magnetic Particle Testing of aerospace products
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Appendix A7	Testing of aerospace composite materials
Appendix Z1	examination syllabus compendium
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BACKGROUND

Aerospace sector qualification and certification was the first to be developed under the PCN scheme during the period 1985 to 1988. Subsequently, in 1993, the structure of the examinations and the criteria for certification were modified to reflect the criteria of the then newly published and adopted EN473 : 1993.

With the publication and adoption of EN 4179 : 2000, and with the subsequent publication of EASA part 145 regulations, it became necessary for the PCN aerospace qualification examination to satisfy EN 4179 criteria and appropriate adjustments to the examination format and content were made.

In 2004, the newly formed UK National Aerospace NDT Board accepted responsibility for the control of PCN aerospace examinations, and undertook to ensure that these examinations provided industry with a mechanism for compliance with the *qualification criteria* of EN 4179 for the *general* application of NDT in the aerospace sector. It is emphasised that PCN aerospace sector NDT personnel certification cannot provide *full* compliance with EN 4179 criteria, since this is a second party certification/approval standard, and thus the employer is responsible for certification and authorisation.

PCN Aerospace sector NDT personnel certification continues to satisfy or exceed the minimum criteria of EN 473, a third party certification standard, but additionally provides employers with a UK National Aerospace NDT Board recognised independent *qualification* delivered by an outside agency (through BINDT Authorised Qualifying Bodies) against the recently published EN 4179 criteria.

NORMATIVE REFERENCES:

ISO/IEC 17024	General requirements for bodies operating certification systems of persons
EN 473	General principles for qualification and certification of NDT personnel
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
CAP747 GR23	Personnel Certification for Non-Destructive Testing of Aircraft, Engines, Components and Materials. Available at www.caa.co.uk.

RELEVANT PCN DOCUMENTS:

Appendix E3	(to PCN/GEN) Radiation Safety
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
PSL04	PCN examination availability
PSL08A	PCN documents - issue status
PSL30	Log of pre-certification employment & experience
PSL31	Information - use of the PCN logo
PSL42	Log for recording pre-certification on-the-job training and/or experience
PSL44	Vision Requirements
PSL49	PCN examination exemptions for holders of current valid certificates issued by other certification bodies
PSL57	PCN examination application form(s)
NANDTB 24	Near Vision Requirements (Aerospace)

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

1. SCOPE

1.1 This document together with Appendices covers the specific requirements for PCN qualification and/or Level 2 or Level 3 certification of personnel engaged in Non-Destructive Testing of Aerospace Materials and Components, Aerospace Structures and Aerospace Welds, and provides certification in compliance with EN 473:2008, as well as qualification in compliance with EN 4179:2009 . The requirements herein, which are intended primarily for employees of organisations seeking to comply with EASA Part 145 regulations, but which may also be utilised for Part 21 organisations and aerospace materials suppliers (subject to the requirements of aerospace prime contractors), cover physical requirements, 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 PCN Scheme. The complete list of published PCN documents is detailed in publication reference PSL/8A, which is updated and republished every three months on the Institute's web site at www.bindt.org where copies of PCN documents are available for download free of charge. Organisations requiring at all times to be in possession of the most up to date PCN documents may register with the "PCN Update Scheme" which guarantees that they automatically receive all new or revised PCN documents.

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 Division of BINDT on telephone number +44 (01604) 893811, or email 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.

2.2 The UK CAA has issued guidance in publication CAP747 GR23 as to where PCN aerospace sector certification may be utilised.

2.3 The UK National Aerospace NDT Board (UK NANDTB) published a document, NANDTB/12, on the applicability and recognition of PCN aerospace certification.

2.4 In accordance with the requirements of EN 4179, NANDTB are entitled to recognise equivalency of NDT qualifications and certification, and in this regard the UK National Aerospace NDT Board has agreed to recognise that the PCN/GEN Appendix A (aerospace sector) certificates issued after 28th November 2004 satisfy the qualification criteria of EN 4179 until 31st March 2011, after which date only certificates issued under PCN/AERO (which superseded PCN/GEN Appendix A on 1st April 2006) will be recognised by the Board as satisfying the qualification requirements of EN 4179.

3. COMPLIANCE

3.1 To be eligible for, and to maintain the validity of PCN certification, personnel are required to comply with the aerospace specific requirements for the NDT method in which certification is sought. The examination syllabus and examples of typical examination questions are provided in the relevant Appendix to this document.

3.2 PCN Certification issued as a result of success in an examination defined herein complies with European standard EN 473:2008 unless stated to the contrary by text within a frame, and may be used by employers of NDT personnel to satisfy the *qualification requirements* of European Standard EN 4179:2009.

3.3 Once PCN NDT personnel certification is awarded, an employing organisation must authorise a person in accordance with its procedures so that that person can carry out and certify NDT inspections (see clause 4.1). The employer is solely responsible for the authorisation of its employees and cannot authorize personnel for another employer. Individuals cannot qualify or authorize themselves.

4. DEFINITIONS AND ABBREVIATIONS

The following definitions apply within this document and its appendices:

4.1 Authorisation (referred to as “certification” in EN 4179) - a written statement by an employer that an individual has met the applicable requirements of this specification and the company written practice.

Operating Approval - Written statement issued by the employer, based upon the scope of certification, authorizing the individual to carry out defined tasks. Such authorisation can be dependent on the employer having provided job or task-specific training.

4.2 Authorised Qualifying Body - A body, independent of any single predominant interest, satisfying the criteria detailed in PCN document reference CP9 and authorised by the British Institute of NDT to prepare and administer PCN aerospace examinations to qualify NDT personnel. An Authorised Qualifying Body within the PCN Scheme may otherwise be referred to as *an Outside Agency*.

4.3 Basic Examination - An examination, at Level 3, which demonstrates the knowledge of the materials science and technology in relation to the field of activity of the candidate, of this qualification and certification system, and of the theoretical principles at level 2.

4.4 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, particular equipment on stated materials, structures or geometries, e.g., ultrasonic testing of aerospace materials and components (excluding aerospace structures). Certified categories will be clearly indicated on the PCN record of certification.

4.5 Certification - a written statement by PCN that an individual has met the applicable requirements of EN 473. Certification does not include *authorisation*, but an employer may, in certain circumstances, confer authorisation on the strength of certification, provided such a process is documented in the employer’s written practice.

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.

4.6 Certification Body - The body that administers procedures for certification of NDT personnel in accordance with this specification, and fulfils the requirements of ISO/IEC 17024. In the present case, the certification body is the British Institute of NDT, which owns and manages the PCN Scheme.

4.7 Closed book examination - an examination administered without access to reference material, except that provided with or during the examination.

4.8 Cognizant Engineering Organisation - The engineering or NDT organisation of the prime contractor or end user authorised to make NDT-related decisions and give NDT-related approvals..

4.9 Direct Observation - Direct observation is when the observer is able to come to the immediate aid of the trainee and remains within a distance that permits uninterrupted, unaided visual and verbal contact with the trainee.

4.10 Direct Readout Instrument - Instruments that physically display measurements in dimensional or electrical units (e.g. inches, millimeters or %IACS, etc.) either as digital readout or an analog 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.

4.11 Documented - the condition of being in written or electronic form.

4.12 Employer - A government, prime contractor, sub-contractor, supplier, or outside agency employing or contracting the services of one or more individuals who perform NDT. Self-employed individuals are included in this definition.

4.13 Evaluation - a review, following interpretation of the indications noted during an NDT inspection, to determine whether they meet specified acceptance criteria or to determine its significance.

4.14 Examination - formal, controlled, documented testing conducted to verify a candidate's visual capability, skill or knowledge of an NDT method.

4.15 Examination Centre - A location, approved by the British Institute of NDT, where PCN qualification examinations will be carried out strictly in accordance with the criteria detailed in PCN document reference CP9. An examination centre may be situated at an employer facility or at a BINDT Authorised Qualifying Body’s premises.

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 so to do by the British Institute of NDT. Defined in EN 4179 as - A Level 3 certified to this standard and designated by the Responsible Level 3 or NANDTB to administer all or part of the qualification and certification process, excluding vision examinations, in the NDT method(s) in which the Examiner is certified.

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 organized 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 - The written examination addressing the basic principles and theory of an NDT method.

4.20 Indication - the response or evidence of a condition resulting from an NDT inspection that requires interpretation to determine its significance.

4.21 Industrial NDT Experience - actual performance or observation 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.

4.22 Instructor - An individual designated or approved by the Responsible Level 3 or NANDTB to provide training for NDT personnel.

4.23 Interpretation - the determination of whether indications are relevant or non-relevant.

4.24 Mature candidate – a candidate for PCN examination having at least 5 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.

4.25 National Aerospace NDT Board (NANDTB): An independent aerospace organisation representing the UK's aerospace industry that is chartered by the participating prime contractors and recognized by the UK CAA to provide or support NDT qualification, examination, and/or certification services in accordance with this specification.

4.26 NDT instruction - a document detailing the NDT technique and testing parameters used for the inspection of a specific component, group of parts (e.g. "aluminium extrusions" or "aluminium brackets"), or assembly. NDT instructions are based on NDT procedures defined below.

4.27 NDT method - one of the disciplines of non-destructive inspection or testing (e.g. radiography) within which different techniques exist.

4.28 NDT procedure - a document containing a written description of all essential parameters and precautions to be observed when applying an NDT technique to a specific test, following an established standard, code or specification. An NDT Procedure can involve the application of more than one NDT Method or Technique. Procedures are then used to develop NDT instructions, as defined above.

4.29 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 cognizant NDT organisation or the applicable NANDTB.

4.30 NDT training (approved training) - an organized and documented program of activities designed to impart the necessary knowledge and skills to be qualified. (see 5.1.1).

4.31 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.

4.32 Open Book Examination - An examination administered with access to specific reference material that is provided with or referenced in the examination.

4.33 Outside agency - An independent company or organisation outside the employer who provides NDT services to implement the requirements of this specification, such as training and examination of NDT personnel. Consultants and self-employed individuals are included in this definition.The UK NANDTB oversees a BINDT system for Accreditation of Outside Agencies.

4.34 Practical examination - the examination used to demonstrate an individual's ability to conduct the NDT method as used by the employer

4.35 Prime contractor - an organisation having overall responsibility for design, control and delivery of a system, component or product.

4.36 Qualification - the skill, training, knowledge, experience, success in a qualification examination and, when applicable, the visual capability required for personnel to properly perform to a particular level.

4.37 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.

4.38 Significant Interruption - an absence from (or a change of) work activity which prevents the individual from practising the duties corresponding to his or her level in the NDT method for (a) a continuous period in excess of one year (b) two or more periods for a total time exceeding two years.

4.39 Specific examination - the written examination to determine an individual's understanding of operating procedures, codes, standards, product technology, test techniques, equipment and specifications for a given method as used by the employer.

4.40 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.

4.41 Test sample (specimen) - 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.

4.42 Written practice - a documented procedure that describes an employer's requirements and methodology for controlling and administering the NDT personnel qualification and certification process.

4.43 The following abbreviations are used in this specification and its appendices:

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 (the certifying agency)

5.1.1 The British Institute of NDT (BINDT), which complies with ISO/IEC 17024, is responsible for providing qualification and certification of aerospace sector NDT personnel in accordance with this specification, which provides compliance with EN 473 and satisfies the qualification criteria of EN 4179 for EASA part 145 organisations.

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 National Aerospace NDT Board.

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. EN 473 and EN 4179.

5.2.2 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 this qualification, employers should evaluate the scope of the PCN qualification and decide whether further training and/or job specific examinations are necessary to cover the employer's products, processes and equipment. In any event, the employer *must* have a formal procedure, or written practice, as defined in EN 4179/AIA-NAS-410, and further described within the body of the standard.

5.3.2 The written practice, which shall be approved by the Responsible Level 3, shall address the procedural details necessary for the employer to implement an NDT qualification and certification program and shall include, either directly or by reference, the details of the NDT qualification and certification process, including:

- the levels of qualification and certification used by the employer
- personnel duties and responsibilities
- training and experience requirements
- certification and recertification requirements
- records and record keeping requirements
- requirements for expiration, suspension, revocation and reinstatement of certifications

5.3.3 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.

5.3.4 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.

6. ELIGIBILITY FOR CERTIFICATION

To be eligible for PCN certification, the candidate shall fulfil the minimum requirements of training, experience and satisfactory vision specified in this clause, and shall have achieved success in the relevant written and practical examinations.

6.1 Training

6.1.1 To be eligible for examination, candidates must have successfully completed, prior to making application for examination, a British Institute of NDT validated course of training which covers the relevant PCN syllabus.

NOTE 1. In exceptional circumstances, for example where PCN examinations are to be conducted for candidates in an overseas location and training has NOT been validated by the British Institute of Non-Destructive Testing, the training provided may be granted interim recognition as meeting PCN requirements for pre-certification training pending validation by BINDT.

NOTE 2. For mature candidates, with at least 5 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 specified in Table 1, the need to have attended a the British Institute of NDT validated course of training may not apply. Such candidates should apply to the BINDT Authorised Qualifying Body under the mature candidate route. If a significant interruption in continuity in the application of the NDT method exists, the candidate may be required to undertake further training determined by BINDT.

6.1.2 The minimum duration of any training, which includes both theoretical and practical elements, in order to satisfy the PCN rules for examination eligibility is shown in Table 1 below:

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

NDT Method	Level 1 hours [2,6,7,9]	Level 2 hours [1,2,6,7]	Level 3 hours [1,7]
ET [4]	40	40	40
PT	16	24	24
MT	16	24	32
RT [3,4]	40	80	72
RI	N/A	56	N/A
UT [4]	40	80	72
VT	16	24	24
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 [8]

NOTE 1. Direct access to Level 2 requires the total number of hours shown in Table 1 for Level 1 and Level 2, and direct access to Level 3 requires the total number of hours shown in Table 1 for levels 1, 2 and 3. Up to one third of the total specified in this table may take the form of OTJ training documented using form PSL/42 provided it is verifiable and covered practical application of the syllabus detailed in CEN ISO/TR 25107:2006.

NOTE 2. For candidates who have successfully completed a British Institute of NDT approved course of training, formal structured and documented job specific training to the PCN syllabus may account for up to one third of the above training requirement. Documentary evidence of successful completion of BINDT approved training must be submitted with the application for examination (PCN form PSL/42 may be used to log pre-certification on-the-job training), and documentary evidence of any formal job-specific training must be submitted to BINDT prior to certification.

NOTE 3. The training duration given in table 1 for the RT and UT methods have been reduced from the duration required in EN 473 to 40 hours to reflect the fact that EN 473 permits a reduction of up to 50% in duration when the training provided covers only one product sector and, for RT because basic radiation safety (BRS) training is provided in a separate course of training.

NOTE 4. Persons attending a BINDT approved course of training prior to gaining the experience necessary for certification are advised that many of the concepts involved in the application of the NDT method concerned may be difficult to grasp without previous experience. This is especially so for volumetric NDT methods (ET, RT and UT), and training in such cases may need to be significantly extended beyond the minimum durations specified in Table 1.

NOTE 5. Training hours are based upon candidates possessing basic mathematical skills. If this is not the case, additional training may be required. Approved Training Organisations may recommend that candidates undertake private study of specified areas of mathematics and or physics prior to commencement of a course of training for some NDT methods.

NOTE 6. Existing certificate holders applying for a PCN examination covering the same NDT method in another industry or product sector will be required to provide evidence of completion of structured classroom and/or job-specific training in the application of the NDT method in that sector, the minimum duration of which is 25% of the time required in Table 1.

NOTE 7. The training durations given in table 1 for all levels include aspects of materials science, including defects associated with manufacturing and in-service degradation.

NOTE 8. The 80 hours training required for Level 3 Basic qualification may be accrued through a combination of classroom training at a BINDT accredited training organisation (minimum 50%), self study and distance learning. However, accrued, candidates should record the training undertaken for presentation to PCN if requested.

NOTE 9. There is no PCN Level 1 certification available in the aerospace sector, the figures in this column exist only to validate NOTE 1 above.

6.1 Industrial NDT Experience

6.1.1 Industrial NDT experience in the appropriate sector may be acquired either prior to or following success in the PCN qualification examination

6.1.2 In the event that the experience is sought following successful examination, the results of the examination shall remain valid for up to two years.

6.1.3 Documentary evidence (in a form acceptable to the British Institute of NDT, i.e., on PCN form PSL/30), of experience satisfying the following requirements shall be confirmed by the employer and submitted to the BINDT AQB prior to examination, or directly to BINDT prior to the award of PCN certification in the event that experience is gained after examination.

6.1.4 The minimum duration of experience for certification shall be as defined in *Table 2.*

Table 2: Minimum Duration of Experience for certification

NDT Method	Experience (months) [1,2,3,4,5,6]

	Level 1 [9]	Level 2	Level 3 [7,8]
ET	3	9	18
MT	1	3	12
PT	1	3	12
RT	3	9	18
UT	3	9	18
VT	1	3	12

NOTE 1.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, he may be credited with experience based on the total hours, but he shall be required to produce evidence of this experience.

NOTE 2.For level 2 certification, 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, the experience shall consist of the sum of the times required for level 1 and level 2.

NOTE 3.Experience duration may be reduced by up to 50 % but shall not be less than one month when the certification sought is limited in application (e.g., automated testing).

NOTE 4.Credit for work experience may be gained simultaneously in two or more of the NDT methods covered by this specification, with the reduction of total required experience as follows:

- two testing methods - reduction of total required time by 25 %;
- three testing methods - reduction of total required time by 33 %;
- four or more testing methods - reduction of total time by 50 %.

In all cases the candidate shall be required to show that, for each of the testing methods for which he seeks certification, he has at least half of the time required in Table 2.

NOTE 5.Up to 50 % of the practical experience time may be achieved by an appropriate practical course, the duration of which may be weighted by a maximum factor of five (5) This procedure shall not be used in conjunction with that described in c. The course shall be concentrated on practical solutions of frequently occurring testing problems, and the programme shall be approved by BINDT.

NOTE 6.Maximum reduction may be 50 %

NOTE 7.For level 3 certification, work experience consists of time as a level 2. If the individual is being qualified directly to level 3, with no time at level 2, the experience shall consist of the sum of the times required for level 1, level 2 and level 3, and no reduction in the period of experience specified shall be allowed.

NOTE 8.These values assume that candidates have successfully completed a technical school or at least two years of engineering or science study at an accredited college or university. In the event that this is not the case, the duration has to be multiplied by a factor of 2.

NOTE 9.There is no Level 1 PCN certification available for the aerospace sector. This column exists simply to validate NOTE 1 above.

6.3 Vision Requirements

6.3.1 The PCN requirements for colour perception and acuity of vision, together with the qualifications of those administering the vision tests, are fully defined in PCN document PSL/44, which includes a form for recording the results of vision tests. The requirements are reproduced below for ease of information:

From 1st January 2011 the NANDTB recognise the Tumbling E Chart as a satisfactory near vision test and confirms no other near vision test shall be carried out as an equivalent test to demonstrate compliance, please refer to NANDTB 24.

6.3.2 Candidates for PCN examinations will be required, on the day of the examination, to provide proof of a satisfactory vision test conducted within the 12 months preceding the examination.

6.3.2.1 Near vision acuity shall permit reading a minimum of Jaeger number 1 or Times Roman N 4.5 or equivalent letters (having a height of 1,6 mm) at not less than 30 cm with one or both eyes, either corrected or uncorrected;

6.3.2.2 Colour vision shall be sufficient 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.

NOTE: Subsequent to certification, the documented tests of visual acuity shall be carried out at least every twelve months.

7. QUALIFICATION EXAMINATION

7.1 Examination Application

7.1.1 Initial enquiries to the BINDT Authorised Qualifying Body (AQB) may be by telephone. Formal applications must be made on an application form (PSL/57) available direct from BINDT or from the AQB. No examination appointment can be considered confirmed until a correctly completed application form (PSL/57) 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 these 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 Applications dependent upon the individual holding appropriate certification must be supported by acceptable evidence of such certification (photocopies are acceptable at this stage). The British Institute of NDT requires candidates to present original certificates to the AQB on the date of examination.

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.

7.1.5 The location of all BINDT AQB, the scope of examinations for which they are approved, and contact information is given on document PSL/4, copies of which are available from the British Institute of NDT.

7.1.6 Provision is made wherever possible for candidates with a disability which 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 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 documentation, other than that provided by the AQB.

7.2.4 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.

7.3 Written Qualification Examination Content - Level 2

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

7.3.1 General Examination

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. 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. The time allowed for the examination is 60 minutes, and the pass mark is 70%.

7.3.2 Specific Examination

7.3.2.1 The specific examination for all levels is a open book examination consisting of 30 multi-choice answer questions covering the application of the NDT method to aerospace products, including use of specifications, codes, equipment, operating procedures, and test techniques that the candidate may typically use in the performance of his/her duties with the employer. The examination includes only

validated questions selected in an unpredictable way from the collection of specific questions approved by the British Institute of NDT at the time of the examination. The time allowed for the examination is 60 minutes, and the pass mark is 70%.

NOTE: At Level 2, 20 of the 30 specific written questions will cover application of the NDT method (and no reference material will be provided), the remaining 10 questions will cover aerospace product technology, standards and specifications (the AQB will provide any specifications requires for use by the candidate in this examination part).

7.3.2.2 Reference material such as specifications, tables, formulas, etc. shall be provided by the AQB as determined by the responsible Examiner. Questions utilizing such material require understanding of the information contained therein rather than merely finding its location.

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

7.3.3.2 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. Details of the PCN radiation safety examinations are 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:

- make the required settings;
- operate the test equipment properly;
- test a number of specimens, as detailed in the relevant appendix to this document, comprising aerospace materials, components and/or structure, as appropriate to the certification sought;
- 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 The candidate will demonstrate the ability to prepare written instructions 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.

7.4.3 The candidate will select the applicable NDT technique and determine the operating conditions related to a given code, standard, or specification.

7.4.4 The specimens used for the practical test will be selected from a collection representative of those likely to be tested by the candidate during normal work activity. Each test specimen will be uniquely identified and have a master report which includes all of the equipment settings used to detect specified discontinuities contained within the specimen.

7.4.5 Test specimens contain discontinuities characteristic of those that occur during manufacturing or in service. They may be natural, artificial or implanted. For practical radiography, the test specimen will not necessarily contain discontinuities since these will be exhibited in the radiographs for interpretation.

7.4.6 The total time allowed for the practical examination is as stated in the relevant appendix. 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).

7.4.7 For radiography candidates, the practical examination includes interpretation and reporting on radiographs of components and structure. The total time allowed for the radiographic interpretation part is 4 hours, and the pass mark is 70%.

7.5 Qualification Examination Content - Level 3

7.5.1 In the basic examination the candidate shall demonstrate:

- in a closed book examination, technical knowledge and understanding of materials science and technology, including production and in-service discontinuities;
- in an open book examination, knowledge and understanding of the qualification and certification system defined in this specification;

- 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 principle method.

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

7.5.2 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	90 minutes

7.5.3 The main method examination consists of:

- a general examination covering the Level 3 knowledge relating to the test method (for which the certification is sought);
- a specific examination relating to the application of the NDT method in the aerospace sector, including the applicable codes, standards and specifications (the candidate will be provided with any relevant code, standard or specification);
- a practical examination requiring the candidate to draft an NDT procedure in the aerospace sector.

7.5.4 The validated examination questions are selected from the collection of the main method questions approved by the British Institute of NDT at the time of the examination. The number of questions shall be as defined in Table 5.

Table 5: Number of Main Method questions

Part	Examination	Number of questions	Duration
D	General	40 multi-choice questions	80 minutes
E	Specific	30 multi-choice questions	60 minutes
F	Practical	Drafting of one or more NDT procedures (see definitions)	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 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).

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. However, 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 to which he or she is entitled, the mark obtained in the examination, which lead to the issue of certification, under which such exemption is claimed, where the actual examination mark cannot be ascertained, a mark of 80% will be used..

7.6.6 If any candidate elects to include in his or her examination any part or parts from which he or she could be exempt, then 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 will be unaffected by such failure.

7.6.7 A candidate for radiography who claims an exemption in respect of Basic Radiation Safety should note that PCN radiography certification is valid only so long as the holder holds any other level of PCN radiation protection certification, or valid radiation safety certification recognised by the British Institute of NDT.

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.

7.7.2 At the time of examination, the candidate shall have in his 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 proved to have cheated in a PCN examination will not be accepted as a candidate for any PCN examination for a 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.

7.7.5 The Level 2 written and practical examinations will be prepared, supervised and graded by one PCN examiner. Level 3 examinations will be graded by two examiners. One or more authorised invigilators may assist the examiner.

7.8 Grading of Examinations

7.8.1 General

The pass mark for each examination part is 70%. To be eligible for certification all candidates must achieve an average score of no less than 80%. 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

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 by the examiner during the practical examination. The grading of the practical examination will be in accordance with PCN document CP22.

7.8.3 Level 3

To be certified the level 3 candidate shall pass the basic and main method examinations.

7.8.3.1 Basic Examination

To be eligible for candidacy in the main method examination the candidate shall 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%

7.8.3.2 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 (initial examinations)

7.9.1 A candidate who fails to obtain the pass grade for the whole examination may attempt two retests in any of the examination parts provided that that re-examination takes place not sooner than one month or later than 12 months from the date of the failed examination, but shall provide evidence of further training acceptable to the British Institute of NDT in areas of weakness highlighted by the examination.

7.9.2 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.

7.9.3 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 21 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 pre-requisites (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 21 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.

8.2 Once the PCN Certification Records Office is in possession of evidence that all pre-requisites (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.

8.3 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 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;

- the signature of an authorised officer of the British Institute of NDT.

NOTE: 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 shall authorise the holder of the certificate to carry out testing on his behalf.

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, 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:

- in any industrial sector which is not covered by the certificate (unless the holder successfully completes a supplementary examination for the industrial sector);
- at the option of the British Institute of NDT after reviewing evidence of unethical behaviour (see CP27 – PCN Code of Ethics);
- if examination or certification fees are not paid when due;
- if the individual fails to satisfy the criteria for visual acuity and colour perception;
- if a *significant interruption* (see definitions) takes place in the method for which the individual is certified;
- from the date of issue of notification of failure in a PCN examination for recertification.
- 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: 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.

9.4 Verification of PCN certification is available at www.bindt.org/PCN provided the name or PCN number of the individual concerned 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. The recertification application shall be presented within six months before the date of expiration of the certification. As an exception, and based upon decision of BINDT, applications presented within twelve 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 Levels 2 personnel comprises a practical and specific examinations equivalent to those required for initial qualification. 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%. Applications for Level 2 recertification are to be submitted directly to the AQB on PCN Form PSL/57B.

10.3 Level 3

10.3.1 The recertification examination for Level 3 personnel comprises examination parts E and F detailed at Table 5. 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%. Applications for Level 3 recertification by examination are to be submitted directly to the AQB on PCN Form PSL/57B.

10.3.2 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 recertification examination, BINDT will immediately cancel the certificate concerned, issuing a new record of certification that no longer shows the competence concerned, and sending this with an explanatory letter to the certificate holder asking for the return of the superseded record of certification. The cancellation of the certificate will not affect the eligibility of the candidate to attempt the one allowable re-examination within the six months following the examination failure.

10.4.2 If the individual fails to achieve a grade of at least 70 % for each examination part, and an overall average of 80%, one retest of the whole recertification examination shall be allowed after at least 7 days and before 6 months. In the event of failure in the one allowable retest, the certificate shall not be revalidated and, to regain certification for that level, sector and method, the candidate shall apply for new certification. In this case, no examination exemptions shall be awarded by virtue of any other valid certification held.

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 his employer, may petition the British Institute of NDT for withdrawal or cancellation of certification. 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.

11.3 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.

11.4 Appeals against certificate cancellation, failure to certify or failure to renew may be made by the candidate or the employer upon application in writing to the Secretary to the UK National Aerospace NDT Board.

11.5 The UK National Aerospace NDT Board may delegate the process of dealing with complaints and appeals to a properly constituted sub-committee.

12. CHANGE OF EMPLOYER

Change of employer shall not be cause for PCN EN 473 recertification. However, PCN certificates signed by the employer for authorisation purposes must be returned to the British Institute of NDT for re-issue upon change of employer.

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 comprised of:

a) 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).

b) for radiography (structures) only, read and report on a total of 8 radiographs of aerospace structures.

13.2 Applications for supplementary examination are to be made direct to the AQB using PCN form PSL/57B. 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 4 hours for ET and UT, and 8 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. This is to allow sufficient time for the publication of results and the retest of failed supplementary examinations. Retests of failed supplementary examination will be allowed between thirty days and one year after the most recent attempt.

13.5 Any new certification issued as a result of successful supplementary examination will incorporate the previous certification and will be valid for a period of 5 years from the date of completion of the successful supplementary examination.

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. 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.

14.2 BINDT Authorised Qualifying Bodies will 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. Holders or employers are not permitted to imply any further degree of competence on the basis of the certificate.

15.2 PCN certificate holders or their employers must 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. 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.

15.3 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). 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. The register of complaints must be made available to the British Institute of NDT on request.

15.4 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. Any misuse, which appears to be an infringement of the law, will result in the matter being reported to the police.

15.5 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. Loss or theft of certificates must be reported to the police and to the British Institute of NDT.

15.6 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.

15.7 New employers presented with PCN certification should satisfy themselves that the certificate holder has been employed without *significant interruption* (see definitions) on work for which the certificate was granted. It is strongly recommended that the employer request sight of the certificate holder's logbook.

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 (EN 473 / 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 over-haulers. 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 employers 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 so long as the employer's 'written practice' embodies such an approach. In such circumstances, a PCN EN 473 / 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 program, 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, e.g. 6 mm and above. Appendix A4 has therefore been published to cover welds normally used in aerospace, e.g. 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 & 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, eg. 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 stabilizers 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, eg. 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 Qualifying Bodies (AQB) 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 AQBs 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 PCN Scheme Manager at BINDT Certification Services, Newton Building, St George's Avenue, Northampton NN2 6JB, United Kingdom (email: pcn@bindt.org).