

Certification Services Division
Newton Building, St George's Avenue
Northampton, NN2 6JB
United Kingdom

Tel: +44(0)1604-893-811.
Fax: +44(0)1604-893-868.
E-mail: pcn@bindt.org



PCN/GEN GUIDED WAVE TESTING ISSUE 1 Rev A **dated 1st January 2013**

GENERAL REQUIREMENTS FOR QUALIFICATION AND PCN CERTIFICATION OF GUIDED WAVE TESTING PERSONNEL

This issue provides compliance with the referenced standards unless indicated to the contrary by text in a frame.

CONTENTS

Introduction.....	2
1. Scope.....	2
2. References.....	2
3. Terms and Definitions.....	3
4. Abbreviations.....	6
5. Duties and responsibilities.....	6
6. Levels of PCN certification.....	7
7. Training.....	8
8. Industrial GWT Experience.....	9
9. Vision Requirements.....	9
10. Qualification Examination.....	9
11. Training Exemptions.....	13
12. Conduct of Examinations.....	13
13. Grading of Examinations.....	13
14. Re-examination.....	14
15. Publication of Examination Results.....	14
16. Certification.....	14
17. Validity of Certification.....	15
18. Recertification.....	15
19. Complaints and Appeals.....	15
20. Change of Employer.....	16
21. Certification and Examination Records.....	16
22. Use and Misuse of Certificates.....	16



The British Institute of Non-Destructive Testing is an accredited certification body offering personnel and quality management systems assessment and certification against criteria set out in international and European standards through the PCN Certification Scheme.



Introduction

The PCN Scheme is an international programme for the certification of competence of non-destructive testing personnel which satisfies the requirements of a number of European and international standards.

The Council of the British Institute of NDT constitutes a Certification Management Committee and delegates to the CMC the responsibility for maintaining a management overview of the operations of its Certification Services Division. Membership of boards and committees is open to the participation of individuals and organisations. Further information on the work of committees and committee membership is available from The Certification Services Division of the British Institute of NDT.

The CMC fulfils the requirement for a Scheme Committee in terms of ISO/IEC 17024 (Personnel Certification) and an Impartiality Committee in terms of ISO/IEC 17021 (Management Systems Certification).

There is a wide range of qualification examinations available within the Scheme, covering various NDT methods and techniques. Authorised Qualifying Bodies are independent organisations (see definition: "Authorised Qualifying Bodies") which have been audited against rigorous criteria prior to authorization, and which are subject to regular surveillance. Organisations anywhere in the world wishing to explore the possibility of being authorised to conduct PCN examinations are encouraged to discuss the potential for their involvement with BINDT Certification Services.

This document, which is implemented with effect from [01/10/2011](#) sets out the general requirements and procedures for Guided Wave Testing

The complete list of published PCN documents is detailed in publication reference PSL/8A, which is updated and republished every three months in "NDT News", the newsletter of the British Institute of NDT (BINDT). PCN documents are also available for download from the Institute's web site at www.bindt.org

Success in qualification examinations described in Appendix A results in the award of PCN certification covering the Guided Wave Testing of Pipes.

Copies of PCN documents are available free of charge from BINDT Certification Services Division at Newton Building, St George's Avenue, Northampton NN2 6JB, United Kingdom. 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, for a small annual fee, guarantees that they automatically receive all new or revised PCN documents in electronic form.

It is intended, through publication of these documents, to provide PCN candidates and certificate holders 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 questions to pcn@bindt.org.

1. Scope

- 1.1. This document prescribes the specific requirements and procedures by which personnel may be examined and, if successful, certified competent for Guided Wave Testing of pipes.
- 1.2. This document incorporates provisions from other PCN publications, all of which are available from the British Institute of NDT at Newton Building, St George's Avenue, Northampton NN2 6JB, or from www.bindt.org, and which are listed below under "References".

2. References

2.1. Standards

ISO/IEC 17024: 2003 General requirements for bodies operating certification systems of persons

CEN/TS 15053: 2005, *Non-destructive testing – Recommendations for discontinuities-types in test specimens for examination*

CEN ISO/TR 25107:2006, Non-destructive testing – Guidelines for NDT training syllabuses (ISO/TR 25107:2006)

CEN ISO/TR 25108:2006, Non-destructive testing – Guidelines for NDT personnel training organisations (ISO/TR 25108:2006)

ISO 9712: 2005 Non-destructive testing - Qualification and certification of personnel

EN 583-1, *Non-destructive testing – Ultrasonic examination – Part 1: General Principles*

EN 1330-2, *Non-destructive testing - Terminology - Part 2: Terms common to the non-destructive testing methods*

EN 1330-4, *Non-destructive testing - Terminology - Part 4: Terms used in ultrasonic testing*

- 2.2. PCN documents (referenced herein):
- PSL/4 Examination availability
 - PSL/8A PCN Documents - Issue status
 - PSL/30 Log of pre-certification experience
 - PSL/31 Use of PCN & UKAS Logo
 - PSL/42 Log of pre-certification on-the-job training
 - PSL/44 Vision Requirements
 - PSL/49 Examination exemptions for holders of certification other than PCN
 - PSL/51 acceptable certification for persons supervising PCN candidates gaining experience prior to certification
 - PSL/57C application for certification, experience gained post examination.
 - CP9 Requirements for BINDT Authorised Qualifying Bodies
 - CP16 Recertification of PCN Levels 1 & 2 certificates
 - CP17 Recertification of PCN Level 3 certificates
 - CP19 Informal access to Authorised Qualifying Bodies by third parties.
 - CP22 Marking and grading PCN practical examinations
 - CP25 Guidelines for the preparation of NDT procedures and instructions in PCN examinations
 - CP27 Code of Ethics for PCN certificate Holders

3. Terms and Definitions.

For the purposes of this document, the following definitions apply:

- 3.1. Advanced Basic pipe - Advanced “basic pipe” to cover pipes with various geometries (including areas close to other features) filled with non-attenuative fluid that may be painted or insulated with non attenuative coatings.
- 3.2. Approved Training Organisation (ATO) – A legal entity assessed against the criteria in CEN ISO/TR 25108 and approved by BINDT to provide specified training courses for personnel intending to attempt a PCN or other specified examination.
- 3.3. Assessment – This compares features classified against the required standards, or codes.
- 3.4. Authorised Examination Centre (AEC) – a location, approved by BINDT, where PCN examinations are conducted.
- 3.5. Authorised Qualifying Body (AQB) - 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 examinations to qualify NDT personnel.
- 3.6. Appropriately Qualified Personnel - Individuals carrying out supervision of candidates for PCN certification holding relevant certification issued by a BINDT recognised certification body meeting the requirements of ISO/IEC 17024.

Note: The certification concerned must include supervisory competence and have a similar technical scope as that certification which is the subject of surveillance. Where there are insufficient appropriately qualified persons in a country outside of the United Kingdom to satisfy the requirement, supervision of PCN candidates may be carried out by persons holding relevant qualification acceptable to BINDT(see PSL/51 acceptable certification for persons supervising PCN candidates gaining experience prior to certification).

- 3.7. Basic Examination - An examination, at Level 3, which demonstrates knowledge of materials science and technology, the PCN qualification and certification system, and of the theoretical principles of at least four NDT methods at level 2.
- 3.8. Basic pipe - Straight pipes (excluding areas close to other features) with total signal attenuation less than 1dB per metre range.

- 3.9. Candidate - individual seeking qualification and certification and who gains experience under the supervision of suitably qualified personnel.
- 3.10. Certificate – document, issued by the certification body under the provisions of the applicable standard, indicating that the named person has demonstrated the competence(s) defined on the certificate
- 3.11. Certification - procedure used by BINDT to confirm that the qualification requirements for a method, level and sector have been fulfilled, leading to the issue of a certificate
- Note: The issuing of a certificate does not authorise the holder to operate; this authority can only be given by the employer.*
- 3.9. Certification Body - The body that administers procedures for certification of NDT personnel in accordance with this specification, and fulfills the requirements of ISO/IEC 17024.
- Note: In the present case, the Certification Body is the British Institute of Non-Destructive Testing, which manages and administers the PCN Scheme.*
- 3.10. Characterisation.-. This is where there is sufficient information from interpretation and other tests to describe in detail the character of the feature
- 3.11. Classify - When a feature is identified that requires classification of severity to use guides and rules as per GWT training to estimate the size and severity and to use the classification rules.
- 3.12. Employer - The organisation for which a candidate or holder of certification works on a regular basis. An employer may also be a candidate.
- 3.13. Examiner - An individual certificated to Level 3 in the method and group 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.
- 3.14. General Examination – a written examination, at Level 1 or 2, concerned with the principles of GWT.
- 3.15. Industrial GWT Experience – the experience needed to acquire the skill and knowledge to fulfil the provisions of qualification in the appropriate group, and which is gained under the supervision of Appropriately Qualified Personnel, in the application of the method in the concerned.
- Note: Experience may be acquired either prior to or following success in the qualification examination. However, the chances of success in a PCN examination may be significantly reduced if candidates have little or no current experience in the application of the GWT method in the group concerned.*
- In the event that the PCN examination has been passed by a candidate lacking the experience required for certification, BINDT will issue a letter of attestation to the successful candidate indicating that he or she has passed the qualification examination and needs only to meet the experience requirement in order to be certificated. Records of experience obtained post examination shall be presented on PCN form PSL/30.*
- 3.16. Invigilator - An individual trained by an AQB in the process of examination invigilation to BINDT requirements, particularly with respect to the points to be observed during a practical examination, and who is impartial with respect to the candidate(s) under examination. Invigilators shall be authorised in writing by BINDT on the AQB schedule of authorisation.
- 3.17. Job-specific training - instruction, provided by the employer (or his agent) to the candidate or certificate holder in those aspects of non-destructive testing specific to the employer's products, GWT equipment, GWT procedures, and applicable codes, standards and specifications, leading to the award of operating authorisation.
- Note: A job specific examination, which is often solely of a practical nature, may be conducted by the employer as a part of the GWT personnel authorisation procedure (the British Institute of NDT publishes guidance for employers in conducting and recording such examinations), or by a BINDT Authorised Qualifying Body.*
- 3.18. Main GWT Method Examination - written examination, at Level 3, which demonstrates the candidate's general and specific knowledge of the applicable GWT method, and the ability to write GWT procedures.

- 3.19. Multiple choice examination question - A question worded in a manner giving rise to four potential replies, only one of which is correct, the remaining three being incorrect or incomplete
- 3.20. Non-attenuative material or product is one where the rate of signal attenuation does not exceed 1.0 dB/m range.
- 3.21. GWT Instruction - A written description of the precise steps to be followed in testing to an established standard, code, specification or *GWT procedure*.
- 3.22. GWT Technique - A specific way of utilizing an GWT method
- 3.23. GWT Procedure - A written description of all essential parameters and precautions to be observed when applying a GWT technique to a specific test, following an established standard, code or specification.
- 3.24. NDT Method - Discipline applying a physical principle in Non-Destructive Testing (for example, Ultrasonic Testing).
- 3.25. GWT Training - a process of instruction in theory and practice in GWT in which certification is sought, which takes the form of training courses to a syllabus approved by BINDT.
- 3.26. Operating Authorisation - written statement issued by the employer, based upon the scope of certification, authorizing the individual to carry out defined tasks. Authorisation may be dependent on the provision of job-specific training.
- 3.27. Practical Examination - assessment of practical skills in which the candidate demonstrates familiarity with and the ability to operate the necessary test equipment, to test the prescribed specimens, and to record and to analyse the resulting information to the degree required.
- 3.28. Qualification - Evidence of training, professional knowledge, skill and experience as well as physical fitness to enable GWT personnel to properly perform GWT tasks
- 3.29. Qualification Examination - An examination administered directly by the British Institute of NDT or by an Authorised Qualifying Body, which assesses the general, specific and practical knowledge and skill of the candidate.

Note: No documentary material, other than that provided by the examination centre, is to be accessible to the candidate under any circumstances during a PCN qualification examination. In an open book examination the candidate is provided with all necessary reference material by the examination centre; during a closed book examination, the candidate is not allowed access to any reference material whatsoever.

- 3.30. Qualified supervision - supervision of candidates gaining experience by GWT personnel certificated under the PCN Scheme or by non-certificated personnel who, in the opinion of BINDT, possess the knowledge, skill, training and experience required to properly perform such supervision
- 3.31. Record of Certification - Document listing all PCN certification issued under the rules specified in this document and its antecedents, indicating that the named individual has demonstrated proficiency in performing GWT within the scope of the certification.
- 3.32. Significant Interruption - absence from (or a change of) work activity which prevents the holder of PCN certification from practising the duties corresponding to his or her level in the method and sector(s) for which certification was issued, for (a) a continuous period in excess of one year or (b) two or more periods for a total time exceeding two years.

Note: Legal holidays, or periods of sickness or courses of less than thirty days are not taken into account when calculating the interruption.

- 3.33. Specific Examination - written examination, at Level 1 or Level 2, concerned with testing techniques applied in a particular sector(s), including knowledge of the product(s) tested, and of codes, standards, specifications, procedures and acceptance criteria.
- 3.34. Specification - document stating requirements

- 3.35. Specimen - a sample used in practical examinations, which may include radiographs and data sets, and which are representative of products typically tested in the applicable sector, and which may include more than one area or volume to be tested.
- 3.36. Specimen master report - model answer, indicating the optimum result for a practical examination given a defined set of conditions (equipment type, settings, technique, specimen, etc.), against which the candidate's test report will be graded.
- 3.37. Spurious Echoes - An indication that can be explained by Guided Wave propagation but not associated with a discontinuity at a specific location.
- 3.38. Supervision - act of directing the application of GWT performed by other GWT personnel, which includes the control of actions involved in the preparation of the test, performance of the test and reporting of the results.
- 3.39. Test/Shot - This is a where a transducer ring or sensor is placed on a pipe and data is gathered and stored. An operator needs to maintain a log of Tests/Shots carried out. This can be a manual log or via an electronic counter linked to individual operators.
- 3.40. Test location - A test location is where a transducer ring/sensor is placed on a pipe. Several data collections or "shots" may be taken at a test location.
- 3.41. Tubes - Generally pipes less than 2.5" diameter and quoted in ID terms.
- 3.42. Validation - act of demonstrating that a verified procedure will work in practice and fulfil its intended function, normally achieved by actual witnessing, demonstration, field or laboratory tests or selected trials.

4. Abbreviations

The abbreviations used within this document or its appendices are as follows:

AEC	Authorised Examination centres
ATO	Approved Training Organisations
AQB	Authorised Qualifying Bodies
BINDT	The British Institute of NDT(the certification body)
CB	Certification Body
DAC	Distance Amplitude Curve
GWT	Guided Wave Testing
NDT	Non-Destructive Testing
OTJ	on-the-job (Training)
TCG	Time Corrected Gain
QA	Quality Assurance
QC	Quality Control

5. Duties and responsibilities

- 5.1. The Certification Body (BINDT)
 - 5.1.1. BINDT will fulfil the requirements of ISO/IEC 17024 and, inter alia, will ensure that the PCN Scheme(s) for qualification and certification of personnel, and the assessment and certification of systems, are controlled and operated so as to ensure, amongst other things, that they are impartial, and that decisions taken and implemented at all levels, including management and committees, are free from commercial or other pressures that may prevent the objective provision of certification services.
 - 5.1.2. BINDT will approve Authorised Qualifying Bodies (AQB) to carry out examinations (assessments) on its behalf, and will carry out regular and frequent assessments of AQB against a published specification (document CP9).
 - 5.1.3. BINDT will approve Examination Centres (AECs) where PCN examinations are conducted.
- 5.2. The employer.
 - 5.2.1. The employer attests to the validity of the personal information provided by the candidate, including the declaration of education, training and experience required for eligibility.

- 5.2.2. Where required by regulatory requirements and codes, the authorisation to operate must be given in writing by the employer in accordance with a Written Practice or Quality Procedure that defines any employer required job-specific training and examinations designed to verify the certificate holder's knowledge of relevant industry code(s), standard(s), GWT procedures, equipment, and acceptance criteria for the products tested.
- 5.2.3. The employer shall ensure that candidates gaining experience for certification are supervised by Appropriately Qualified Personnel.
- 5.2.4. With regard to certificated persons, the employer shall be responsible for:
 - issuing the operating authorisation
 - verification of visual acuity in accordance with PSL/44, and
 - verification of continuity in the application of GWT without Significant Interruption.
- 5.3. Candidates for PCN Certification shall
 - 5.3.1. provide verifiable documentary evidence in a form acceptable to BINDT (a correctly completed form PSL/30 satisfies this requirement) that experience has been gained under the supervision of Appropriately Qualified Personnel (see definition at 3.4).
 - 5.3.2. provide documentary evidence of satisfactory completion of a course of training at an ATO approved by BINDT.
 - 5.3.3. undertake to abide by the Code of Ethics, published as CP27, for candidates and certificates holders
 - 5.3.4. assume all of the responsibilities described for the employer if self employed.
- 5.4. Certificate holders shall
 - 5.4.1. undertake to abide by the Code of Ethics published as CP27.
 - 5.4.2. submit to an annual test of visual acuity, and provide the results of tests to the employer.
 - 5.4.3. notify BINDT Certification Services and the employer in the event that the conditions for validity of PCN certification (see clause 17) are not fulfilled

6. Levels of PCN certification

- 6.1. Level 1 personnel are qualified to carry out GWT operations according to written instructions, within the scope of the competence defined on the certificate.
 Level 1 personnel may perform the following under the supervision of Appropriately Qualified Level 2 or Level 3 Personnel in accordance with written GWT instructions:
 - set up equipment;
 - carry out the test;
 - record and classify the results in terms of written criteria;
 - report the results.
- 6.2. Level 2 personnel have demonstrated competence to perform and supervise GWT according to established or recognised procedures. Within the scope of the competence defined on the certificate, level 2 personnel may be authorised by the employer to:
 - select the GWT technique for the test method to be used;
 - define the limitations of application of the testing method;
 - translate GWT standards and specifications into GWT instructions;
 - set up and verify equipment settings;
 - perform and supervise tests;
 - interpret and evaluate results according to applicable standards, codes or specifications;
 - prepare written GWT instructions;
 - carry out and to supervise all level 1 duties;
 - provide guidance for personnel at or below level 2, and
 - organise and report the results of non-destructive tests.

- 6.3. Level 3 personnel are qualified to direct any GWT operation for which they are certificated and may be authorised by the employer to:
- assume full responsibility for a test facility or examination centre and staff;
 - establish, review for editorial and technical correctness and validate GWT instructions and procedures;
 - interpret codes, standards, specifications and procedures;
 - designate the particular test methods, techniques and procedures to be used;
 - within the scope and limitations of any certification held (see clause 6.3.3), carry out all level 1 and level 2 duties, and
 - provide guidance and supervision at all levels.
- 6.3.1. Level 3 personnel have demonstrated:
- a competence to interpret and evaluate test results in terms of existing codes, standards and specifications;
 - possession of the required level of knowledge in applicable materials, fabrication and product technology sufficient to enable the selection of GWT methods and techniques, and to assist in the establishment of test criteria where none are otherwise available;
 - a general familiarity with other GWT methods.
- 6.3.2. Level 3 certificated personnel may be authorised to carry out, manage and supervise PCN qualification examinations on behalf of the British Institute of NDT.
- 6.4. The range and scope of PCN certification available at each level is defined in the relevant appendix to these general requirements.

7. Training

- 7.1. 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 at a BINDT ATO which covers the relevant part of the published syllabus
- 7.2. Candidates will be required to demonstrate that they meet the following minimum supplementary Training and Experience requirements (Table 1) before they will be allowed to take Guided Wave Testing examinations.

**Table 1:
Minimum Training Requirements:**

Level 1 Basic Pipe		80 Hours (Note 1)
Level 2	Group	
3.1	Basic Pipe - Advanced	40 Hours
3.2	Road crossings and Buried Pipe	40 Hours Note 2
3.3	Monitoring and permanently installed	16 Hours Note 2
3.4	Steam raising applications	16 Hours Note 2
3.5	Tube	24 Hours Note 2
Level 3		40 Hours

Note 1: Candidates for Level 1 training must have experience in at least one of the following:

- a) Further education in science or engineering (candidates who have graduated from technical college or university, or have completed at least two years of engineering or science study at college or university.)*
- b) Hold a qualification in UT*
- c) Has worked as an assistant to a GWT Level 2 or Level 1 operator for a period of at least 3 months.*

Note 2: Certification for these groups is currently under development, please refer to manufacturers standards.

8. Industrial GWT Experience

- 8.1. Industrial GWT experience for level 1 and 2 shall be acquired following success in the qualification examination. All experience needs to be specific to the equipment that the training was based on, or the equipment the candidate wishes to be certificated for.
- 8.2. Where experience is sought following successful examination, the results of the examination shall remain valid for a minimum of 3 months and a maximum of 12 months from the date of examination for level 1, 24 months for level 2 and 48 months for level 3
- 8.3. 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 BINDTAQB prior to examination, or directly to BINDT prior to the award of PCN certification in the event that experience is gained after examination.
- 8.4. The minimum duration of experience for certification shall be as defined in *Table 2*.

Table 2:
Minimum Experience Requirements:

Level 1 ¹	Basic Pipe	3 months and at least 100² tests
Level 2	Group	
3.1 ²	Basic Pipe – Advanced	9 months and at least 300² tests
3.2	Road crossings and Buried Pipe	9 months and at least 100² tests ⁴
3.3	Monitoring and permanently installed	9 months and at least 100² tests ⁴
3.4	Steam raising applications	9 months and at least 100² tests ⁴
3.5	Tube	9 months and at least 100² tests ⁴
Level 3		36 months and at least 600³ tests in total

Note 1: Level 1 Basic pipe is a normative requirement before progressing to Level 2 Basic Pipe and certification will not be issued until 3 months and evidence of at least 100 tests has been achieved

Note 2: Level 2 Basic Pipe Advanced is a normative requirement before progressing to other level 2 groups however other level 2 groups may be progressed concurrently. The number of tests need to be in the appropriate group.

Note 3: Work experience consists of time as a level 2 basic pipe or higher certified operator

Note 4: Certification for these groups is currently under development, please refer to manufacturers standards

9. Vision Requirements

- 9.1. 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:
- 9.2. 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.
 - 9.2.1. 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;
 - 9.2.2. Colour vision shall be sufficient that the candidate can distinguish and differentiate contrast between the colours used in the GWT 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.

10. Qualification Examination

- 10.1. General

An examiner shall not be permitted to examine any candidate that he has trained for the examination, or who is employed in the same facility as the candidate.

Note: only BINDT authorises examiners and examination invigilators within the PCN Scheme, and all examination personnel are required to declare any interest in a candidate that presents for examination. In case of doubt regarding maintenance of impartiality, AQB shall consult with BINDT Certification Services before conducting examinations.

10.2. Examination Application

10.2.1. Initial enquiries to the BINDT Authorised Qualifying Body may be by telephone. Formal applications must be made on an application form (PSL/57) available direct from BINDT Tor from the AQB. No examination appointment can be considered confirmed until a correctly completed application form has been received.

10.2.2. 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.

10.2.3. Applications dependent upon the individual holding appropriate certification must be supported by acceptable evidence of such certification; photocopies are acceptable at this stage, but original certificates, together with proof of identity, shall be presented to the examination invigilator on the date of examination. Failure to comply with this clause will result in a refusal to examine.

10.2.4. The location of all Authorised Qualifying Bodies, the scope of examinations for which they are approved, and contact information is given in document PSL/4, copies of which are available from the British Institute of NDT.

10.2.5. 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.

10.3. Examination Equipment and Documentation

10.3.1. BINDT Authorised Qualifying Bodies will provide as a minimum, a laptop computer with the relevant GWT equipment operating software. 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 Authorised Qualifying Body.

10.3.2. All necessary reference standards will be provided by the BINDT Authorised Qualifying Body. Candidates must not be in possession of any reference documentation, other than that provided by the AQB, during a PCN examination.

10.3.3. 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 GWT instruction and GWT procedure writing section of the PCN 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 (PDAs, etc.) into the examination facilities at a PCN AQB or Examination Centre. The provision of computers for candidate use is optional for any BINDT AQB.

10.3.4. 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.

10.3.5. Mobile telephones or any portable memory devices are not permitted in any PCN examination area.

10.4. Qualification Examination Content - Levels 1 and 2

10.4.1. Examination sections

- 10.4.1.1. The qualification examination consists of written general and specific parts, and a specific practical examination covering a given GWT method applied to representative specimens.
- 10.4.1.2. The general and equipment specific written examination comprises multi-choice answer questions.
- 10.4.1.3. The time allowed to the candidates for completion of the examination shall be based upon the number and difficulty of the questions. The average time allowed shall be no less than one minute nor longer than two minutes per multiple choice question.
- 10.4.1.4. The practical examination is of sufficient duration, complexity and scope to adequately verify the candidate's ability to apply the GWT method to real test situations. The time allowed for the practical examination is detailed in the appendix to these general requirements.

10.4.2. General and equipment specific Examination

- 10.4.2.1. The 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 number of questions in the GWT method general and equipment specific examination is as defined in *Table 3*.

Table 3. Numbers of questions		
GWT Method	Level 1	Level 2
Guided Wave Testing	40 General 30 Equipment Specific	30 General 40 Equipment Specific

10.4.3. Practical Examination (see CP22 for information on preparation for tests and grading)

- 10.4.3.1. The practical examination is designed to ascertain the ability of the candidate to:
 - make the required settings;
 - operate the test equipment properly;
 - perform testing of prescribed components relating to the group concerned;
 - record and to analyse the resultant information to the degree required according to written instructions.
- 10.4.3.2. For Level 2 the candidate will demonstrate the ability to prepare written instructions for Level 1. This will be an open book examination where the candidate is provided with the relevant standard, code or specification, together with a copy of CP25.
- 10.4.3.3. The Level 1 candidate will follow the GWT instruction(s) provided by the examiner, while the Level 2 candidate will select the applicable GWT technique and determine the operating conditions related to a given code, standard, or specification.
- 10.4.3.4. The specimens used for the practical test will be selected from a collection of representative specimens approved by BINDT during the approval audits at the AQB. Each test specimen shall contain one or more of the discontinuities defined in CP22.
- 10.4.3.5. The number of areas or volumes to be tested and the time allowed during the practical examination will be adequate to the level and GWT method, and to the group concerned, and is defined in PCN [GW GEN Appendix A](#).

10.4.3.6. Specimens 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. The master sheet is compiled based upon at least two independent tests, and is validated by an authorised examiner for use in grading PCN examinations. The independent test reports from which the master report is compiled shall be retained as records.

10.4.3.7. Specimens contain discontinuities characteristic of those that occur during manufacturing or in service. They may be natural, artificial or implanted.

10.5. Qualification Examination Content - Level 3

10.5.1. General

10.5.1.1. All candidates for level 3 certification in the GWT method shall have successfully completed (with a grade of $\geq 70\%$) the practical examination for level 2 in the relevant groups.

10.5.1.2. A candidate, who is level 2 in the all relevant product groups, is exempt from passing again the level 2 practical examination. This exemption is only valid for the product groups covered by the sector concerned and, in any other circumstances; the relevant sector is the sector in which the candidate seeks level 3 certification.

10.5.2. Basic Examination.

10.5.2.1. The basic examination shall be passed first and the result will remain valid, provided that the first main method examination is passed within five years after passing the basic examination. A candidate holding a valid level 3 certificate is exempt from the need to retake the basic examination.

10.5.2.2. Examination questions shall be selected from the current collection of questions approved by BINDT at the time of the examination. The number of questions set will be as defined in Table 4.

10.5.2.3. All the questions are of the multiple choice answer type. The total time allowed for this examination is 3 hours.

Table 4: Number of Basic examination questions		
Part	Examination	Number of questions
A	Materials technology and science, including typical defects in a wide range of products including castings welds and wrought products.	30
B	Qualification and certification procedure in accordance with this document	10
C	15 general questions at Level 2 standard for each of four NDT methods chosen by the candidate, including at least one volumetric NDT method (UT or RT).	60

10.5.3. Main Method Examination

10.5.3.1. This written examination shall assess the candidate's knowledge of the main method subjects using the minimum required number of multiple choice 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.

10.5.3.2. The duration of the examination is 1 hour for part D, 40 minutes for part E, and 4 hours for part F.

Table 5: Main Method examination		
Part	Subject	Number of questions
D	Level 3 knowledge relating to the test method applied	30
E	Application of GWT in the sector concerned, including the applicable codes, standards, and specifications. This may be an open book examination in relation to codes, standards, and specifications.	20
F	Drafting of two GWT procedures in the relevant sector. The applicable codes, standards, and specifications shall be available to the candidate.	

11. Training Exemptions

For the purpose of claiming exemptions, certification issued by other GWT training bodies may be considered by the British Institute of NDT for training equivalence, candidates are to present their certificate to the AQB when seeking a training exemption.

12. Conduct of Examinations

12.1. General

12.1.1. At the time of examination, the candidate shall have in his or her possession valid proof of identification and an official notification of the examination, which shall be shown to the examiner or invigilator upon demand.

12.1.2. Any candidate who, during the course of the examination, does not abide by the examination rules or who perpetrates, or is an accessory to, fraudulent conduct shall be excluded from further participation.

12.1.3. 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.

12.2. Preparation and conduct of examinations

12.2.1. All PCN examinations shall be prepared, and supervised by authorised examiners, and conducted in AECs established, approved and monitored by the British Institute of NDT, either directly or through an AQB.

12.2.2. Examinations shall be invigilated by an examiner, or by one or more trained and authorised invigilators placed under the responsible examiner's control.

13. Grading of Examinations

14.1 The pass mark for each examination part, and for levels 1 and 2, for each examination specimen tested, is 70%.

13.1 Grading of PCN practical; examinations is detailed in document CP22.

13.2 To be eligible for certification all candidates must achieve an overall score of no less than 80%, which is the average of the scores for the general, specific and practical examination parts. All examination scores shall be of equal weight in determining the average score.

13.3 The Level 3 pass mark for each examination part is 70% with a straight average of no less than 80%.

14. Re-examination

- 14.1. A candidate who fails to obtain the pass grade for any examination part (general, specific or practical), may be re-examined once in the failed part(s), provided the re-examination takes place not sooner than three months, unless further training acceptable to BINDT (see 7.2) is satisfactorily completed, nor later than twelve months after the original examination.
- 14.2. A candidate who achieves a passing grade of 70% in each of the examination parts, (general, specific or practical), but whose average score is less than the required 80%, may be re-examined once in any or all of the examination parts in order to achieve an overall average score of 80%, provided the re-examination takes place not sooner than three months, unless further training acceptable to BINDT (see 7.2) is satisfactorily completed, nor later than twelve months after the original examination.
- 14.3. A candidate who fails all permitted re-examinations shall apply for and take the initial examination according to the procedure established for new candidates.
- 14.4. A candidate whose examination results have not been accepted for reason of fraud or unethical behaviour shall wait at least 12 months before re-applying for examination.

15. Publication of Examination Results

- 15.1. 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.
- 15.2. 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.
- 15.3. Candidates who have met all requirements for certification with the exception of having the required minimum experience will be advised by the PCN Certification Records Office on how to record experience gained under Appropriately Qualified Supervision. Applications for certification post experience are made directly to the PCN Certification Records Office on form PSL/57C.
- 15.4. Candidates who fail any part of the examination will be provided with brief reasons for failure on the results notice.

16. Certification

- 16.1. Successful candidates will be issued a PCN certificate of competence, which indicates that all conditions for certification, as detailed in the present specification document, are met. Issue of certification normally takes place within 21 days of BINDT receiving the formal notification of success in the examination from the AQB. 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 one year from the date of success in the PCN examination.
- 16.2. 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 published.
- 16.3. The PCN record of certification and/or corresponding wallet card bears:
 - 16.3.1. the full name of the certificated individual;
 - 16.3.2. the date of certification;
 - 16.3.3. the date upon which certification expires;
 - 16.3.4. the level of certification;
 - 16.3.5. the GWT method(s);
 - 16.3.6. the applicable group(s);
 - 16.3.7. the specific scope of the competence;
 - 16.3.8. a unique PCN identification number;
 - 16.3.9. the signature of the certificated individual;

16.3.10. a photograph of the certificated individual (either on the certificate or a wallet card).

16.3.11. Equipment name

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.

17. Validity of Certification

17.1. The period of validity of the certification is normally of five years from the date of certification, and the expiry date is indicated on the certificate and/or wallet card.

17.2. Where success in the recertification procedure occurs within the 90 days prior to expiry of the certificate, the new certificate will expire five years after the expiry date of the certificate being revalidated. If the recertification procedure is completed prior to 90 days before expiry, the new certificate will be valid for five years from the completion of that renewal or recertification procedure.

17.3. PCN certification shall be invalid:

17.3.1. in any industrial sector which is not covered by the certificate (unless the holder successfully completes a supplementary examination for the industrial sector);

17.3.2. at the option of the British Institute of NDT after reviewing evidence of unethical behaviour (see CP27 – PCN Code of Ethics);

17.3.3. if examination or certification fees are not paid when due;

17.3.4. if the individual fails to satisfy the criteria for visual acuity and colour perception;

17.3.5. if a *significant interruption* (see definitions) takes place in the method for which the individual is certificated;

17.3.6. from the date of issue of notification of failure in a PCN examination for recertification.

17.4. Verification of current PCN certification is available at www.bindt.org/PCN provided the correct PCN number of the individual is entered.

18. Recertification

18.1. The procedure for recertification of PCN level 1 and 2 certificates is detailed in PCN document CP16.

18.2. The procedure for recertification of PCN level 3 certificates is detailed in PCN document CP17.

18.3. To ensure continuity, it is advisable to submit applications for recertification at least 56 days prior to certificate expiry. Applications for recertification after the certificate has expired may be considered (up to one year after expiry), but such applications will be subject to payment of an additional administration fee.

18.4. 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 permitted retest within the six month period allowed.

18.5. If renewal is applied for more than 12 months after expiry, recertification by examination shall be required.

18.6. If recertification is applied for more than 12 months after expiry, a complete initial examination - general, specific and practical - for Level 1 and Level 2, and a main method examination for Level 3, including the Level 2 practical, shall be required.

19. Complaints and Appeals

19.1. 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 – paragraph 23). 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.

- 19.2. 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.
- 19.3. If the petition is substantiated to the satisfaction of the PCN Management Committee (or a committee to which has been assigned responsibility for such matters), the certification may be cancelled, or renewal or recertification may be refused, for such period as the Management Committee may decide, unless the holder of certification is successful in a further examination, the content of which will be decided by the Management Committee or its authorised sub-committee at an ordinary meeting.
- 19.4. 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 Management Committee.
- 19.5. The Certification Management Committee may delegate the process of dealing with complaints and appeals to a properly constituted sub-committee.

20. Change of Employer

- 20.1. Change of employer shall not be cause for recertification.
- 20.2. 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.

21. Certification and Examination Records

- 21.1. 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. Verification of the certification status of individual PCN certificated personnel is freely available at www.bindt.org.
- 21.2. 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.

22. Use and Misuse of Certificates

- 22.1. 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. Certificate holders or employers are not permitted to imply any further degree of competence on the basis of the certificate.
- 22.2. 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.
- 22.3. 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.
- 22.4. 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.

- 22.5. 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.
 - 22.6. 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.
 - 22.7. 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.
-