CERTIFICATION OF PERSONNEL FOR LIQUID PENETRANT TESTING IN THE PRE & IN-SERVICE INSPECTION SECTOR

ASSOCIATED DOCUMENTS:
Appendix Z1 to PCN/GEN (examination syllabus compendium)
Appendix Z2 to PCN/GEN (specimen examination questions compendium)

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1. SCOPE
This document prescribes the specific requirements and procedures by which personnel may be
examined and, if successful, certificated for the Liquid Penetrant testing of General Engineering
Materials and Components. Requirements contained in this document are supplementary to those
contained in the current edition of PCN General Requirements for PCN Qualification and Certification
of NDT Personnel.

2. EXAMINATION CONTENT
The examination format is described in PCN General Requirements. This Appendix amplifies the
provisions of that document only where necessary.

2.1 Level 1
Except where exemptions apply (refer to PCN General Requirements), all candidates will be required
to attempt an examination comprised of the following parts:

2.1.1 General theory of the Liquid Penetrant NDT method.

2.1.2 Sector Specific Theory of the application of the Liquid Penetrant NDT method to general
engineering products including basic production processes and associated defects.

2.1.3 Sector Specific Practical examination comprising:
   (i) preparation of testing systems for use (this may involve system sensitivity and control
       checks).
   (ii) testing three samples (selected by the examiner) in accordance with NDT instructions
       provided.
   (iii) reporting test results in a prescribed manner in accordance with the NDT instructions
       provided.

The total time allowed for the practical examination is three hours. The minimum pass mark for the
practical part is 70% in each sample tested.

2.2 Level 2
Except where exemptions apply (refer to PCN General Requirements), all candidates will be required
to attempt an examination comprised of the following parts:

2.2.1 General Theory of the Liquid Penetrant NDT method.

2.2.2 Sector Specific Theory of the application of the Liquid Penetrant NDT method to the testing of
general engineering products, including questions on the basic casting, forging and welding processes
and associated defects.

2.2.3 Sector Specific Practical examination comprising:
   (i) preparation of testing systems for use (this may involve system sensitivity and control
       checks).
   (ii) testing three samples (selected by the examiner from castings, welds and wrought
       products, according to the certification sought - see Clause 3.2), in accordance with
       NDT procedures or instructions (two to be provided by the test centre and one to be
       generated by the candidate – see (iv) below) which will give, where appropriate,
       sensitivity levels and reporting thresholds.
   (iii) reporting test results in a prescribed manner on proforma report sheets
   (iv) preparation of a detailed NDT instruction (suitable for level 1 personnel to follow) for
       the testing of one of the above samples to a provided procedure, code, standard or
       specification, and prove the instruction by application.

The total time allowed for the sector specific practical examination is four hours. The minimum pass
mark is 70% in each sample tested,
2.3 Level 3

Except where exemptions apply (refer to PCN General Requirements), all candidates will be required to attempt an examination comprising a Basic examination and a Main Method examination. Information on the content and grading of PCN level 3 examinations is provided in PCN General Requirements for Certification of Personnel engaged in Non-Destructive Testing.

Level 3 candidates who do not hold PCN level 2 certification for Liquid Penetrant Testing will be required to successfully complete the examination described in Clause 2.2.3 (excepting clause (iv)).

3. CERTIFICATION AVAILABLE

3.1 Level 1 Liquid Penetrant Testing (Dye penetrant and/or fluorescent penetrant) of general engineering materials, components and fabrications in the pre and in-service inspection multi-sector.

3.2 Level 2 Liquid Penetrant Testing (Dye penetrant and/or fluorescent penetrant) of general engineering materials, components and fabrications in the pre and in-service inspection multi-sector.

Alternatively, Level 1 and Level 2 candidates may apply for single sector certification covering for one (only) of the following groups:

3.2.1 Castings
3.2.2 Welds
3.2.3 Wrought Products

3.3 Level 3 Liquid Penetrant Testing of general engineering materials, components and fabrications in the pre and in-service inspection multi-sector.

Candidates who achieve an overall score of 80% or more for Level 1, 2 and 3 examinations shall be awarded with the distinction level ‘D’ (refer to PCN GEN – Grading of Examinations).

4. RENEWAL AND RECERTIFICATION

4.1 The general rules for level 1 and level 2 renewal and recertification are fully described in PCN document CP16, and the rules for level 3 recertification are detailed in PCN document CP17.

4.2 Level 1 and Level 2 certificate holders seeking recertification will be required to undertake the practical examination described above for their level.

5. SUPPLEMENTARY EXAMINATIONS

5.1 Candidates holding certification in one product sector who wish to add another single sector will be required to pass a further practical examination comprising the testing of 3 samples selected by the examiner as representative of the single sector sought.

Candidates should note that this will result in 2 separate certificates being held and will need to be maintained separately.

5.2 Candidates holding certification in one product sector who apply for certification in the multi-sector (all product sectors) will be required to pass a further practical examination comprising the testing of three samples selected by the examiner as representative of the additional sectors sought (see Clause 3.2 above). Level two candidates attempting supplementary examination will not be required to produce a written instruction (Clause 2.2.3 (iv)).

5.3 Candidates who wish to add another category to their existing certification/scope will be required to pass a further practical exam testing samples within the existing sector selected from the new category/scope sought (i.e. dye penetrant or fluorescent penetrant).

6. GRADING

General information on the grading of examinations will be as specified in the current edition of PCN General Requirements, and information on the grading of practical examinations is provided in PCN document CP22.
7. REFERENCE LITERATURE

Essential Reading

- BS EN ISO 23277: Non-destructive testing of welds. Penetrant testing of welds. Acceptance levels
- BS EN 1330-1: Non-destructive testing – Terminology – Part 1 List of general terms
- BS EN 1330-2: Non-destructive testing – Terminology – Part 2: Terms common to the non-destructive testing methods
- BS EN ISO 3059: Non-destructive testing. Penetrant testing and magnetic particle testing. Viewing conditions.
- BS EN ISO 3452-2 Non-destructive testing. Penetrant testing. Testing of penetrant materials
- BS EN ISO 3452-3 Non-destructive testing. Penetrant testing. Reference test blocks
- BS EN ISO 3452-4 Non-destructive testing. Penetrant testing. Equipment
- BS EN ISO 12706 Non-destructive testing – Terminology – Terms used in penetrant testing
- QPL 25135: Qualified Products List.
- Product Technology Classroom Training Handbook. Obtainable from Certification Services Division, The British Institute of Non-Destructive Testing, Newton Building, St George’s Avenue, Northampton NN2 6JB.
- Training Course Notes. PCN requires candidates to have attended an approved course of training. Accredited Training Establishments are required to provide trainees with an up-to-date set of training course notes. These are considered essential reading.

Recommended Reading

- Air Registration Board, Civil Aircraft Inspection Procedure BL/10-9 (Aluminium Test Blocks).
- Basic Metallurgy for Non-Destructive Testing. Edited by J L Taylor. The British Institute of Non-Destructive Testing, Newton Building, St George’s Avenue, Northampton NN2 6JB.
- Question and Answer Book, Levels 1, 2 and 3, Liquid Penetrant Testing, ASNT, 1980.
- Liquid Penetrant Testing, Student Package, ASNT.
- Liquid Penetrant Testing, Instructor Package (overheads for training) ASNT.

NOTE. Some of the above are available only in reference libraries. For information on sources of the above recommended reading contact The British Institute of Non-Destructive Testing, Newton Building, St George’s Avenue, Northampton NN2 6JB.