

DEVELOPMENT AND IMPLEMENTATION OF A SPECIFICATION FOR AUTHORISED QUALIFYING BODIES

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INTRODUCTION

ISO 9712^[8] and EN 473^[7], which both require conformance with ISO/IEC 17024^[1], define an Authorized Qualifying Body (AQB) as a body, independent of the employer, authorized by the Certification Body (CB) to prepare and administer qualification examinations.

Both of these standards allow the CB to delegate, under its direct responsibility, the detailed administration of 'qualification' of personnel to AQB, to which they will issue specifications for facilities, personnel, equipment, examination materials, records etc..

Both standards state that, where established, the authorized qualifying body shall:

- work under the control of the certification body;
- ensure that it is impartial with respect to each candidate seeking qualification, bringing to the attention of the certification body any actual or potential threat to its impartiality;
- conform to the specification issued by the certification body;
- apply a documented quality management system approved by the certification body;
- have the resources and expertise necessary to establish, monitor and control examination centres, including examinations and the calibration and control of equipment;
- prepare and supervise examinations under the responsibility of an examiner authorized by the certification body;
- maintain appropriate records according to the requirements of the certification body.

In this paper the author will discuss the essential and desirable content of the required specification, and the benefits and pitfalls of implementing personnel assessments through independent commercial entities that have come to be known as 'Authorised Qualifying Bodies'.

SPECIFICATIONS FOR AQB SHOULD INCLUDE AT LEAST THE FOLLOWING

Foreword

Here the CB will describe, in general terms, its policy with regard to assessing and approving AQB, as well as the process for application, assessment, approval and monitoring.

Definitions of terms

It is vital for the sake of clarity that terms are clearly and unambiguously defined. However carefully this might be done, there will inevitably be instances where existing definitions are found to be less than clear, and new definitions will be required in order to close

loopholes. An example of a critical definition is that of invigilator. ISO 9712 defines an invigilator as:

“a person authorized by the certification body to supervise examinations”

This might well suffice for the CB that administers its own examinations directly, but with over 25 years of experience as a certification body offering PCN examinations through AQB's, BINDT has found it necessary to be more precise in defining an invigilator:

“An individual trained by the AQB in the process of examination invigilation to BINDT requirements, particularly with respect to the points to be observed during a practical examination. Invigilators, who will be named as such within the AQB quality documentation and on the AQB approval certificate, are authorised by the AQB Co-ordinator and supervised by an examiner. The term supervised, in this context, means that invigilation is effectively controlled by an authorised examiner who is available and contactable by the appointed invigilator at all times when PCN examinations are being conducted”

So, as can be seen, definitions play a vital role in controlling the activities entrusted to AQB, and must be included in the specification to which they will work and with which they must comply.

Resources - Staff

It should be left to the AQB to decide who to appoint to what position, but all appointments should be subject to the approval of the CB. The specification must require that provision be made for deputization of key personnel in case of planned or unplanned absence.

Management staff must include an individual who is ultimately responsible for compliance with the CB's specification (in the PCN Scheme this position holder is known as the Co-ordinator). This individual does not need to be technically qualified (in the NDT sense), but he or she must be intimately familiar with the quality and technical requirements of the specification.

The AQB must also appoint an individual to be responsible for examination facilities (question papers, specimens, equipment and infrastructure). This individual could also be an examiner, and this is preferable (in the PCN Scheme this position holder is known as the Chief Examiner. The AQB Co-ordinator and the Chief Examiner could be one and the same person.

At least one other examiner is essential; it might be difficult to identify one person with Level 3 certification for all of the NDT method/sector applications covered by the scope of the AQB's operations, and anyway, there will be a requirement for moderation and coverage in case of unplanned absences. Level 3 examiners are expensive to hire, so the AQB will wish to utilise lesser qualified individuals for invigilation and general administration. Again, it is vital that the specification make clear that AQB staff involved in any aspect of the administration or conduct of qualification examinations shall be appropriately trained and qualified for their functions.

AQB's will inevitably also be providers of training^[4,5], and the CB could also license them as Approved Training Organisations (ATO). However, there can be no dual usage of training and examination specimens. Nor can staff that have trained an individual also examine that individual. And there can be no simultaneous dual usage of training and examination facilities and/or NDT equipment. All of this should be clearly stated in the specification.

Another major consideration that the specification must address is impartiality. Examination staff must be required to declare any interest in any candidate in whose examination they are involved in any capacity. An examiner or invigilator must be prohibited from direct involvement in any examination of a candidate in whom they may have an interest by virtue of:

- having a common employer - now or within the preceding two years;
- having provided training within the preceding two years;
- being employed by an organisation which has an interest in the outcome of examinations;
- any other circumstance which may actually or potentially threaten impartiality.

Resources - Premises

There is little to say about premises, except that the specification should place a requirement on the AQB to ensure that examination premises are suitable for the conduct of examinations. CBs will be able to vet and approve premises in most cases, but if the AQB is permitted to offer examinations at overseas locations on an ad hoc basis, then it must discharge that responsibility and record that it has carried out a 'suitability assessment' of the facilities before use.

Examination Questions

The standards permit the AQB to establish question banks and compile questionnaires. However, this leads to a lack of control over the level of quality and difficulty of examinations, and is to be decried. Far better that the CB states in its specifications something along these lines:

"The CB provides a central bank of validated multi-choice examination questions from which centrally issued examination papers are constructed, all AQB's are required to contribute questions, which shall subsequently be validated and added to the central question bank".

Very soon the CB will possess an enviable number of questions. Of course, it should have *some* questions to start with!

Resources - Examination specimens

These days the applicable standards include specifications for examination specimens as normative annexes or technical reports/specifications (CEN/TS 15053: 2005^[31]). The CB has only to specify the minimum holding of specimens, and this can be provided in an annex to its main AQB specification, which should state that "specimens shall meet the relevant specification (where one exists) before use in PCN examinations".

Specimen master reports

It is vital to set out in some detail the requirements for master reports, for it is these that ensure consistence in marking and grading between different examiners. For this reason, the specification should state that: "There shall be a documented procedure for the production of master reports of flaws in each specimen. The master report shall be based only on the inspection or test method and the particular technique to be applied to the specimen by examination candidates".

The detail required in master reports is critical, and there is insufficient space in this paper to go into too much detail in this important area, but the applicable standards are, today, quite helpful in this matter.

Resources - test equipment

It is highly recommended that the CB promulgate through its AQB specification the range and numbers of NDT equipments to be held by each AQB, and to require that the AQB record any changes in equipment holdings. If a significant reduction in equipment holdings is planned, this may result in a change in the scope of AQB authorisation and must be notified to the CB beforehand

Control of test equipment

The specification should require that the AQB establish and maintain a documented calibration procedure for all inspection, test and measuring equipment, traceable to national standards where appropriate. Such procedures shall include details of equipment type, identification, location, frequency of checks, method of check, allocation of responsibility and actions to be taken when results are unsatisfactory

Consumables

The CB must require that maintenance of process capability for processes involving consumable materials is to be covered by a process control procedure, which should also ensure that consumables are properly disposed of strictly in accordance with applicable national regulations.

Security

Examination materials, including questions and practical specimens, and information on candidates, require handling with a high degree of security, confidentiality, integrity and impartiality. If data at AQBs are computerised, a documented procedure should cover, as a minimum, general security, authorisation for access, and measures to prevent loss of hard copy and/or computerised data.

Where examination material is stored at a location not under the constant supervision of AQB staff, e.g., at a site remote from any permanently established and staffed examination centre, the AQB should be required to notify the CB of the location concerned, and the measures in place to safeguard the security and confidentiality of examination material. The specification must make clear that the CB reserves the right to audit such storage facilities and to direct that specific additional measures be implemented to safeguard security and confidentiality.

Candidate eligibility and identification

The Specification must require that the AQB will have a documented procedure for ensuring that candidates satisfy all requirements, particularly in terms of examination eligibility and identification, which includes verification of experience and supervision information provided by the candidate. The procedure will detail, but not be limited to:

- Training
- Experience
- Vision
- Identification

All of which must satisfy the requirements of the CB (which should satisfy the requirements of the applicable standards).

Conduct of examinations

The specification will require that the AQB shall have in place an operating procedure which ensures that candidates are, at all times during examination, closely supervised by a suitably qualified and authorised examiner or invigilator who will ensure that no candidate is permitted an unfair advantage or to collude with other candidates. A procedure for invigilation is to be covered in the AQB quality system, and is to define appropriate training in invigilation techniques including, where necessary, specific points to be noted during practical examinations. An invigilator need not be an examiner, but must:

- be appropriately qualified if invigilating practical examinations;
- be required to ensure that appropriate examination conditions are maintained at all times;

- ensure that any infringement of examination conditions by any candidate is recorded, and reported without delay to the Chief Examiner or PCN Co-ordinator;
- declare (to the AQB Co-ordinator or Chief Examiner) an interest in any candidate prior to commencement of an examination.

The procedure must require that all staff involved with examinations will ensure that no examination material is removed by any candidate. This includes any rough notes, sketches etc. that the candidate may have made during the examination, and that all candidates are adequately prepared on the day of the examination. This will cover, as a minimum, provision of correct examination papers, codes and standards, examination equipment and materials, information on breaks during examination and the consequences of cheating.

Mobile phones and other electronic communications devices are a potential source of cheating and may disturb other candidates if they should be activated during examinations. Consequently mobile phones and any other electronic communications devices shall be barred from written and practical examination facilities when qualification examinations are being conducted

Consistency of examinations

The AQB must be required to make every effort to ensure that the standard of examination(s) is consistent and at all times complies with CB requirements.

The conduct of practical examinations is to be defined by written procedures which shall include assessment and marking schedules for all possible solutions, observation of the candidate for compliance with safety notes and notices, and selection and correct usage of test equipment. Practical examination marking schedules shall be prepared by an authorised Examiner with appropriate certification, and signed by the Chief Examiner.

Marking and grading of examinations

It is logical to assign responsibility to the AQB for marking and grading, since they directly employ the examiners that the CB has approved and named on the certificate of authorisation. This is a topic worthy of a specification in its own right, and PCN document CP22^[13] is one such specification.

Examination results notices should be transmitted to the CB and the candidate not later than a specified number of days from the date of the examination and, in the case of failure in the examination, should include an indication of the reason for failure which is useful to the candidate in preparing for re-examination.

Quality Management System - General

The CB could devise a standard quality management system (QMS) and procedures for AQB. Alternatively, recognising that most AQB will already have a QMS, the specification could detail what the AQB's QMS *must address*. The following are suggestions for consideration

The AQB shall provide the CB with formal quality management system documentation (and maintain this documentation up-to-date) detailing the scope of examinations, and applicable management and staff structures, together with documentation detailing its facilities, equipment, specimens, control arrangements and procedures, which shall be shown to comply fully with this specification and be adequate to maintain a consistent standard of examinations. The documented quality system shall include a statement of the AQB's safety policy and shall also include terms of reference for staff.

The quality system shall cover as a minimum, all of the following:

- AQB organisation:
 - Co-ordinator's duties and responsibilities;

- Chief examiner's duties and responsibilities;
- Examiner's duties and responsibilities;
- Invigilator's duties and responsibilities;
- Staff training and qualifications;
- Examination facilities, including premises, specimens and equipment;
- Examination procedural data:
 - conduct of examinations
 - grading of examinations
 - examination records;
 - consistency of examination standard;
 - Security (of specimens, records and information);
- Facilities for visiting representatives of BINDT;
- Document and data control
- Internal audit, and
- Management review

Control of quality records

This is a significant responsibility to devolve, and the specification placed upon AQB's should adequately reflect this significance.

The AQB must be required to maintain for at least seven years comprehensive records as evidence of compliance with these requirements. Such records shall include, but not be limited to, results of:

- continuous monitoring and internal audit;
- staff re-appraisal;
- equipment maintenance reviews and recalibration;
- periodic reviews of marking schemes, procedures and documentation.

The AQB should also be required to maintain comprehensive examination records (including precise details of which questions and specimens each candidate was set for each initial examination and re-examination) in secure lockable storage. Examination records shall be retained for a period of 11 years but, in any case, shall not be disposed of without prior consultation with the CB

Records may be in the form of any type of media, such as hard copy or electronic media but must be available for scrutiny by authorised CB representatives at any time.

A statement is required that, in the event that an AQB ceases trading, or where authority to conduct examinations is relinquished or withdrawn, all examination records will become the property of the CB.

PROS AND CONS OF SUB-CONTRACTING QUALIFICATION TO AQB

For

- Low initial investment and reduced operating overheads for CB; an AQB operates as a franchisee under the direct control of the CB, providing the necessary infrastructure, NDT equipment, specimens and qualified staff;
- Provided that the CB has an open door policy with respect to accepting applications from potential AQB, merely requiring compliance with technical and quality specifications, competition between AQB on service and price is healthy for the certification scheme and all stakeholders;
- AQBs are usually very commercially aware organisations, and their business and marketing skills can be a considerable asset to the certification body;
- The number of examinations that it is possible to offer in any given period is limited only by the capacity of the AQBs, and if there is a big demand, one can be sure that new AQBs will come forward to satisfy that demand.

Against

- The specifications issued by the CB must be detailed and unambiguous (this paper will assist CB to develop the required specification);
- It is essential to ensure that all AQB operate within the published specification, necessitating regular and frequent audit by trained, qualified and experienced NDT auditors;
- The participation of AQB on scheme committees must be carefully controlled to prevent the scheme being subjected to the influence of vested interests.
- Because the CB is invariably accredited, it must demonstrate to the accreditor how it controls its AQBs compliance with its specification^[11]. This will involve the accreditor witnessing the CB assessments of its AQB, and such access has to be described in a separate public document^[12].

CONCLUSIONS

The experience gained in the development and implementation of the PCN scheme over the past 25 years has shown the benefits to all stakeholders (industry, the certification body, trainees and candidates, and the AQBs themselves) of qualification and certification through a successful partnership between BINDT and its sub-contracting Authorised Qualifying Bodies. This partnership has built up an enviable reputation for delivering a highly respected and widely specified qualification and certification package under the PCN brand to the industries operating in over 50 countries around the world.

There are presently over 5000 PCN examinations per annum delivered world wide through a network of 8 AQBs^[10] and over 30 Authorised Examination Centres, the latter being either under the control of AQBs, or directly under BINDT control.

The documents and specifications that have been developed and published^[9] to inform, regulate and control PCN operations are freely available from the BINDT website. The BINDT specification embodying "Requirements for BINDT Authorised Qualifying Bodies" is CP9^[11].

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3. CEN/TS 15053: 2005 Non-destructive testing – Recommendations for discontinuities-types in test specimens for examination
4. CEN ISO/TR 25107: 2006 Non-destructive testing – Guidelines for NDT training syllabuses (ISO/TR 25107:2006)
5. CEN ISO/TR 25108: 2006 Non-destructive testing – Guidelines for NDT personnel training organisations (ISO/TR 25108:2006)
6. CEN/TR 15589: 2006 Non-destructive testing – Code of practice for the approval of NDT personnel by recognised third party organizations under the provisions of Directive 97/23/EC
7. EN 473: 2008 General principles for qualification and certification of NDT personnel
8. ISO 9712: 2005 Non-destructive testing - Qualification and certification of personnel

PCN documents (http://www.bindt.org/Certification/PCN_Document_Download):

9. PSL/8A PCN Documents - Issue status
10. PSL/04 PCN Examination Availability
11. CP9 Requirements for BINDT Authorised Qualifying Bodies
12. CP19 Informal access to Authorised Qualifying Bodies by third parties.
13. CP22 Marking and grading PCN practical examinations
14. CP25 Guidelines for the preparation of NDT procedures and instructions in PCN examinations
15. CP27 Code of Ethics for PCN certificate Holders

THE AUTHOR'S BACKGROUND AND PRESENT ACTIVITIES

Following a career in the United Kingdom Royal Air Force (RAF), where he was initially involved in aeronautical engineering, followed by 10 years of non-destructive testing aircraft, missiles and cranes, John Thompson was recruited by the British Institute of NDT to manage the development and implementation of the PCN Scheme for Certification of NDT personnel.

During this period he has accumulated over 20 years experience in developing and implementing schemes for the assessment and certification of competence of personnel engaged in many engineering disciplines, including non-destructive testing, condition monitoring, engineering inspection, domestic gas systems installation and maintenance, and vehicle maintenance and repair.

The author has also participated directly in the drafting of numerous national, European and international standards on the subject, including EN 473 and ISO 9712 (Non-destructive Testing – Qualification and certification of personnel) and currently holds the following external appointments:

- Chairman, ICNDT WG1 on Qualification and Certification of NDT personnel
- Chairman, EFNDT WG1 on Accreditation, Qualification and Certification
- Secretary, European Forum for National Aerospace NDT Boards
- Secretary, United Kingdom National Aerospace NDT Board
- Member, European Federation for NDT Certification Executive Committee
- UK lead delegate to CEN TC 138 for work involving qualification and certification of NDT personnel
- Member, ISO TC 135 SC7 (Qualification and Certification of NDT personnel).