
Non-destructive testing — Performance-based qualification

Essais non destructifs — Qualification sur une base de performances

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 11774 was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 7, *Personnel qualification*.

Introduction

Performance demonstration establishes the ability of a specific examination system (i.e. equipment, procedures and personnel) to achieve a desirable level of performance. The pre-established criteria for acceptable performance are based on an industry obtaining desired test results on qualification specimens with or without discontinuities including an established acceptable false call rate using qualified procedures and equipment.

NOTE Wherever gender specific words such as “his”, “her”, “he” or “she” appear in this Technical Specification the other gender is also applicable.

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Non-destructive testing — Performance-based qualification

1 Scope

This Technical Specification provides a method for qualification of non-destructive testing (NDT) personnel, procedures, and equipment for specific non-destructive tests conducted in accordance with documented procedures established within a performance-based qualification programme.

Implementation of this Technical Specification requires cooperation between applicable industry sector committees (ISCs) and qualification bodies to ensure that specific performance expectations are addressed.

The qualification methodology described in this Technical Specification is based upon the ability of a candidate to demonstrate capability in detecting and sizing critical discontinuities equivalent to those to be detected and sized in the performance-based qualification programme as established by the ISC.

It is possible that second party (employer-based) qualification and approval (e.g. in accordance with ANSI/ASNT CP-189^[3]) or qualification and third party certification (e.g. in accordance with ISO 9712^[1] or EN 473^[2]), followed by on-the-job training does not provide the required degree of confidence for safety critical inspections, and this Technical Specification provides criteria to assist in preparing an individual for performance-based qualification examinations.

Qualification to this Technical Specification is limited to the specific applications, using the specific documented procedure in the performance-based qualification programme.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 17024, *Conformity assessment — General requirements for bodies operating certification of persons*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

candidate

individual seeking qualification under a qualification procedure who has satisfied all prerequisites detailed in the qualification document

NOTE The qualification document is a description of the qualification system, including all applicable conditions, agreed between the parties to the qualification.

3.2

certification body

body that administers procedures for certification according to the requirements of this Technical Specification and which fulfils the requirements of ISO/IEC 17024

3.3

employer

legal entity for which the candidate for qualification or the qualified individual works on a regular basis

3.4

essential parameter

parameter of the NDT method, technique, the component, and defects that the test is intended to detect or characterize

3.5

false call

reporting a defect when none exists

3.6

grading unit

section of a qualification specimen

NOTE Grading units can be of unequal lengths and spacing, and either with or without discontinuities.

3.7

industry sector committee

ISC

body comprised of individuals representative of the interests in the inspection to be qualified

3.8

NDT qualification examiner

impartial individual who is certified to NDT level 3 within a scheme recognized by the qualification body, and who is qualified in the specific NDT application

3.9

NDT procedure

written description of all essential parameters and precautions to be applied when non-destructively testing products in accordance with standard(s), code(s) or specification(s)

3.10

performance-based qualification programme

methodology for establishing the ability of a specific qualification system (for equipment, procedures, and personnel) to achieve a required level of performance

3.11

qualification body

independent entity that administers qualification of NDT personnel, NDT equipment and NDT procedures

3.12

qualification certificate

document issued under the rules of a qualification system indicating that adequate confidence is provided that NDT procedures, equipment and personnel or any combination of these are capable, for a specific non-destructive test, of achieving the stated objectives

3.13

qualification procedure

orderly sequence of rules describing how a specific non-destructive test on a specific component is qualified

3.14

qualification specimen

example or a simulation of the component for which the non-destructive test is qualified which, as appropriate, replicates size, geometry, material properties and containing discontinuities to be encountered on site

4 Responsibilities

4.1 Qualification body

A qualification body shall develop and administer the qualification process, in accordance with the qualification procedure, and issue certificates of qualification upon compliance with this Technical Specification and ISC specific requirements.

4.2 Employer

An employer is responsible for authorizing employees to perform NDT for which they are qualified in compliance with this Technical Specification and ISC specific requirements.

4.3 Industry sector committee

An ISC establishes qualification requirements for specific industry applications, and advises the qualification body on all technical and procedural matters concerning the qualification.

5 Qualification of the NDT procedure

To ensure effective and consistent evaluation of personnel, the NDT procedure shall first be qualified in accordance with Annex A. The qualified procedure is valid only when the essential parameters are applied and controlled as defined within the procedure. The procedure qualification shall demonstrate the capability to resolve mandatory detectable discontinuities under representative conditions.

6 Prerequisites for performance-based qualification examinations

6.1 To be permitted to continue with the performance-based qualification examination, the candidate shall fulfil either 6.1.1 or 6.1.2.

6.1.1 The candidate shall provide evidence of current level 2 or 3 certification in the method(s) for which he is to be qualified under this Technical Specification. For NDT level 2 personnel, the certification may be from a nationally recognized employer-based programme or a certification body accepted by the ICS. For NDT level 3 personnel, the certification shall be from a certification body.

6.1.2 The candidate shall satisfy the training and experience established by the ISC in 6.2 and successfully complete written examinations administered by a certification body approved by the ISC. The certification body accepted by the ISC shall confirm conformance with the foregoing.

6.2. Candidates for qualification shall have sufficient training and specific practical experience to ensure they are capable of performing non-destructive tests using the qualified NDT procedure. The experience may be obtained with the use of virtual training systems, or by examining representative specimens, that may be located in a laboratory, with relevant and non-relevant discontinuities that may be located in a laboratory, or analysing recorded data from automatic, digital or analogue systems.

7 Performance-based qualification examination

7.1 Qualification specimens

The ISC shall:

- specify the mandatory detectable discontinuities size and type, in consultation with the regulator, original equipment manufacturer or design authority where appropriate, using applicable codes, standards and engineering principles; and
- confirm that qualification specimens are consistent with the specification.