

ASNT STANDARD

2018
EDITION

NONDESTRUCTIVE TESTING — QUALIFICATION AND CERTIFICATION OF PERSONNEL



The American Society for Nondestructive Testing, Inc.
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ASNT Mission Statement:
ASNT exists to create a safer world by advancing scientific, engineering, and technical knowledge in the field of nondestructive testing.

FOREWORD

The *ANSI/ASNT CP-106, Nondestructive Testing — Qualification and Certification of Personnel* document is a modified adoption of *ISO 9712:2012, Non-destructive Testing — Qualification and certification of NDT personnel* with modifications made in accordance with *ISO/IEC Guide 21-1:2005, Regional or national adoption of International Standards and other International Deliverables*. The document is formatted in the style of *ISO 9712:2012* and the rationale for each national modification is in an outlined text box titled “national explanatory note” directly after the clause, figure or table that was modified.

The term “International Standard,” used in *ISO 9712*, has been replaced in this document by the term “American National Standard” unless specific reference is being made to the international document.

Prepared by the American Society for Nondestructive Testing, Inc. (ASNT), this document was approved by the ASNT Standards Development Committee, a consensus body organized in accordance with the requirements of the American National Standards Institute (ANSI) for Standards Developing Organizations. The purpose of developing this document was to provide the United States with an American National Standard that would incorporate the provisions of *ISO 9712:2012* while recognizing the current national preferences for certification of nondestructive testing personnel.

INTRODUCTION

Since the effectiveness of any application of nondestructive testing (NDT) depends upon the capabilities of the persons who perform or who are responsible for the test, a procedure was developed to provide a means for evaluating and documenting the competence of personnel whose duties require the appropriate theoretical and practical knowledge of the nondestructive tests that they perform, specify, supervise, monitor, or evaluate. An added incentive stems from the worldwide comparability of a wide range of industrial applications requiring common NDT approaches.

When certification of NDT personnel is required in product standards, regulations, codes, or specifications, it is important to certify the personnel in accordance with this American National Standard. When latitude is provided in the criteria within this American National Standard, the certification body has the final decision in determining specific requirements.

When there is no requirement in legislation, in standard, or in the order for certification of NDT personnel, it is for employers of such personnel to decide how to ensure themselves that they are competent to do the work assignments. Thus, they may employ people who are already certified or they may apply their own expertise to assure themselves that their employee has the necessary competence. In this last case, prudent employers would no doubt use the American National Standard *ANSI/ASNT CP-189*, *ASNI/ASNT CP-105*, or *Recommended Practice No. SNT-TC-1A* as a reference document.

Any certification body adopting this American National Standard shall comply with current third-party certification requirements contained in this American National Standard for qualification and certification of personnel. A transition period of up to five (5) years to implement Level I, Level II, and Level III requirements is permitted. Details of any transition period must be addressed in the certification body's implementing procedures.

The aim is to permit the adoption of *ISO 9712* requirements or the establishment of a system in an industry with no third-party certification. It is also applicable when the certification body applies the certification scheme to emerging NDT method(s) or industrial sector(s).

National Explanatory Note:

In keeping with national practice, the *ANSI/ASNT CP-106* document uses roman numerals to denote the numbered levels of NDT qualification, that is, Level I, Level II, and Level III.

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NONDESTRUCTIVE TESTING

Qualification and Certification of Personnel

1.0 Scope

- 1.1 This American National Standard specifies requirements for principles for the qualification and certification of personnel who perform industrial nondestructive testing (NDT).

Note 1: The term “industrial” implies the exclusion of applications in the field of medicine. The system specified in this American National Standard can also apply to other NDT methods or to new techniques within an established NDT method, provided a comprehensive scheme of certification exists and the method or technique is covered by international, regional, or national standards or the new NDT method or technique has been demonstrated to be effective to the satisfaction of the certification body.

Note 2: *ANSI/ASNT CP-105*^[1] and/or *CEN/TR 14748*^[2] can be used as guidance. The certification covers proficiency in one or more of the following methods:

- 1.1.1 acoustic emission testing (AE),
- 1.1.2 electromagnetic testing (ET),
- 1.1.3 ground penetrating radar (GPR),
- 1.1.4 guided wave testing (GW),
- 1.1.5 laser testing methods (LTM),
- 1.1.6 leak testing (LT),
- 1.1.7 liquid penetrant testing (PT),
- 1.1.8 magnetic flux leakage (MFL),
- 1.1.9 magnetic particle testing (MT)
- 1.1.10 microwave technology (MWT),
- 1.1.11 neutron radiographic testing (NR),
- 1.1.12 radiographic testing (RT),
- 1.1.13 strain gauge testing (ST),
- 1.1.14 thermal/infrared testing (IR)
- 1.1.15 ultrasonic testing (UT),
- 1.1.16 vibration analysis (VA),
- 1.1.17 visual testing (VT).

Note 3: The American National Standard specifies requirements for what are, in effect, third-party conformity assessment schemes. These requirements do not directly apply to conformity assessment by second or first parties, but relevant parts of this American National Standard can be referred to in such arrangements.

Note 4: Wherever gender specific words such as “his,” “her,” “he,” or “she” appear in this American National Standard, the other gender is also applicable.

National Explanatory Note:

Method titles for eddy current, penetrant, magnetic, and infrared testing were changed to align with current national practice.

Example: The American Society for Nondestructive Testing’s Certification Management Council shall serve as the “Certification Body” to implement the American Society for Nondestructive Testing Central Certification Program (ACCP).

2.0 Normative references

- 2.1 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 amendments) applies.
 - 2.1.1 *ANSI ISO/IEC 17024:2012: Conformity Assessment – General Requirements for Bodies Operating Certification of Persons.*
 - 2.1.2 *ANSI/ASNT CP-105: ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel*, 2016 edition.
 - 2.1.3 *ISO/TR 25107: 2006: Non-destructive Testing Guidelines for NDT Training Syllabuses.*
 - 2.1.4 *IAEA-TECDOC-628/Rev. 2: Training Guidelines in Non-destructive Testing Techniques*, 2008 edition.
 - 2.1.5 *ISO/TR 25108: 2006: Non-destructive Testing – Guidelines for NDT Personnel Training Organizations.*

National Explanatory Note:

Additional references were added to provide clarity.

3.0 Terms and definitions

For the purposes of this American National Standard, the following terms and definitions apply:

- 3.1 **Authorized examination center:** center approved by the certification body, either directly or through an authorized qualification body, where qualification examinations are carried out.
- 3.2 **Authorized qualification body:** organization, independent of the employer, approved by the certification body to prepare and administer NDT qualification examinations.
- 3.3 **Candidate:** individual seeking qualification and certification who gains experience under the supervision of personnel having a qualification acceptable to the certification body.
- 3.4 **Certificate:** document issued by the certification body under the provisions of this standard indicating that the named person has demonstrated the competence(ies) defined on the certificate.
- 3.5 **Certification:** procedure used by the certification body to confirm that the qualification requirements for a method, level, and sector have been fulfilled, leading to the issuing of a certificate.
- 3.6 **Certification body:** body that administers procedures for certification according to specified requirements.
Note: The provisions are specified in this American National Standard.
- 3.7 **Cut score:** minimum passing score established using the process.
- 3.8 **Employer:** organization for which the candidate works on a regular basis.
Note: An employer can also be a candidate at the same time.
- 3.9 **Examination, basic:** written examination, at Level III, which demonstrates the candidate's knowledge of the materials science and process technology and types of discontinuities, the specific qualification and certification system, and the basic principles of NDT methods as required for Level II. When applicable, condition based maintenance practices, machinery reliability concepts, and machinery design.
Note 1: For an explanation of the three levels of qualification, see paragraph 6.0.
Note 2: The qualification and certification system is specified in this American National Standard.
- 3.10 **Examination, general:** written Level I or Level II examination concerned with the principles of an NDT method.
- 3.11 **Examination, main method:** written examination, at Level III, which demonstrates the candidate's general and specific knowledge, and the ability to write NDT procedures for the NDT method as applied in the industrial or product sector(s) for which certification is sought.
- 3.12 **Examination, practical:** assessment of practical skills, in which the candidate demonstrates familiarity with, and the ability to perform, the test.
- 3.13 **Examination, qualification:** examination administered by a certification body or by an authorized qualification body, which assesses the general, specific, and practical knowledge, and the skill of the candidate.
- 3.14 **Examination, specific:** written examination at Level I or Level II, 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.
- 3.15 **Examiner:** person certified to Level III in the method and product or industrial sector of which he is authorized by the certification body to conduct, supervise, and grade the qualification examination.

- 3.16 **Experience:** time, acceptable to the certification body, gained under qualified supervision, in the application of the NDT method in one or more sector(s) concerned, needed to acquire the skill and knowledge to fulfill the provisions of qualification.
- 3.17 **Job-specific training:** training, provided by the employer (or his agent) to the certificate holder in those aspects of NDT specific to the employer's products, NDT equipment, NDT procedures, and applicable codes, standards, specifications, and procedures, leading to the award of operating authorizations.
- 3.18 **Job task analysis:** the process of identifying the content of a job in terms of activities involved and attributes needed to perform the work and identifies major job requirements.
- 3.19 **Monitor:** person authorized by the certification body to supervise written examinations.
- 3.20 **Choice examination question:** wording of a question giving rise to five potential replies, only one of which is correct, the remaining four being incorrect or incomplete.
- 3.21 **NDT instruction:** written description of the precise steps to be followed in testing to an established NDT procedure, standard, code, or specification.
- 3.22 **NDT method:** discipline applying a physical principle in NDT.
- 3.23 **NDT procedure:** written description of all essential parameters and precautions to be applied when nondestructively testing products in accordance with standards, codes, and/or specifications.
- 3.24 **NDT technique:** specific way of utilizing an NDT method. Example: immersion ultrasonic testing.
- 3.25 **NDT training:** process of instruction in theory and practice in the NDT method in which certification is sought, which takes the form of training courses to an approved syllabus as approved by the certification body.
- 3.26 **Operating authorization:** written statement issued by the employer, based upon the scope of certification, authorizing the individual to carry out defined tasks.
Note: Such authorization can be dependent on the provision of job-specific training.
- 3.27 **Practical training:** instruction in which the personnel being trained are instructed in the hands-on setup and use of equipment in the applicable test method.
- 3.28 **Psychometric process:** the science and technology of measurement used to develop and analyze assessments of cognitive and skill ability.
- 3.29 **Proctor:** Level III (certified in method) authorized by the certification body to supervise written and/or practical examinations.
- 3.30 **Qualification:** demonstration of physical attributes, knowledge, skill, training, and experience required to properly perform NDT tasks.
- 3.31 **Recertification:** procedure for revalidation of a certificate by examination or by otherwise satisfying the certification body that the published criteria for recertification are satisfied.
- 3.32 **Renewal:** procedure for revalidation of a certification without examination at any time up to five (5) years after success in an initial, supplementary, or recertification examination.
- 3.33 **Scorable questions:** questions used to judge (score) a candidate's knowledge of the materials being tested. Non-scorable questions are used in the psychometric process to validate new or revised questions.
- 3.34 **Sector:** particular section of industry or technology where specialized NDT practices are used, requiring specific product related skill, knowledge, equipment, or training
Note: A sector can be interpreted to mean a product (welded products, castings) or an industry (aerospace, in-service training). See Appendix A.
- 3.35 **Specification:** document stating requirements.
- 3.36 **Specimen, test:** sample used in practical examinations, possibly including radiographs and/or data sets, which is representative of products typically tested in the applicable sector.
Note: A specimen can include more than one area or volume to be tested.
- 3.37 **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 is graded.
- 3.38 **Significant interruption:** absence or a change of activity which prevents the certified individual from practicing the duties corresponding to his or her level in the method and the industrial sector(s) for which he or she is certified, for either a continuous period in excess of one (1) year or two (2) or more periods for a total time exceeding two (2) years.
Note: Legal holidays or periods of sickness or courses of less than thirty (30) days are not taken into account when calculating the interruption.
- 3.39 **Supervision, direct:** line-of-sight supervision during the inspection process by a person qualified to Level II or Level III in the applicable test method.

- 3.40 **Supervision, general:** the act of directing the application of NDT test methods performed by other NDT personnel, which includes the control of actions involved in the preparation of the test, performance of the test, and reporting of the results.
- 3.41 **Supervision, qualified:** supervision of candidates gaining experience by NDT personnel certified in the same method under supervision or by non-certified personnel who, in the opinion of the certification body, possess the knowledge, skill, training, and experience required to properly perform such supervision.
- 3.42 **Trainee:** individual who works under the supervision of certified personnel but who does not conduct any tests independently, does not interpret test results, and does not write reports on test results.
- 3.43 **Validation:** act of demonstrating that a verified procedure works in practice and fulfills its intended function, normally achieved by actual witnessing, demonstration, field, or laboratory tests or selected trials.

National Explanatory Note:

Additional definitions have been added to this document: 3.7, Cut score; 3.18, Job task analysis; 3.27, Practical training; 3.28, Psychometric process; and 3.39, Supervision, direct. *ISO 9712* definition 3.32, Supervision, has been renumbered 3.40 and renamed Supervision, general. Definitions for Monitor (3.19) and Proctor (3.29) have also been added.

4.0 Methods and abbreviated terms

- 4.1 For the purposes of this American National Standard, the abbreviated terms listed in Table 1 are used to identify NDT methods.

Table 1. Methods and abbreviated terms

NDT method	Abbreviated terms
Acoustic emission testing	AE
Electromagnetic testing	ET
Ground penetrating radar	GPR
Guided wave testing	GW
Laser testing methods	LTM
Leak testing	LT
Liquid penetrant testing	PT
Magnetic flux leakage	MFL
Magnetic particle testing	MT
Microwave testing	MWT
Neutron radiographic testing	NR
Radiographic testing	RT
Strain gauge testing	ST
Thermal/infrared testing	IR
Ultrasonic testing	UT
Vibration analysis	VA
Visual testing	VT

- 4.2 When other NDT test methods are added, they shall be given similar abbreviations based on commonly used national or international practices.

5.0 Responsibilities

5.1 General

- 5.1.1 The certification system, which shall be controlled and administered by a certification body (with the assistance, where necessary, of authorized qualification bodies) includes all procedures necessary to demonstrate the qualification of an individual to carry out tasks in a specific NDT method and product or industrial sector, leading to certification of competence.

5.2 Certification body

5.2.1 Fulfills the requirements of *ANSI/ISO/IEC 17024* and this American National Standard.

5.2.2 The certification body:

- 5.2.2.1 shall initiate, promote, maintain, and administer the certification scheme according to *ANSI/ISO/IEC 17024* and this American National Standard;
- 5.2.2.2 shall review, endorse, and verify publication of specifications for training courses that include the syllabi which embody the content of recognized documents, e.g., *CP-105*^[1], *ISO/TR 25107*^[3], or equivalent;
- 5.2.2.3 may delegate, under its direct responsibility, the detailed administration of qualification to authorized qualification bodies, to which it shall issue specifications and/or procedures covering facilities, personnel, calibration, and control of NDT equipment, examination materials, specimens, conduct of examinations, examination grading, records, etc.;
- 5.2.2.4 shall conduct an initial audit and subsequent periodic surveillance audits of the authorized qualification body(ies) to ensure their conformity to the specifications;
- 5.2.2.5 shall monitor, in accordance with a documented procedure, all delegated functions;
- 5.2.2.6 shall approve properly staffed and equipped examination centers, which it shall monitor on a periodic basis;
- 5.2.2.7 shall establish an appropriate system for the maintenance of records, which shall be retained for at least shall one (1) certification cycle (ten [10] years);
- 5.2.2.8 shall be responsible for the issue of all certificates;
- 5.2.2.9 shall be responsible for the definition of sectors (see Appendix A);
- 5.2.2.10 shall be responsible for ensuring the security of all examination materials (specimens, master reports, shall question banks, examination papers, etc.) and shall ensure that specimens are not in use for training purposes;
- 5.2.2.11 shall require all candidates and certificate holders to give a signed or stamped undertaking to abide by a code of ethics, which it shall develop for the purpose and publish; and
- 5.2.2.12 shall designate (and/or delegate to AQB or AEC) authorized proctors or monitors to supervise the written examination process. Proctors may also supervise the practical examination process. Their duties shall include: verify examinees' identification, read examination ground rule/instructions, distribute sealed examination packages or allow access to computer-based examinations, establish examination start and finish times, ensure no additional materials are accessible during the examination process, ensure no interaction occurs during the examination period, announce time milestones, announce when examination time expires, instruct examinees to re-seal their packages, collect sealed packages, and secure packages in appropriate storage until the examination grading process begins. They shall not be allowed to provide any assistance in the interpretation of examination questions or associated materials contained in the examination package. The monitor or proctor role is to ensure the examination process as defined by the certification body is followed by everyone involved in the examination(s) session assigned.

5.2.3 A certification body shall be composed of interested parties (e.g., NDT users, NDT service suppliers, societies, and government agencies) as defined in its implementing procedures. The body shall be responsible for developing and maintaining the technical specifications for the certification process. Its members shall be qualified for the tasks by an appropriate combination of NDT certification and/or experience. The certification body shall ensure qualification examinations validate the knowledge and skills identified in paragraphs 2.1.2, 2.1.3, and/or 2.1.4.

National Explanatory Note:

The participant makeup of the certification body adopted in this American National Standard is the same used by ANSI for Standards Developing Organizations. The no-majority blend of users, suppliers, and manufacturers has proven satisfactory in ensuring that no single influence will predominate in the selection of certification activities.

The certification body has the option to use a monitor or proctor or to supervise the written examination process, as defined in paragraph 5.2.1.12. Proctors may also supervise the practical examination process.

5.3 Authorized qualification body (AQB)

5.3.1 Where established, an AQB shall:

- 5.3.1.1 work under the control of and apply the specifications issued by the certification body;
- 5.3.1.2 be independent of any single predominant interest;
- 5.3.1.3 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;
- 5.3.1.4 apply a documented quality management system approved by the certification body;
- 5.3.1.5 have the resources and expertise necessary to establish, monitor, and control examinations centers, including examinations and the calibration and control of the equipment;
- 5.3.1.6 prepare, supervise, and administer examinations under the responsibility of an examiner authorized by the certification body;
Note: A designated trained monitor or proctor may be used to administer prepared written examinations in accordance with established guidelines approved by the certification body.
- 5.3.1.7 maintain appropriate qualification and examination records according to the requirements of the certification body.

5.3.2 If there are no AQBs, the certification body shall fulfill the requirements of the qualification body.

5.4 Examination center

5.4.1 Authorized examination centers (AECs) may be established or approved by the certification body or through AQBs and shall, at a minimum:

- 5.4.1.1 work under the control of the certification body or AQB;
- 5.4.1.2 apply a documented quality procedure approved by the certification body;
- 5.4.1.3 have the resources needed to administer examinations, including the calibration and control of equipment;
- 5.4.1.4 have adequate qualified staff, premises, and equipment to ensure satisfactory qualification examinations for the levels, methods, and sectors concerned;
- 5.4.1.5 prepare and conduct examinations under the responsibility of an examiner authorized by the certification body (or using designated/trained examination monitors or proctors), using only those examination questionnaires and specimens established or approved by the certification body for that purpose;
- 5.4.1.6 use only specimens prepared or approved by the certification body or qualification body for the practical examinations conducted at that center (when more than one examination center exists, each shall have examination specimens of comparable test difficulty containing similar discontinuities); under no circumstances shall specimens be used for training purposes; and
- 5.4.1.7 maintain appropriate qualification and examination records per the requirements of the certification body.

5.4.2 An examination center may be situated at an employer's premises. However, in this case, the certification body shall require additional controls to preserve impartiality and examinations shall be conducted only in the presence of, and under the control of, an authorized representative of the certification or AQB. In no case shall an examination center's employee (monitor, proctor, or examiner) administer examinations to another employee of the examination center.

5.5 Employers

- 5.5.1 The employer shall introduce the candidate to the certification body or the AQB and document the validity of the personal information provided. This information shall include the declaration of education, training and experience, and visual acuity needed to determine the eligibility of the candidate. If the candidate is unemployed or self-employed, the declaration of education, training, and experience shall be attested to by at least one (1) independent party acceptable to the certification body.
- 5.5.2 Neither the employer nor his or her staff shall be directly involved in the qualification examination.
- 5.5.3 In respect to certified personnel under their control, the employer shall be responsible for:
 - 5.5.3.1 all that concerns the authorization to operate, e.g., providing job-specific training (if necessary);
 - 5.5.3.2 issuing the written authorization to operate;