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Neporušitveno preskušanje - Kvalificiranje in certificiranje osebja za neporušitvene preiskave - Splošna načela

Non destructive testing - Qualification and certification of NDT personnel - General principles

Zerstörungsfreie Prüfung - Qualifizierung und Zertifizierung von Personal der zerstörungsfreien Prüfung - Allgemeine Grundlagen

Essais non destructifs - Qualification et certification du personnel END - Principes généraux

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EUROPEAN STANDARD

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English Version

Non-destructive testing - Qualification and certification of NDT personnel - General principles

Essais non destructifs - Qualification et certification du personnel END - Principes généraux

Zerstörungsfreie Prüfung - Qualifizierung und Zertifizierung von Personal der zerstörungsfreien Prüfung - Allgemeine Grundlagen

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Foreword

This document (EN 473:2008) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2008, and conflicting national standards shall be withdrawn at the latest by December 2008.

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

This document will supersede EN 473:2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard establishes principles for the qualification and certification of personnel who perform industrial non-destructive testing (NDT). The term ‘industrial’ implies the exclusion of applications in the field of medicine.

The system described in this European 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 European, international or national standards, or the new NDT method or technique has been demonstrated as effective through a formal qualification carried out in accordance with CEN/TR 14748.

NOTE 1 Wherever gender specific words such as "his", "her", "he" or "she" appear in this standard, the other gender is also applicable.

When certification of NDT personnel is defined in product standards, regulations, codes or specifications, it is recommended to certify the personnel in accordance with this European Standard.

NOTE 2 The methodology for “Approval” of NDT personnel is not specified in Directive 97/23/EC [4] and it was agreed that guidance was required in order to ensure a consistent approach to the application of the Directive and the implementation of Working Group Pressure guideline 6/13 [5] by Recognised Third Party Organisations (RTPO). As a result a Code of Practice was developed as Technical Report CEN/TR 15589 [3].

The certification covers proficiency in one or more of the following methods:

a) acoustic emission testing;

b) eddy current testing;

c) leak testing (hydraulic pressure tests excluded);

d) magnetic particle testing;

e) penetrant testing;

f) radiographic testing;

g) ultrasonic testing;

h) visual testing (direct unaided visual tests and visual tests carried out during the application of another NDT method are excluded).

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.

CEN/TR 14748:2004, *Non-destructive testing – Methodology for qualification of non-destructive tests*

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

EN ISO/IEC 17024:2003, *Conformity assessment – General requirements for bodies operating certification of persons (ISO/IEC 17024:2003)*

3 Terms and definitions

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

3.1
authorized qualifying body
body, independent of the employer, authorized by the certification body to prepare and administer qualification examinations

3.2
basic examination
written examination, at level 3, which demonstrates the candidate's knowledge of the materials science and process technology and types of discontinuities, the qualification and certification system according to this European Standard, and the basic principles of NDT methods as required for level 2

NOTE For an explanation of the three levels of qualification, see Subclause 5.3.

3.3
candidate
individual seeking qualification and certification who gains experience under the supervision of suitably qualified personnel

3.4
certificate
document issued by the certification body under the provisions of this European Standard, indicating that the named person has demonstrated the competence(s) 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 the requirements of this European Standard and which fulfils the requirements of EN ISO/IEC 17024

3.7
employer
organization for which the candidate works on a regular basis; an employer can also be a candidate at the same time

3.8
examination centre
centre approved by the certification body where qualification examinations will be carried out

3.9
examiner
person certified to level 3 in the method and product or industrial sector for which he is authorized by the certification body to conduct, supervise and grade the qualification examination

3.10
general examination
written examination, at level 1 or 2, concerned with the principles of an NDT method

3.11
industrial experience
experience, acceptable to the certification body, gained under qualified supervision, in the application of the NDT method in the sector concerned, needed to acquire the skill and knowledge to fulfil the provisions of qualification

3.12
invigilator
person authorized by the certification body to supervise examinations

3.13
job-specific training
training, provided by the employer (or his agent) to the certificate holder in those aspects of non-destructive testing specific to the employer's products, NDT equipment, NDT procedures, and applicable codes, standards, specifications and procedures, leading to the award of operating authorizations

3.14
main-method examination
written examination, at level 3, 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

3.15
multiple-choice examination question
wording of a question giving rise to four potential replies, only one of which is correct, the remaining three being incorrect or incomplete

3.16
NDT instruction
written description of the precise steps to be followed in testing to an established standard, code, specification or NDT procedure

3.17
NDT method
discipline applying a physical principle in non-destructive testing

EXAMPLE Ultrasonic testing.

3.18
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)

3.19
NDT technique
specific way of utilizing an NDT method

EXAMPLE Immersion ultrasonic testing.

3.20
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 a syllabus approved by the certification body

3.21
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.

3.22
practical examination
assessment of practical skills, in which the candidate demonstrates familiarity with, and the ability to perform,

the test

3.23
qualification
demonstration of physical attributes, knowledge, skill, training and experience required to properly perform NDT tasks

3.24
qualification examination
examination, administered by the certification body or the authorized qualifying body, which assesses the general, specific and practical knowledge and the skill of the candidate

3.25
qualified supervision
supervision of candidates gaining experience by NDT personnel certified to this European Standard 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

3.26
sector
particular section of industry or technology where specialized NDT practices are used, requiring specific product-related knowledge, skill, equipment or training

NOTE A sector can be interpreted to mean a product (welded products, castings) or an industry (aerospace, in-service testing). See Annex A.

3.27
significant interruption
absence or change of activity which prevents the certified individual from practising the duties corresponding to the level in the method and the sector(s) within the certified scope, for either a continuous period in excess of one year or 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.

3.28
specific examination
written examination, at level 1 or 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

3.29
specification
document stating requirements

3.30
specimen
sample used in practical examinations, possibly including radiographs and data sets, which is representative of products typically tested in the applicable sector

NOTE It can include more than one area or volume to be tested.

3.31
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

3.32
supervision
act of directing the application of NDT 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

3.33
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 Methods and symbols

For the purposes of this European Standard, the following symbols are used to identify the NDT methods.

Table 1 – Methods and symbols

NDT Method	Symbol
Acoustic emission testing	AT
Eddy current testing	ET
Leak testing	LT
Magnetic particle testing	MT
Penetrant testing	PT
Radiographic testing	RT
Ultrasonic testing	UT
Visual testing	VT

5 General principles

5.1 General

The certification system, which shall be controlled and administered by a certification body (with the assistance, where necessary, of authorized qualifying 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.

5.1.1 The certification body shall fulfil the requirements of EN ISO/IEC 17024.

5.1.2 Where established, the authorised qualifying body shall:

a) work under the control of the certification body;

b) have the resources needed to administer examinations at examination centres, including the calibration and control of equipment;

c) prepare and supervise examinations under the responsibility of an examiner authorised by the certification body;

d) be independent of any single predominant interest;

e) apply a documented quality management system approved by the certification body;

f) have the resources and expertise necessary to establish examination centres;

g) ensure that test specimens are not in use for training purposes.

When an authorised qualifying body covers a sector, the authorised qualifying body shall be comprised of more than one company active in the sector concerned.

If there are no authorised qualifying bodies, the certification body shall fulfil the requirements of the qualifying body.

5.1.3 The examination centre shall:

a) work under the control of the certification body or authorised qualifying body;

b) apply a documented quality procedure approved by the certification body;

c) have the resources needed to administer examinations, including the calibration and control of equipment;

d) prepare and conduct examinations under responsibility of an examiner authorised by the certification body;

e) ensure that test specimens are not in use for training purposes.

5.2 Duties and responsibilities

5.2.1 Certification body

The certification body:

a) shall initiate, promote, maintain and administer the certification scheme according to EN ISO/IEC 17024 and this European Standard;

b) may delegate, under its direct responsibility, the detailed administration of qualification to authorised qualifying bodies, to which it should issue specifications and/or quality procedures covering facilities, personnel, calibration and control of NDT equipment, examination materials, specimens, conduct of examinations, examination grading, records, etc;

c) shall approve properly staffed and equipped examination centres which it shall monitor on a periodic basis;

d) shall establish an appropriate system for the maintenance of records, which shall be retained for at least one certification cycle (10 years);

e) shall be responsible for the issue of all certificates;

f) shall be responsible for the definition of sectors (see Annex A);

g) shall ensure that test specimens are not in use for training purposes;

h) shall monitor, in accordance with a documented procedure, all delegated functions;

i) shall require all candidates and certificate holders to give a signed undertaking to abide by a code of ethics which it shall develop for the purpose and publish.

5.2.2 Authorised qualifying bodies

5.2.2.1 Where established, authorised qualifying bodies shall:

a) work under the control of and, where applicable, apply the specifications issued by the certification body;

b) work within a documented quality management system approved by the certification body;

c) have the resources needed to prepare, supervise and administer examinations under the responsibility of an examiner authorised by the certification body at examination centres established for the purpose;

d) maintain appropriate qualification and examination records according to the requirements of the certification body.

5.2.2.2 If there are no authorised qualifying bodies, the certification body shall fulfil the requirements of the qualifying body.

5.2.3 Examination centre

5.2.3.1 An examination centre can be situated at an employer's premises. In this case, examinations shall be conducted only in the presence of, and under the control of, an authorised representative of the certification body.

5.2.3.2 When more than one examination centre exists, each shall have test specimens of comparable test difficulty containing similar discontinuities. Under no circumstances shall test specimens be used for training purposes.

5.2.3.3 Examination centres shall apply a documented quality procedure approved by the certification body, and:

a) work under the control of the certification body or authorised qualifying body, and have adequate qualified staff, premises and equipment to ensure satisfactory qualification examinations for the levels, methods, and sectors concerned;

b) prepare and conduct examinations under responsibility of an examiner authorised by the certification body, using only those examination questionnaires and specimens established or approved by the certification body for that purpose;

c) have the resources needed to administer examinations, including the calibration and control of equipment;

d) maintain appropriate qualification and examination records according to the requirements of the certification body.

5.2.4 Employer

5.2.4.1 The employer shall introduce the candidate to the certification body or the authorised qualifying body and document the validity of the personal information provided, including the declaration of education, training and experience required for the eligibility of the candidate, but shall not be directly involved in the qualification examination.

5.2.4.2 With regard to certificated persons, the employer shall be responsible for:

a) providing job-specific training, if necessary;

b) issuing the written operating authorisation;

c) verifying annually the NDT employee's visual acuity in accordance with 6.4, and

d) verifying continuity in the application of the NDT method without significant interruption.

It is recommended that these responsibilities be described in a documented procedure.

5.2.4.3 A self employed individual shall assume all responsibilities ascribed to the employer.

5.2.5 Candidate

Candidates, either employed or unemployed shall:

a) provide documentary evidence of satisfactory completion of a course of training approved by the Certification Body;

b) provide verifiable documentary evidence that the required experience has been gained under qualified supervision;

c) provide documentary evidence of vision satisfying the requirements of 6.4;

d) undertake to abide by a code of ethics published by the certification body for candidates and certificates holders.