

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

The European Standard EN 473:2000, with the incorporation of amendment A1:2005, has the status of a British Standard

ICS 03.100.30; 19.100

National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 32, an inside back cover and a back cover.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 15 December 2000

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Amendments issued since publication

Amd. No.	Date	Comments
16035	6 March 2006	See national foreword

ISBN 0 580 36795 9

English version

**Non-destructive testing - Qualification and certification of NDT
personnel - General principles**
(includes amendment A1:2005)

Essais non-destructifs - Qualification et certification du
personnel END - Principes généraux
(inclut l'amendement A1:2005)

Zerstörungsfreie Prüfung - Qualifizierung und Zertifizierung
von Personal der zerstörungsfreien Prüfung - Allgemeine
Grundlagen
(enthält Änderung A1:2005)

This European Standard was approved by CEN on 17 September 2000; amendment A1:2005 was approved by CEN on 29 August 2005.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by April 2001, and conflicting national standards shall be withdrawn at the latest by April 2001.

This European Standard supersedes EN 473:1993 and CR 12459:1996.

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.

The annexes A and D are informative; the annexes B and C are normative.

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

Foreword to amendment A1

This European Standard (EN 473:2000/A1:2005) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing”, the secretariat of which is held by AFNOR.

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1 Scope

This European Standard establishes a system 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.

NOTE 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 EN 473.

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).

The system described in this standard can also apply to other NDT methods provided an approved programme of certification exists.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 45013:1989, *General criteria for certification bodies operating certification of personnel*.

3 Terms and definitions

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

3.1

qualification

evidence of training, professional knowledge, skill and experience as well as physical fitness to enable NDT personnel to properly perform NDT tasks

3.2

certification

procedure used to demonstrate the qualification of NDT personnel in a method, level and sector, and leading to the issue of a certificate. Certification does not include operating authorization

3.3

certification body

body that administers procedures for certification of NDT personnel according to the requirements of this standard and fulfils the requirements of EN 45013

3.4

authorized qualifying body

body, independent of any single predominant interest, authorized by the certification body to prepare and administer examinations to qualify NDT personnel

NOTE The authorized qualifying body constitutes one of the elements of the system governed by the certification body.

3.5

examination centre

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

NOTE The examination centre constitutes one of the elements of the system governed by the certification body.

3.6

examiner

a person certificated to level 3 in the method he is to examine and authorized by the certification body to conduct, supervise and grade NDT qualification examinations

3.7

certificate

document issued under the rules of the certification system defined in this standard indicating that adequate confidence is provided that the named person is competent to perform the NDT tasks defined on the certificate

3.8

NDT candidate

individual seeking qualification and certification and who works under the supervision of suitably qualified personnel while gaining appropriate experience for qualification (see clause 3.24)

3.9

employer

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

3.10

operating authorization

written statement issued by the employer based on the individual's competence as specified by the certificate. In addition to the certification, amongst other factors, the job-specific knowledge, skill and physical ability should be assessed for the specific task

3.11

NDT method

discipline applying a physical principle in non-destructive testing (for example: ultrasonic testing)

3.12

NDT technique

specific way of utilizing an NDT method (for example: ultrasonic immersion technique)

3.13

NDT procedure

written description of all essential parameters and precautions to be observed when applying an NDT technique to a specific test, following an established standard, code or specification. An NDT procedure can involve the application of more than one NDT method or technique

3.14

NDT instruction

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

3.15

specification

document stating requirements
[ISO 8402:1994]

3.16

sector

particular section of industry or technology where specialized NDT practices are used requiring specific product related knowledge, skill, equipment or training. A sector can be interpreted to mean a product (welded products, castings...) or an industry (aerospace, in-service testing...) (see annex A)

3.17

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

3.18

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

3.19

general examination

examination which is concerned with the principles of an NDT method

3.20

specific examinations

examination which is concerned with testing techniques applied in a particular sector, knowledge of the product being tested, and of standards, codes, specifications and acceptance criteria

3.21

(a) practical examination (levels 1 and 2)

examination of practical skills, in which the candidate demonstrates familiarity with, and the ability to operate the test equipment

3.21

(b) practical examination (level 3)

examination in which the level 3 candidate demonstrates the ability to draft one or more NDT procedures

3.22

basic examination

examination, at level 3, which demonstrates the candidate's knowledge of the materials science and technology in relation to the field of activity of the candidate, of this qualification and certification system, and of the theoretical principles at level 2

3.23

main NDT method examination

examination, at level 3, in which the candidate demonstrates knowledge of the general and specific theory of the main NDT method, and the ability to write an NDT procedure

3.24

industrial NDT experience

experience in the applicable NDT method and field of application concerned, which leads to the required skill and knowledge

3.25

significant interruption

absence or change of activity which prevents the certificated individual from practising the duties corresponding to his level in the method and the sector(s) for which he is certified, for:

- a) a continuous period in excess of 365 days; or
- b) two or more periods for a total time exceeding two fifths of the total period of validity of the certificate

NOTE Legal holidays, periods of sickness or courses of less than thirty days are not taken into account when calculating the interruption.

3.26

test specimen

sample used in practical examinations. Samples should be representative of products typically tested in the applicable sector and can include more than one area or volume to be tested

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 Requirements concerning the certification body, the authorized qualifying body and the examination centre.

5.1.1 The certification body shall fulfil the requirements of EN 45013.

5.1.2 Where established, the authorized 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 authorized 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 authorized qualifying body covers a sector, the authorized qualifying body shall be comprised of more than one company active in the sector concerned.

If there are no authorized 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 authorized 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 authorized 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 this standard;
- b) may delegate, under its direct responsibility, the detailed administration of the qualification procedure to authorized qualifying bodies, which could represent sectors;
- 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, but may delegate the preparation of level 1 and level 2 certificates to authorized qualifying bodies;
- f) shall be responsible for the definition of sectors (see annex A);
- g) shall monitor, in accordance with a documented procedure, all delegated functions.

5.2.2 Authorized qualifying bodies

Where established, the authorized qualifying body shall:

- a) apply the documented quality procedure of the certification body;
- b) establish and monitor examination centres;
- c) prepare and supervise the qualification examinations;
- d) maintain appropriate qualification and examination records according to the requirements of the certification body.

5.2.3 Examination centre

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 authorized representative of the certification body.

Any examination centre shall:

- a) have adequate qualified staff, premises and equipment to ensure satisfactory qualification examinations for the levels, methods and sectors concerned;
- b) use only those documents and examination questionnaires established or approved by the certification body;
- c) use only test specimens prepared or approved by the certification body for the practical examinations conducted at that centre;
- d) maintain appropriate qualification and examination records according to the requirements of the certification body.

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.

5.2.4 Employer

The employer shall introduce the candidate to the certification body or the authorized 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.

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

- a) issuing the operating authorization;
- b) the verification of the visual acuity in accordance with 6.3; and
- c) verification of continuity in the application of the NDT method without significant interruption.

A self-employed individual shall assume all responsibilities described for the employer.

5.2.5 Candidate

Candidates may be self-employed or unemployed so long as they provide documentary evidence that experience has been gained under the supervision of certificated personnel.

5.3 Levels of qualification

An individual certificated in accordance with this standard shall be classified in one or more of the three following levels, depending upon his respective qualification.

5.3.1 Level 1

An individual certificated to level 1 has demonstrated competence to carry out NDT according to written instructions and under the supervision of level 2 or level 3 personnel. Within the scope of the competence defined on the certificate, level 1 personnel may be authorized to:

- a) set up NDT equipment;
- b) perform the tests;