SLOVENSKI STANDARD
SIST EN 4179:2010

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Aeronavtika - Usposobljenost in odobritev osebja za neporušitveno preskušanje

Aerospace series - Qualification and approval of personnel for non-destructive testing

Luft- und Raumfahrt - Qualifikation und Zulassung des Personals für zerstörungsfreie Prüfungen

Série aérospatiale - Qualification et agrément du personnel pour les contrôles non destructifs

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Aerospace series - Qualification and approval of personnel for non-destructive testing

Série aérospatiale - Qualification et agrément du personnel pour les contrôles non destructifs

Luft- und Raumfahrt - Qualifikation und Zulassung des Personals für zerstörungsfreie Prüfungen

This European Standard was approved by CEN on 3 October 2009.

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Foreword

This document (EN 4179:2009) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.

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 supersedes EN 4179:2005.

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

1.1 Purpose

This European Standard establishes the minimum requirements for the qualification and certification of personnel performing non-destructive testing (NDT), non-destructive inspection (NDI), or non-destructive evaluation (NDE) in the aerospace manufacturing, service, maintenance and overhaul industries. For the purposes of this standard, the term NDT is used and is considered equivalent to NDI and NDE.

In Europe, the term “approval” is used to denote a written statement by an employer that an individual has met specific requirements and has operating approval. Certification per EN ISO/IEC 17024 is not required by this standard unless specified by local or regulatory requirements. The term “certification” as defined in 3.1 is used throughout this standard as a substitute for the term “approval”. Except when otherwise specified in the written practice, certification in accordance with this standard includes operating approval.

1.2 Applicability

This standard applies to personnel using NDT methods to test and/or accept materials, products, components, assemblies or sub-assemblies. This standard also applies to personnel directly responsible for the technical adequacy of the NDT methods used, who write NDT procedures and/or work instructions, who audit NDT facilities, or who provide technical NDT support or training.

This standard does not apply to individuals who only have administrative or supervisory authority over NDT personnel or to research personnel developing NDT technology for subsequent implementation and approval by a certified Level 3. Personnel performing specialized inspections using certain direct readout instruments as determined by a Level 3 certified in the method, do not require qualification or certification to this standard.

1.3 Implementation

This standard addresses the use of a National Aerospace NDT Board (NANDTB). NANTDBs are only used as specified herein and it is not mandatory to have such a board for compliance with this document. Personnel certified to previous revisions of NAS 410 or EN 4179 need not recertify to the requirements of this standard until their current certification expires.

1.4 Common methods

This standard contains detailed requirements for the following common NDT methods:

Penetrant testing	(PT)
Magnetic testing	(MT)
Eddy current testing	(ET)
Ultrasonic testing	(UT)
Radiographic testing	(RT)
Thermographic testing	(TT)
Shearographic testing	(ST)

1.5 Other methods

When invoked by engineering, quality, cognizant engineering organization or prime contractor requirements, this standard applies to other current and emerging NDT methods used to determine the acceptability or suitability for intended service of a material, part, component, sub-assembly or assembly. Such methods may

include, but are not limited to, acoustic emission, neutron radiography, leak testing and holography. The requirements for personnel training, experience, and examination for these other methods should be established in accordance with 6.4 and documented by the employer.

2 Normative references

2.1 Standards

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.

EN 473, *Non-destructive testing — Qualification and certification of NDT personnel — General principles*

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

ISO 9712, *Non-Destructive Testing — Qualification and certification of personnel*

NAS 410, *Certification and Qualification of Non-destructive Test Personnel (current revision)*

2.2 Order of precedence

In the event of a conflict between the text of this document and the references cited herein, the requirements of this document take precedence. Nothing in this document supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 Terms and definitions

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

3.1
certification
written statement by an employer that an individual has met the applicable requirements of this standard

3.2
closed book examination
examination administered without access to any reference materials

3.3
cognizant engineering organization
engineering or NDT organization of the prime contractor or end user authorized to make NDT-related decisions and give NDT-related approvals

3.4
direct observation
observation where the observer is able to come to the immediate aid of the trainee and remains within a distance that permits uninterrupted, unaided visual and verbal contact with the trainee

3.5
direct readout instrument
instruments that physically display measurements in dimensional or electrical units (e.g. in, mm or % IACS, etc.) either as digital readout or an analog display, such as a scale/pointer configuration and do not require special skills or knowledge to set up the instrument and do not involve adjusting signal displays such as gates, delays, gain, or phase to obtain measurements

EXAMPLE Common direct readout instruments include basic ultrasonic thickness gauges without an oscilloscope display, and eddy current coating thickness gauges.

3.6
documented
condition of being recorded in written or electronic form

3.7
employer
government, prime contractor, sub-contractor, supplier, or outside agency employing or contracting the services of one or more individuals who perform NDT

NOTE Self-employed individuals are included in this definition.

3.8
evaluation
review following interpretation of the indications noted during an NDT inspection to determine whether the indications meet specified acceptance criteria or to determine the significance of the indication

3.9
examination
formal, controlled, documented testing conducted in accordance with a documented written practice to verify a candidate's visual capability, skill or knowledge of an NDT method

3.10
examiner
Level 3 certified to this standard and designated by the Responsible Level 3 or NANDTB to administer all or part of the qualification and certification process, excluding vision examinations, in the NDT method(s) in which the Examiner is certified

3.11
experience
actual performance of an NDT method conducted in the work environment resulting in the acquisition of knowledge and skill

NOTE This does not include formal classroom training, but may include laboratory and on-the-job training as defined by the employer's written practice.

3.12
formal training
organized and documented program of learning activities designed to impart the knowledge and skills necessary to be qualified to this standard

NOTE Formal training may be a mix of classroom, practical and programmed self-instruction as approved by the Responsible Level 3, Examiner or NANDTB.

3.13
general examination
written examination addressing the basic principles and theory of an NDT method

3.14
indication
response or evidence of a condition resulting from an NDT inspection that requires interpretation to determine its significance

3.15
instructor
individual designated or approved by the Responsible Level 3 or NANDTB to provide training for NDT personnel

3.16
interpretation
determination of whether indications are relevant or non-relevant

3.17
method
one of the disciplines of non-destructive testing (e.g. ultrasonic, radiography, etc.) within which different techniques may exist

3.18
national aerospace NDT board
NANDTB
independent national aerospace organization representing a nation's aerospace industry that is chartered by the participating prime contractors and recognized by the nation's regulatory agencies to provide or support NDT qualification, examination, and/or certification services in accordance with this standard

3.19
on-the-job training
training in the work environment to gain experience in learning instrument set-up, equipment operation, applying the process, and recognition, interpretation and evaluation of indications under appropriate technical guidance

3.20
open book examination
examination administered with access to specific reference material that is provided with or referenced in the examination

3.21
operating approval
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 employer having provided job or task-specific training.

3.22
outside agency
independent company or organization outside the employer who provides NDT services to implement the requirements of this standard, such as training and examination of NDT personnel

NOTE Consultants and self-employed individuals are included in this definition.

3.23
practical examination
examination to demonstrate an individual's ability to conduct an NDT method as used by the employer

NOTE Questions and answers need not be written, but a checklist must be used and observations and results must be documented.

3.24
prime contractor
organization having overall responsibility for design, control and delivery of a system, component or product

3.25
procedure
written general "how to" instruction for conducting a given process

NOTE Procedures are then used to develop work instructions, as defined in 3.32.

3.26
qualification
the skills, training, knowledge, examinations, experience and visual capability required for personnel to properly perform to a particular level

3.27
responsible level 3
Level 3 designated by the employer with the responsibility and authority to ensure that the requirements of this standard are met and to act on behalf of the employer

3.28
specific examination
written examination to determine an individual's understanding of operating procedures, codes, standards, product technology, test techniques, equipment and specifications for an NDT method as used by the employer

3.29
sub-contractor
organization responsible to the prime contractor for the manufacture or maintenance of aerospace products

NOTE For the purposes of this standard, this includes suppliers and processors.

3.30
technique
category within a method, for example, ultrasonic immersion testing or ultrasonic testing of composites

NOTE Specific techniques within a method are defined by the employer or NANDTB.

3.31
test sample
part or image containing one or more known and documented natural or artificial discontinuities, flaws or conditions used in the practical examination to demonstrate the candidate's proficiency in an NDT method

EXAMPLE Test samples can refer to actual hardware, fabricated test parts, or, when applicable, images of actual hardware such as radiographs.

3.32
work instruction
document detailing the NDT technique and testing parameters to be used for the inspection of a specific component, group of parts (e.g. “aluminium extrusions” or “steel brackets”), or assembly

NOTE These are sometimes referred to in the industry as “technique sheets” or “data cards”. Such work instructions are based on procedures defined in 3.25.

3.33
written
retrievable electronic or hard copy

3.34
written practice
procedure that describes an employer’s requirements and methodology for controlling and administering the NDT personnel qualification and certification process

4 General requirements

4.1 Written practice

The employer shall develop and maintain a written practice for the qualification and certification of their NDT personnel that meets the requirements of this standard. The written practice shall address the procedural

details necessary for the employer to implement an NDT qualification and certification program and shall include, either directly or by reference, the details of the NDT qualification and certification process, including:

a) the levels of qualification and certification used by the employer;

b) personnel duties and responsibilities;

c) training and experience requirements;

d) certification and recertification requirements;

e) records and record keeping requirements;

f) requirements for expiration, suspension, revocation and reinstatement of certifications.

The employer's written practice may reference this standard in whole or in part to meet these requirements provided the written practice includes the requirements in 4.1.1 through 4.1.6. The written practice shall be approved by the Responsible Level 3. The written practice and applicable NANDTB procedures shall be available for review by the employer's customer(s) and regulatory agencies.

4.1.1 Additional requirements

The written practice shall include any additional requirements levied by the employer or cognizant engineering organization, such as additional certification levels or increased experience requirements. This includes those areas of this standard that specify documentation in the employer's written practice for implementation.

4.1.2 NDT techniques

The written practice shall include the specific technique(s) within each method as defined by the employer or NANDTB.

4.1.3 Training outlines

The written practice shall reference or include the NDT training outlines used by the employer. The amount of time to be spent on each subject area shall be documented. If an outside agency or NANDTB is used to provide training, the Responsible Level 3 shall verify that the training meets the employer's requirements.

4.1.4 Examination practices

The written practice shall include the designation of the individual(s) or organization(s) responsible for administering examinations, the number of examination questions to be administered, and the specific visual acuity examination method to be used. If required, the use of a general examination for recertification shall be documented in the written practice.

4.1.5 Administration

The written practice shall include the identification of the individual(s) or organization(s) responsible for administering and maintaining all or part of the employer's certification program.

4.1.6 Records

The written practice shall include the designation of the individual(s) or organization(s) responsible for maintaining the qualification and certification records and where such records shall be kept.