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Aerospace Purposes

Interested committees:

Title: Draft BS EN 4179 - Aerospace series — Qualification and approval of personnel for non-destructive testing

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Introduction

This draft standard is based on European discussions in which the UK has taken an active part. Your comments on this draft are welcome and will assist in the preparation of the consequent British Standard. Comment is particularly welcome on national, legislative or similar deviations that may be necessary.

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Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	(7)
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/ Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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

Luft- und Raumfahrt — Qualifizierung und Zulassung des Personals für zerstörungsfreie Prüfungen

Série aérospatiale — Qualification et agrément du personnel pour les essais non destructifs

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European foreword

This document (prEN 4179:2019) has been prepared by Technical Committee CEN/TC ASD-STAN "Aerospace and Defence Industries Association of Europe - Standardization.

This document is currently submitted to the CEN Enquiry.

1 SCOPE

1.1 PURPOSE

This standard establishes the minimum requirements for the qualification and certification of personnel performing nondestructive testing (NDT), nondestructive inspection (NDI), or nondestructive evaluation (NDE) in the aerospace manufacturing, service, maintenance and overhaul industries. For the purposes of this standard, the term NDT will be used and will be 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. 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 approve 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.

1.2.1 IMPLEMENTATION

This standard addresses the use of a National Aerospace NDT Board (NANDTB). NANDTBs are only used as specified per Annex C and it is not mandatory to have such a board for compliance with this document. Personnel certified to previous revisions of NAS410 or EN 4179 need not recertify to the requirements of this standard until their current certification expires.

1.3 METHODS

1.3.1 Common Methods

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

Liquid penetrant	(PT)
Magnetic particle	(MT)
Thermography	(IRT)
Eddy current	(ET)
Ultrasonic	(UT)

Radiography (RT)

1.3.2 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, holography, and shearography. The requirements for personnel training, experience, and examination for these other methods shall be established in accordance with 6.4 and shall be documented by the employer.

2 REFERENCE DOCUMENTS**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 4179, Aerospace Series - Qualification and Approval of Personnel for Nondestructive Testing

ISO 18490, Nondestructive Testing – Evaluation of Vision Acuity of NDT Personnel

NAS410, Certification and Qualification of Nondestructive Test Personnel

ISO 9712, Non-Destructive Testing - Qualification and Certification of Personnel

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 DEFINITIONS

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

3.1**BASIC EXAMINATION**

An examination utilized to verify a Level 3 candidate's knowledge of other NDT methods used by the employer at a Level 2 skill level.

3.2**CERTIFICATION**

A written statement by an employer that an individual has met the applicable requirements of this standard.

3.3**CLOSED BOOK EXAMINATION**

An examination administered without access to any reference materials.

3.4

COGNIZANT ENGINEERING ORGANIZATION

The engineering or NDT organization of the prime contractor, OEM (Original Equipment Manufacturer), or end user authorized to make NDT-related decisions and give NDT-related approvals.

3.5

DIRECT OBSERVATION

When the observer is able to view the NDT process in a manner that permits uninterrupted, visual and verbal two-way contact with the trainee.

3.6

DIRECT READOUT INSTRUMENT

Instruments that physically display measurements in dimensional or electrical units (e.g. inches, millimeters or %IACS) 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. For example, common direct readout instruments include basic ultrasonic thickness gauges without an oscilloscope display, and eddy current coating thickness gauges.

3.7

DOCUMENTED

The condition of being recorded in written or electronic form.

3.8

EMPLOYER

An organization employing or contracting the services of one or more individuals who perform NDT. Self-employed individuals are included in this definition.

3.9

EVALUATION

A 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.

3.10

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.

3.11

EXAMINER

A Level 3 certified to this standard and designated by the Responsible Level 3 to administer all or part of the qualification process in the NDT method(s) in which the Examiner is certified.

3.12

EXPERIENCE

Actual performance of an NDT method conducted in the work environment resulting in the acquisition of knowledge and skill. This does not include formal classroom training, but may include laboratory and on-the-job training as defined by the employer's written practice.

3.13

FORMAL EDUCATION

Engineering or science studies at a technical school, college, or university.

3.14

FORMAL TRAINING

An organized and documented program of learning activities designed to impart the knowledge and skills necessary to be qualified to this standard. Formal training may be a mix of classroom, practical and programmed self-instruction as approved by the Responsible Level 3 or Examiner.

3.15

GENERAL EXAMINATION

A written examination addressing the basic principles and theory of an NDT method.

3.16

INDICATION

The response or evidence of a condition resulting from an NDT inspection that requires interpretation.

3.17

INSTRUCTOR

An individual designated or approved by the Responsible Level 3 or Examiner to provide training for NDT personnel.

3.18

INTERPRETATION

The determination of whether indications are relevant or non-relevant.

3.19

METHOD

One of the disciplines of nondestructive testing (e.g. ultrasonic, radiography, etc.) within which different techniques may exist.

3.20

NATIONAL AEROSPACE NDT BOARD (NANDTB)

An independent 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 and/or examination services in accordance with Annex C of this standard.

3.21

NON-FILM RADIOGRAPHY

Radiographic imaging that does not use a film based recording medium. Non-Film radiography includes, but may not be limited to, Computed Radiography, Digital Radiography, Radioscopy, and Computed Tomography.

3.22

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.

3.23

OPEN BOOK EXAMINATION

An examination administered with access to specific reference material that is provided with or referenced in the examination.

3.24

OPERATING APPROVAL

Written statement issued by the employer, based upon the scope of certification, authorizing the individual to carry out defined tasks. Such authorization can be dependent on the employer having provided job or task-specific training.

3.25

OUTSIDE AGENCY

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

3.26

PRACTICAL EXAMINATION

An examination to demonstrate an individual's ability to conduct an NDT method as used by the employer. Questions and answers need not be written, but a checklist must be used and observations and results must be documented.

3.27

PRIME CONTRACTOR

An organization having overall responsibility for design, control and delivery of a system, component or product.

3.28

PROCEDURE

A written general "how to" instruction for conducting a given process. Procedures are then used to develop work instructions, as defined in 3.35.

3.29

QUALIFICATION

The skills, training, knowledge, examinations, experience and visual capability required for personnel to properly perform to a particular level.

3.30

RESPONSIBLE LEVEL 3

The 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.

3.31

SPECIFIC EXAMINATION

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

3.32

SUB-CONTRACTOR

An organization responsible to the prime contractor for the manufacture or maintenance of aerospace products. For the purposes of this standard, this includes suppliers and processors.