



NANDTB-CN 认证专用资料

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国防科技工业无损检测人员资格鉴定与认证委员会

Qualification and Certification Committee for NDT Personnel of Defense Indust

航空航天无损检测人员资格鉴定与认证

CERTIFICATION & QUALIFICATION OF NONDESTRUCTIVE TEST AEROSPACE PERSONNEL

考试专用版

Examination special edition

航空航天无损检测认证部

National Aerospace NDT Board of China

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# 前言

## Introduction

本文件内容等同于美宇航标准 NAS 410, Rev4, 2014.12.19 和欧盟标准 EN 4179, Edition5.2014E。  
This Revised Document is Equivalent in Technical Content to: NAS410,Rev4,2014 and EN4179, Edition5,2014.

本文件国家航空航天无损检测认证部 (NANDTB), 是指国防科技工业无损检测人员资格鉴定与认证委员会设立的航空航天无损检测认证部 (National Aero NDT Board-China, 英文缩写: NANDTB-CN) 按照与 NAS410/EN4179 及 DiNDT-P15S01 的要求, 开展资格鉴定活动。

This document addresses the use of a National Aerospace NDT Board (NANDTB). National Aerospace Nondestructive Testing Board of China (NANDTB-CN) established by DiNDT is used as specified and it is mandatory to compliance with requirements of the standard NAS410/EN4179 and DiNDT-P15S01 in personnel qualification acts.

国防科技工业无损检测人员资格鉴定与认证委员会秘书处 (DiNDT) 作为认证机构, 按照本文件要求开展资格鉴定与认证工作, 航空航天无损检测认证部全体成员对本文件进行表决, 并对资格鉴定过程的符合性进行监督。

DiNDT as the qualification and certification body shall qualify and certify NDT personnel in accordance the requirements of with this document. NANDTB-CN shall vote for this document and maintain oversight to conformance of the DiNDT qualification

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# 航空航天无损检测人员资格鉴定与认证

Qualification and Certification of National Aerospace NDT personnel

## 1 范围 SCOPE

### 1.1 目的

本标准规定了从事航空航天产品无损检测（包括：无损探伤、无损检查、无损检验和无损评价）人员的资格鉴定与认证的最低要求。这些要求适用于从事航空航天制造、服务、维护和翻修的无损检测人员。

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.

注：在欧洲，术语“批准”是用来表示由雇主以书面形式声明某个人达到要求并获得操作授权。当地方或法律要求有规定时，在本标准中要求按照 EN ISO/IEC 17024 认证。3.1 中定义的术语“认证”一词在整个标准中作为“批准”替代使用。除非另有书面规定，按照本标准进行的认证，将包括操作授权。

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/CEI 17024 is required by this standard when 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 适用性

本标准适用于使用无损检测方法检测和/或验收材料、产品、零部件、组件和分组件的人员，也适用于对所有 NDT 方法的技术充分性直接负责的人员，这些人员包括批准无损检测工艺流程及工艺卡的人员，审核无损检测机构的人员，或提供无损检测技术支持或培训的人员。

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.

本标准不适用于仅对无损检测人员进行监督和管理的人员，也不适用于无损检测技术研究开发人员，即使此技术在后续实施时需要得到 3 级人员批准。凡使用直读式仪器进行特定检验的人员，经该方法 3 级人员批准后不需要按本标准的要求进行资格鉴定与认证。

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 实施

本标准规定了认证部的使用。认证部只是作为规定而不是强制性要求来满足本标准。按照之前版次 NAS410 或 EN4179 要求认证的人员，不需要按本标准的要求进行更新认证，直到其所持有的证书到期。

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 NAS410 or EN 4179 need not recertify to the requirements of this standard until their current certification expires.

### 1.3 常用方法

本标准包括如下常用无损检测方法的详细要求:

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

渗透检测	Liquid Penetrant (PT)
磁粉检测	Magnetic Particle (MT)
红外热像检测	Thermography (IRT)
错位散斑检测	Shearography (ST)
涡流检测	Eddy Current (ET)
超声检测	Ultrasonic (UT)
射线检测	Radiography (RT)

#### 1.3.1 其它方法

当工程或质量部门、认可的工程组织或主承包商提出要求时, 本标准可适用于其它流行和新兴的无损检测方法, 来验收和判定使用材料、零件、部件、分组件或组件适用性, 且此方法对零件的预期功能没有损害。这些方法包括但不限于声发射、中子照相检测、泄漏检测和全息照相检测。对从事其它方法的人员的培训、实践经历和考试的要求应按照 6.4 条的要求来确定, 并且雇主应将此类要求形成文件。

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 shall be established in accordance with paragraph 6.4 and shall be documented by the employer.

## 2 规范性引用文件 REFERENCE DOCUMENTS

### 2.1 本标准引用了下述文件:

STANDARDS: The following documents are referenced in this standard:

EN 4179	航空航天系列无损检测人员资格鉴定与批准
ISO 18490	无损检测-无损检测人员视力评定
NAS 410	无损检测人员资格鉴定与认证
EN ISO/CEI 17024	合格评定—人员认证机构总则
ISO 9712	无损检测—人员资格鉴定与认证

2.2 优先次序: 如果本文件和在此引用的参考标准发生冲突时, 以本文件的要求为主。本文件的内容不能替代适用的法律和法规, 除非已获得特别的豁免。

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 术语和定义 TERMS & DEFINITIONS

下列术语和定义适用于本标准。

DEFINITIONS AS APPLIED TO THIS STANDARD

## 3.1

**认证 CERTIFICATION**

雇主向符合本标准相关规定的人员颁发的书面凭证。

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

## 3.2

**闭卷考试 CLOSED BOOK EXAMINATION**

考试过程中不允许使用任何参考资料的考试。

CLOSED BOOK EXAMINATION: An examination administered without access to any reference materials.

## 3.3

**认可的工程组织 COGNIZANT ENGINEERING ORGANIZATION**

主承包商、制造商或最终用户授权其工程或无损检测组织，对有关无损检测做出决定，并给出无损检测相关批准。

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

## 3.4

**直接观察 DIRECT OBSERVATION**

观察者在适当的距离内、无需借助任何辅助手段，可以不被干扰的在现场观察学员并进行语言等交流，能够对学员提供直接的指导和辅助。

DIRECT OBSERVATION: Direct observation is when 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

**直读式仪器 DIRECT READOUT INSTRUMENT**

以尺寸或电荷为单位（如英寸、毫米或国际退火（软）铜标准），通过数字读数或以模拟显示器显示测量值的仪器，如标尺/指针结构。不需要特殊技能或知识就可以对此类仪器进行设定，并且不涉及如阈值、延迟、增益或相位等信号显示的调节就可获得测量值。例如，通用的直读仪器包括不带示波器显示的超声测厚仪和涡流涂层测厚仪。

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.

## 3.6

**文档 DOCUMENTED**

以书面形式或电子形式的记录。

DOCUMENTED: The condition of being recorded in written or electronic form.

### 3.7

#### 雇主 EMPLOYER

雇用或合同形式聘用一个或多个无损检测人员的组织。个体经营者也包括在本定义内。

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

### 3.8

#### 评定 EVALUATION

在无损检测过程中对出现的显示进行评判解释并观察确定是否满足规定的验收标准或确定其严重程度。

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.

### 3.9

#### 考试 EXAMINATION

按照程序要求进行的正式的、受控的、且有书面证明的测试，用于验证报考人的视力、无损检测技能或知识。

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

#### 主考人 EXAMINER

按照本标准认证并由责任3级授权的3级人员，在其认证的无损检测方法范围内，负责管理全部或部分资格鉴定过程。

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

### 3.11

#### 实践经历 EXPERIENCE

在工作中通过实践操作与观察获得无损检测方法知识和技能的经历，不包括正式课堂培训，但可以包括雇主书面管理程序中规定的实验室工作、在岗培训。

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.

### 3.12

#### 正式教育 FORMAL EDUCATION

在技校、学院或大学的理工科学习。

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

### 3.13

**正式培训 FORMAL TRAINING**

一个有组织和书面管理程序指导的学习活动，目的是传授按本标准鉴定所必要的知识和技能。经责任3级或主考人的批准，正式培训可以采取课堂授课、实际操作和自学相结合的形式。

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.

## 3.14

**基础考试（基础考试） GENERAL EXAMINATION**

针对一种无损检测方法的基本原理和理论而进行的书面考试。

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

## 3.15

**显示 INDICATION**

无损检测获得的响应或显现，并需对其进行解释。

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

## 3.16

**教师 INSTRUCTOR**

由责任3级人员或认证部指定或批准的对无损检测人员进行培训的人员。

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

## 3.17

**解释 INTERPRETATION**

确定显示是相关显示还是非相关显示。

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

## 3.18

**方法 METHOD**

一种存在不同技术的NDT学科（如超声检测，射线检验）。

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

## 3.19

**国家航空航天无损检测认证部（简称“认证部”） NATIONAL AEROSPACE NDT BOARD (NANDTB)**

是一个能够代表国家航空航天工业的独立航空航天组织，由主承包商特许并且获得国家监管部门承认，按照4.4.2要求提供或支持NDT资格鉴定与考试服务。

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, examination services in accordance with 4.4.2 of this standard.

## 3. 20

**非胶片射线检测 NON-FILM RADIOGRAPHY**

射线图像不用胶片作为记录介质。非胶片射线包括但不限于CR、DR、实时成像和CT。

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. 21

**在岗培训 ON-THE-JOB TRAINING**

在工作环境中获得适当的技术指导下，学习仪器设定、设备操作、工艺应用，显示识别、解释和评定等而进行的培训，以获得实践经历。

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. 22

**开卷考试 OPEN BOOK EXAMINATION**

在考试中可以翻看提供的指定参考资料的一种考试。

OPEN BOOK EXAMINATION: An examination administered with access to specific reference material that is provided with or referenced in the examination

## 3. 23

**操作授权 OPERATING APPROVAL**

由雇主根据认证范围签发的、授权个人完成指定任务的书面证明。此类授权一定是在雇主对操作人员进行工作指定任务培训的前提下进行。

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. 24

**外部机构 OUTSIDE AGENCY**

独立于雇主之外的，能够按照本标准要求提供无损检测的服务，比如：培训和考核无损检测人员的公司或机构。顾问和个体经营者也属于这一范畴。

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. 25

**实操考试 PRACTICAL EXAMINATION**

考查个人执行雇主所要求使用的无损检测方法的能力的考试。考试过程中应使用评分表，现场提问和回答无需书面记录，观察情况及结果应予以记录。

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. 26

**主承包商 PRIME CONTRACTOR**

对系统、零部件和产品的设计、控制和交付负全部责任的组织。

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

## 3. 27

**工艺规程（程序） PROCEDURE**

如何去执行某一特定工艺的书面通用说明。此程序是用于编制工艺卡（见3.34定义）。

PROCEDURE: A written general “how to” instruction for conducting a given process. Procedures are then used to develop work instructions, as defined in 3.34.

## 3. 28

**资格鉴定 QUALIFICATION**

考核报考人是否具备与其所报考级别相应的技能、培训、知识、考试、实践经历和视力的能力。

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

## 3. 29

**责任3级 RESPONSIBLE LEVEL 3**

由雇主指定并授权的3级人员，并代表雇主确保本标准的要求得到满足。

RESPONSIBLE LEVEL 3: A 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. 30

**专业考试 SPECIFIC EXAMINATION**

考查个人对雇主使用的无损检测方法的工艺规程、法规、标准、产品生产工艺、检测技术、设备和规范的理解能力的书面考试。

SPECIFIC EXAMINATION: A 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. 31

**分包商 SUB-CONTRACTOR**

对主承包商负责，进行航空航天产品制造或维修的组织机构。就本标准目的而言，它包括供应商和工序提供商。

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.

## 3. 32

**技术 TECHNIQUE**

一种检测方法中的一个类别；例如：超声检测水浸法或超声检测接触法。

TECHNIQUE: A category within a method; for example, ultrasonic immersion testing or ultrasonic contact testing.

### 3. 33

#### 考试试件 TEST SAMPLE

在实操考试中, 为了考查报考人对某种无损检测方法的掌握情况而使用的含有一种或多种已知的有文件记录的自然或人工不连续或缺陷的影像或零件。试件可以是实际零件, 制造的试验零件或者实际零件的图像, 例如: 射线照相底片。

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

### 3. 34

#### 工艺卡 WORK INSTRUCTION

指详细描述某具体部件, 一类零件(例如: “铝型材” “钢支架”)或组件的无损检测技术和检测参数的文件。在行业内有时也称为“技术卡”或“数据卡”。此类工艺卡以3.27定义的工艺规程为基础。

WORK INSTRUCTION: A document detailing the NDT technique and testing parameters to be used for the inspection of a specific component, group of parts (e.g. “aluminum extrusions” or “steel brackets”), or assembly. These are sometimes referred to in the industry as “technique sheets” or “data cards”. Such work instructions are based on procedures defined in 3.27.

### 3. 35

#### 书面 WRITTEN

可追溯性的电子或硬拷贝文档。

WRITTEN: Retrievable electronic or hard copy.

### 3. 36

#### 书面管理程序 WRITTEN PRACTICE

描述雇主控制和管理无损检测人员的资格鉴定和认证要求和方法的程序。

WRITTEN PRACTICE: A procedure that describes an employer's requirements and methodology for controlling and administering the NDT personnel qualification and certification process.

## 4 一般要求 GENERAL REQUIREMENTS

### 4.1 书面管理程序

雇主应制定和维护符合本标准要求的无损检测人员资格鉴定和认证的书面管理程序。此程序应详细叙述雇主执行无损检测资格鉴定和认证时所必需的程序, 还应包括, 直接或间接的无损检测资格鉴定和认证程序的详细内容, 主要包括:

- 雇主所使用的资格鉴定和认证级别
- 人员的职责和义务
- 培训和实践经历要求
- 认证和更新认证要求

- 记录和记录保存要求
- 证书过期、中止、吊销和证书恢复的要求
- 年度资格维护程序

书面管理程序应由责任 3 级批准。当雇主的客户和管理机构进行审查时，应可提供该程序和采用的认证部的程序。

WRITTEN PRACTICE: The employer shall develop and maintain a written practice for the qualification and certification of 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:

- the levels of qualification and certification used by the employer
- personnel duties and responsibilities
- training and experience requirements
- certification and recertification requirements
- records and record keeping requirements
- requirements for expiration, suspension, revocation and reinstatement of certifications
- Process for annual maintenance

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 附加要求

书面管理程序应包括雇主或认可的工程组织提出的所有附加要求，如附加认证级别或增加的实践经历要求。

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.

#### 4.1.2 无损检测技术

书面管理程序应包括每种检测方法中的具体检测技术，还应包括对已认证的个人增加特定的检测技术时所采取的行动，涉及附加培训、实践经历以及书面考试和实操考试等。

NDT TECHNIQUES: The written practice shall include the specific technique(s) within each method and the actions to be taken concerning additional training and experience, as well as the written and practical testing, when additional techniques are introduced for a currently certified individual.

#### 4.1.3 培训大纲

书面管理程序应参考或包括雇主所使用的无损检测培训大纲。如果是由外部机构来提供培训时，责任 3 级人员应核查此培训满足雇主的要求。

TRAINING OUTLINES: The written practice shall reference or include the NDT training outlines used by the employer. If an outside agency is used to provide training, the Responsible Level 3 shall verify that the training meets the employer's requirements.

#### 4.1.4 考试程序

书面管理程序应包括负责管理考试的个人的姓名或机构的名称、试题数量和所使用的具体视力检查方法。如需要，更新认证的基础考试的使用也应在书面管理程序中规定。

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 管理

书面管理程序应当包括负责管理和维护全部或部分雇主认证项目的个人或机构的识别信息。

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 记录

书面管理程序应包括负责管理和保存所有或部分雇主认证记录的个人或机构的识别信息以及存放地点等。

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.

#### 4.2 方法

对于 1.3 节中列出的常用方法，关于培训、经历和考试的最低要求见本标准第 6 章和 7 章。这些要求应作为对 1.3.1 节中规定的其它现有方法或新方法的指南。

METHODS: For the common methods listed in 1.3, the minimum requirements for training, experience and examination are detailed in Sections 6 and 7 of this standard. These requirements shall serve as a guideline for other current or emerging methods as defined in 1.3.1.

#### 4.3 有限 1 级

当有认可的工程组织和雇主的书面管理程序授权时，有限 1 级的人员可以对某个特定零件、部件或组件进行无损检测。每一项有限 1 级人员的使用都应单独认证，并得到认可的工程组织批准。在任何指定的时间，一个人不应同时拥有 3 项以上有限 1 级证书。下列内容应形成文件，以供雇主的客户和管理机构在进行审查时使用：

- 逐项说明使用有限 1 级人员的理由；
- 认可的工程组织的批准；
- 培训和实践经历时间和试题数量；
- 将要进行的具体的无损检测试验；
- 待检测的具体零部件；
- 当适用时，接受/拒收零件的授权。

LEVEL 1-LIMITED: When authorized by the cognizant engineering organization and the employer's written practice, the performance of a specific NDT test on a specified part, feature, or assembly may be performed by personnel certified to Level 1-Limited. Each use of Level 1-Limited is a separate certification and shall be approved by the cognizant engineering organization. An individual shall not possess more than three Level 1-Limited certifications at any given time. The following shall be documented and be made available for review by the employer's customers and regulatory agencies:

- the case-by-case justification for using Level 1-Limited
- the cognizant engineering organization approval
- the training and experience hours and the number of examination questions
- the specific NDT test to be performed
- the specific hardware to be tested
- the authority to accept or reject hardware, if applicable

#### 4.4 职责

雇主的职责是负责履行和遵守本标准并对人员资格进行认证。此外，主承包商应负责其分包商遵守本标准。使用外部机构的雇主应负责确保符合本标准的适用要求。雇主仅负责其员工进行认证，不能替代其他雇主进行认证。个人不能自我鉴定。如果个体经营者具备书面管理程序且已被其他按照本

标准认证的 3 级人员鉴定为符合本标准的要求，则其可以进行自我认证。

RESPONSIBILITY: The employer is responsible for the implementation of, and compliance with, this standard and for certifying qualified personnel. In addition, the prime contractor shall be responsible for compliance to this standard by their sub-contractors. Employers using outside agencies shall be responsible for assuring that the appropriate requirements of this standard are met. The employer is solely responsible for the certification of its employees and cannot certify for another employer. Individuals cannot qualify themselves. Self-employed individuals may certify themselves provided they have a written practice and have been qualified to the requirements of this standard by another individual certified to Level 3 in accordance with this standard.

#### 4.4.1 责任 3 级

雇主应以书面形式指定一名“责任 3 级”人员，代表其实施无损检测资格鉴定和认证过程的相关事宜。责任 3 级人员应根据本标准的要求被认证为一种或多种无损检测方法的 3 级人员，并且应全面了解雇主所使用的工艺规程、法规、规范和标准。同时还应熟知雇主所使用的材料、零部件、产品技术、无损检测方法及无损检测技术。责任 3 级应以书面形式进行确定和任命本标准定义的其他主考人，以覆盖雇主所使用的所有检测方法。责任 3 级人员可以来自外部机构，但是在这种情况下，仅能对人员进行资格鉴定，认证由雇主负责。责任 3 级人员负责执行本标准，并全面负责人员资格鉴定和认证的流程。

RESPONSIBLE LEVEL 3: The employer shall identify in writing a “Responsible Level 3” to act on its behalf in matters regarding the NDT qualification and certification process. The Responsible Level 3 shall be certified in accordance with this standard as a Level 3 in one or more NDT methods and shall have a thorough knowledge of the written instructions, codes, specifications and standards used by the employer. He/she shall also have a thorough knowledge of the materials, components, product technologies, NDT methods and NDT techniques used by the employer. Additional Examiners as defined in this standard may be identified and delegated in writing as necessary to provide coverage for all methods used by the employer. The Responsible Level 3 may be an outside agency but in this case he/she can only qualify personnel, as only the employer can certify personnel. The Responsible Level 3 shall be responsible for implementation of this standard and the overall administration of the qualification and certification program.

#### 4.4.2 认证部 (NANDTB)

认证部应有章程和管理委员会，并按照管理规定和工作程序进行运作，管理委员会的投票成员应该是 3 级人员，并来自主承包商代表或型号适航证持有者。其他成员为有投票权或无投票权的增选代表但支持认证部工作的人员，民航或国防主管部门有权作为观察员。

责任 3 级可委托认证部进行：

- 编写培训大纲和培训教材；
- 建立考试题库和管理考试；
- 批准提供培训和考试服务的内外部机构；
- 规定新的无损检测方法人员资格鉴定要求；
- 保留笔试和实操考试记录；
- 在为外部或内部组织提供培训和考试服务时指定主考人及教师。

当使用认证部时，应制定满足本标准要求的程序文件。认证部提供开发的、活动、过程、程序、技术类别等应可提供给主承包商或外部机构审查。对于没有建立认证部的国家，可以使用其它国家的认证部所提供的服务，但并不要求这样做，除非当地的管理条例有相应的要求。

NATIONAL AEROSPACE NDT BOARD (NANDTB): The organization has a constitution, a deciding entity, and is governed according to administrative and working procedures. The voting members in the deciding entity are NDT Level 3 personnel and are from participating prime contractors or type certificate holders as a minimum. Other members may be co-opted as voting or non-voting members as necessary to support the NANDTB. Regulatory agencies for civilian and/or defense have the right to be included as observer members.

The Responsible Level 3 may use an NANDTB to:

- Develop training course outlines and training material

- Create examination questions and administer examinations
- Approve outside and/or internal organizations providing training and/or examination services
- Define requirements for qualification of NDT personnel in emerging NDT methods
- Retain written and practical examinations

Designate Examiners and/or instructors at outside or internal organizations providing training and examination services

Where an NANDTB is used to provide such services, it shall develop processes and procedures that shall ensure full compliance with the requirements of this standard. The activities, processes, procedures, technique catalogs, etc. undertaken/developed by an NANDTB shall be made available for review by prime contractors and regulatory agencies. For countries where no NANDTB exists, the services of other NANDTB's may be used, but are not required to do so, unless specified by local or regulatory requirements.

#### 4.4.3 外部机构

雇主可以使用来自外部（按照本标准要求认证）的 3 级人员作为责任 3 级，制定其认证程序；对无损检测人员开展资格鉴定或履行 3 级人员职责。外部机构可以进行资格鉴定，但不能进行人员认证。雇主应对其选定的外部机构的适当性进行书面记录，以确定该机构所履行的职责是符合本标准的要求。该文件应充分列明详细信息，以证实外部机构有能力履行所规定的 3 级人员职责。

OUTSIDE AGENCY: An employer may use a Level 3 certified in accordance with this standard from an outside agency to develop a certification program, act as the Responsible Level 3, examine NDT personnel or perform any other qualification or Level 3 function. An outside agency may qualify, but not certify personnel. The employer shall document the suitability of any outside agency selected to perform any function in meeting the requirements of this standard. This documentation shall be of sufficient detail to justify the outside agency's ability to perform the required Level 3 function(s).

### 5 资格鉴定与认证级别 QUALIFICATION AND CERTIFICATION LEVELS

#### 5.1 鉴定和认证的级别

四个基本的认证级别包括：有限 1 级、1 级、2 级和 3 级。雇主可以适当地对级别进行细分、增加和限制，但不得删减或降低每个级别的最低要求。如果雇主不使用所有级别，则所使用的级别应体现在雇主的书面管理程序文件中。若实施了其它变动或细分时，其要求和责任也应在雇主的书面管理程序中予以详述。

如果无损检测人员未被认证为相应技术/方法的相应级别时，则不得独立履行 5.1.2、5.1.3、5.1.4 和 5.1.5 中列出的职能。

LEVELS OF QUALIFICATION AND CERTIFICATION: The four basic levels of certification are Level 1-Limited, Level 1, Level 2 and Level 3. The employer may subdivide, add or limit levels as appropriate, but cannot eliminate or reduce the minimum requirements for each level. If the employer does not wish to use all of the levels, those levels to be used shall be documented in the employer's written practice. Where other variations or subdivisions are implemented, the requirements and responsibilities shall also be detailed in the employer's written practice.

NDT personnel shall not independently perform the functions listed in 5.1.2, 5.1.3, 5.1.4 and 5.1.5 if not certified to the appropriate level in the applicable technique/method.

##### 5.1.1 学员

是指有文件证明参加某种无损检测方法的培训课程，并在将获得被认证为 1 级、有限 1 级或直接认证到 2 级资格过程中的个人。在学员准备进行认证的技术/方法领域，学员应：

- 有文件证明其为学员，并在规定的时间内，积极参加特定无损检测方法的培训课程。
- 在同一方法的 2 级或 3 级人员的直接观察下获得实践经验。
- 只有经责任 3 级人员批准后，才可以在 1 级人员或教师的直接观察下获得经验。
- 不能做出验收或拒收的决定。

- 不能独立进行检验。
- 不能独立履行任何其它无损检测职责。

TRAINEE: An individual who is documented as participating in a training program for an NDT method and is in the process of becoming qualified for certification to Level 1, Level 1-Limited or directly to Level 2 shall be considered a trainee. In the technique/method in which they are preparing for certification, trainees shall:

- Be documented as a trainee and be actively participating in a training program for a stated NDT method for a limited and specified period of time.
- Obtain experience under the direct observation of a Level 2 or Level 3 in the same method.
- Obtain experience under the direct observation of a Level 1 or instructor only when approved by the Responsible Level 3.
- Not make accept or reject decisions.
- Not independently conduct tests.
- Not independently perform any other NDT function

### 5.1.2 有限 1 级

有限 1 级是只允许对指定零件、特定零件或组件进行特定的无损检测方法的认证。对于经过此认证的检测技术和方法，有限 1 级人员应：

- 能够遵守工艺卡。
- 必要时，接受同方法 2 级或 3 级人员的指导或监督。
- 具备按照批准的工艺卡处理零件，记录检测结果与设备标定的技能和知识。
- 具备按照批准的工艺卡，在检验前或后对零件进行必要准备的技能和知识。
- 当书面管理程序中有规定，和经过认可的工程组织的允许时，拥有评定检测结果和按照经批准的工艺卡对责任 3 级人员在书面管理程序中限定范围的特定零件、部件或组件进行验收或拒收的技能和知识。

LEVEL 1-LIMITED: Level 1-Limited is a limited certification allowing only the performance of a specific NDT test on a specified part, part feature, or assembly. In the test technique and method in which certified, Level 1-Limited personnel shall:

- be able to follow work instructions.
- receive guidance or supervision from a certified level 2 or level 3 in the method when necessary.
- have the skills and knowledge to process parts, document results and perform equipment standardization in accordance with approved work instructions.
- have the skills and knowledge to carry out any necessary preparation of parts before or after inspection in accordance with approved work instructions.
- when specified in the written practice and when the cognizant engineering organization allows, have the skills and knowledge to evaluate test results and perform acceptance or rejection of a specific part, part feature, or assembly in accordance with approved work instructions, and within the limitations documented by the Responsible Level 3.

### 5.1.3 1 级

对已认证的检测方法，1 级人员应：

- 能够遵守工艺卡；
- 具备按照批准的工艺卡处理零件、记录检测结果与校验设备的技能和知识；
- 具备按照批准的工艺卡在检验前后对零件进行必要准备的技能和知识；
- 具备按照适用的工艺标准进行系统性能检查的技能和知识；
- 必要时，接受相同方法 2 级或 3 级人员的指导或监督；
- 当书面管理程序中有规定，并且经过责任 3 级人员的批准后，可以按照经批准的工艺卡，对特定零件、特制零件或组件进行解释及评定，并判定其验收或拒收。

LEVEL 1: In the method in which certified, Level 1 individuals shall:

- be able to follow work instructions

- have the skills and knowledge to process parts, document results and perform equipment standardization in accordance with approved work instructions.
- have the skills and knowledge to carry out any necessary preparation of parts before or after inspection in accordance with approved work instructions.
- have the skills and knowledge to conduct system performance checks in accordance with the applicable process standard.
- receive guidance or supervision from a certified Level 2 or Level 3 in that method when necessary.
- when specified in the written practice and approved by the Responsible Level 3, may perform interpretations and evaluations of specific product(s) or product form(s) for acceptance or rejection in accordance with approved work instructions.

#### 5.1.4 2 级

对已认证的检测方法，2 级人员应：

- 具备设定和校验设备、处理零件、解释、评定、验收或拒收和记录检测结果的技能和知识；
- 熟悉检测技术/方法的适用范围和局限性；
- 具备按照适用的工艺标准进行系统性能检查的技能和知识；
- 能够对学员和 1 级人员提供所需的指导及监督；
- 熟悉雇主用于控制无损检测工艺的法规、标准和其它合同文件；
- 当书面管理程序中有规定时，能够根据经批准的通用程序编制工艺卡，此类工艺卡应要求经该方法的 3 级人员的最后批准；
- 具备产品制造和检验技术相关的基础知识；
- 当书面管理程序中有规定时，具备飞机或飞行器维护的基础知识。

LEVEL 2: In the method in which certified, Level 2 individuals shall:

- have the skills and knowledge to set up and standardize equipment, process parts, interpret and evaluate for acceptance or rejection, and document results.
- be thoroughly familiar with the scope and limitations of the technique/method.
- have the skills and knowledge to conduct system performance checks in accordance with the applicable process standard.
- be capable of providing the necessary guidance and/or supervision to trainees and Level 1 personnel.
- be familiar with the codes, standards, and other contractual documents that control the method as used by the employer.
- when specified in the written practice, be capable of developing work instructions from approved general procedures. Such work instructions shall require final approval by a Level 3 certified in the method.
- have a basic knowledge of relevant product manufacturing and inspection technology.
- when specified in the written practice, have a basic knowledge of aircraft or vehicle maintenance.

#### 5.1.5 3 级

对已认证的检测方法，3 级人员应：

- 具有解释、控制无损检测方法的法规、标准和其他合同文件的技能和知识。
- 具备对无损检测机构和人员承担技术责任的能力。
- 对某一项具体检测具备选择方法和技术的技能。
- 具备编制和校核程序及工艺卡适用性的能力。
- 批准无损检测程序和工艺卡，以确定技术的适合性。
- 具备雇主所采用的其它无损检测方法和产品制造技术及检测技术的一般知识。
- 当书面管理程序中有规定，则应具备飞机或飞行器维护的基础知识。
- 能够实施或指导培训，并对该方法检测人员进行鉴定和认证。
- 只有在实操考试中其熟练能力得到证明时，才能指导零件无损检测的验收并记录结果。
- 当书面管理程序中有规定时，能够审核外部机构以确保符合书面管理程序的要求。

LEVEL 3: In the method in which certified, Level 3 individuals shall:

- have the skills and knowledge to interpret codes, standards, and other contractual documents that control the NDT method(s).
- be capable of assuming technical responsibility for the NDT facility and staff.
- be capable of selecting the method and technique for a specific inspection.
- be capable of preparing and verifying the adequacy of procedures and work instructions.
- approve NDT procedures and work instructions for technical adequacy.
- have a general knowledge of other NDT methods and product manufacturing and inspection technologies used by the employer.
- when specified in the written practice, have a basic knowledge of aircraft or vehicle maintenance.
- be capable of providing or directing training, examination, and certification of personnel.
- conduct NDT for the acceptance of parts and document the results if a demonstration of proficiency in this ability was included in the practical examination.
- when required by the written practice, be capable of auditing outside agencies to ensure the requirements of the written practice are met.

#### 5.1.6 审核员

执行无损检测审核、评审或评定的人员，应进行培训，并应具有理解所采用无损检测工艺和程序的技能和知识。审核人员应熟悉适用于控制无损检测工艺的法规、标准和其它合同文件。

AUDITOR: Personnel performing technical NDT audits, surveys or assessments shall have the training, skills and knowledge to understand the processes and procedures utilized in the application of NDT processes. The individual shall be familiar with the applicable codes, standards, and other contractual documents that control the applicable method(s).

### 6 培训和实践经历 TRAINING AND EXPERIENCE

#### 6.1 培训

报考所有级别认证的人员应完成足够的正式培训，以熟悉适用检测方法和技术的原理和实际操作，并有能力履行第 5 部分中所规定的职责。正式培训应在在岗培训之前或与在岗培训同时进行。所有已完成的无损检测培训都应有书面记录。

表 1 和表 1A 列出了特定检测方法 1 级和 2 级人员的最短培训学时要求，有限 1 级人员的最短培训时间由责任 3 级人员决定，并进行书面记录，但有限 1 级人员的学时不应少于相应检测方法 1 级人员最短培训学时的 25%。个人在通过 2 级认证之前，不能被认证为 3 级人员。

对于已认证的射线检测方法的 3 级人员，要进行额外的 40 学时的培训，才能实现胶片与非胶片射线技术之间的转换。

通常情况下，可以从雇主或外部机构获得基础、专业和实际操作培训，但雇主应补充提供在岗培训。

TRAINING: Candidates for certification to all levels shall complete sufficient formal training to become proficient with the principles and practices of the applicable test method and technique(s) and be capable of carrying out the duties specified in Section 5. Formal training shall be conducted prior to, or in conjunction with, on-the-job training. All completed NDT training shall be documented.

The minimum training hours for Level 1 and Level 2 are provided in Table I and Table IA for the specified NDT methods. The minimum training hours for Level 1-Limited shall be determined and documented by the Responsible Level 3, but Level 1-Limited hours shall not be less than 25% of those required for Level 1 in the applicable method. Individuals cannot certify to Level 3 without prior certification to Level 2 in the method.

40 additional hours of training is required for current certified Level 3 radiography personnel transitioning to either film or non-film radiography.

General, specific and practical training may be obtained with the employer or outside agency but shall always be supplemented by practical on-the-job training with the employer.

表1：1级和2级人员最短的正式培训时间

方法	1级	2级（有1级证）	2级（无1级证）
渗透检测	16	16	32
磁粉检测	16	16	32
红外热像检测	20	40	60
错位散斑检测	20	40	60
涡流检测	40	40	80
超声检测	40	40	80
射线检测（胶片或非胶片）	40	40	80
射线检测（胶片和非胶片）	60	60	120

表1A：胶片和胶片射线检测相互转化的正式培训时间

附加的正式培训学时		
1级 转 1级	2级 转 2级	1级 转 2级
20	40	80

Table1-MINIMUM FORMAL TRAINING HOURS, LEVEL 1 &amp; LEVEL 2

Method	Level 1	Level 2 with previous Level 1 certification	Level 2 without previous Level 1 certification
PT	16	16	32
MT	16	16	32
IRT	20	40	60
ST	20	40	60
ET	40	40	80
UT	40	40	80
RT Film or NonFilm	40	40	80
RT Film & NonFilm	60	60	120

Table1A- RT FORMAL TRAINING HOURS FOR TRANSITION TO FILM AND NONFILM

Additional Formal Training Hours		
Current Level 1	Current Level 2	Current Level 1 to Level 2 Film & NonFilm
20	40	80

### 6.1.1 培训大纲

所有培训应按照责任 3 级人员批准的详细课程大纲进行。该大纲应包括培训参考资料清单。培训内容至少应包括：

- 基础理论
- 检测原则，包括无损检测方法的选择，适用材料、零部件和检测参数

- 产品形状和材料；缺陷的形式和特征
- 设备操作和标定
- 工艺控制的重要性
- 适当工艺步骤和参数的重要性
- 安全事项
- 适用技术及其优缺点
- 每种方法和技术的局限性和检测能力
- 适用规程、法规、操作程序和工艺卡
- 适用时，评定、解释和记录检测结果。

如果由外部机构或认证部提供培训时，责任 3 级人员应验证其培训达到了雇主的要求。

TRAINING OUTLINES: All training shall be conducted in accordance with a detailed course outline approved by the Responsible Level 3. The outline shall include a list of references from which the training material is derived. As a minimum the training shall include:

- Basic theory
- Test principles, including choice of NDT methods, relevance to different materials and part and test variables
- Product forms and materials; defect formation and characterization
- Equipment operation and standardization
- The importance of process controls
- The importance of appropriate processing steps and parameters
- Safety
- Applicable techniques and the advantages and disadvantages of each
- Limitations and capabilities of each method and technique
- Applicable specifications, codes, operating procedures and work instructions
- If applicable, evaluation, interpretation and documentation of inspection results.

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.

#### 6.1.2 前期培训

经过前期培训的人员或在培训 12 个月内没有鉴定的人员应进行重新培训。前期培训应有书面记录，以便于雇主接受。重新培训至少应包括产品、设备的设置、操作和校验、详细的操作程序、适用的技术、无损检测结果的解释和评定、安全和适用的法规、标准及规程。前期培训的证明可以不是原始记录，只要责任 3 级人员或主考人认可了前期培训的充分性和等效性。

PREVIOUS TRAINING: For personnel credited with previous training, or personnel not certified within 12 months of their training, refresher training must be provided. Previous training must be documented to be accepted by the employer. As a minimum, refresher training shall cover products, equipment set-up, operation and standardization, specific operating procedures, applicable techniques, interpretation and evaluation of NDT results, safety, and applicable codes, standards and specifications. For documentation of previous training, records other than original records may be accepted if adequacy and equivalency have been determined to be acceptable by the Responsible Level 3 or Examiner.

#### 6.1.3 等效培训

对于根据 NAS410、EN4179 或其它无损检测资格鉴定程序认证的人员，前期培训的充分性和等同性是否满足表 1 和表 1A 的要求，应由责任 3 级人员或主考人确定并进行记录。适用时，前期培训的小时数可全部或部分接受。

EQUIVALENT TRAINING: For personnel previously certified under NAS 410, EN 4179 or other recognized NDT qualification program, the adequacy and equivalency of their previous training to the requirements of Table I and Table 1A shall be determined and documented by the Responsible Level 3 or Examiner. All or a portion of previous hours may be accepted as applicable.

#### 6.1.4 健康与安全培训

应严格遵守有关危险品、事故预防及安全操作规程有关的所有条例。应按照当地的法规和条例确定相关安全培训的要求。在接受认证之前,所有报考射线照相检测的人员都应了解有关电离辐射的危害和安全要求的相关知识,并熟悉适用的法律法规。

HEALTH AND SAFETY TRAINING: All regulations relating to hazardous substances, accident prevention and safe working practices shall be strictly adhered to. Safety-related training requirements shall be determined in accordance with local codes and regulations. Prior to certification, all candidates seeking radiography qualification shall have received instruction on the hazards and safety requirements associated with ionizing radiation and be knowledgeable of, and comply with, the applicable regulations and laws.

### 6.1.5 培训设施

培训设施和教室应提供一个无干扰的教学环境。教学应配备数量充足的设备、教具、模型和试样等,以确保满足培训课程的全部要求。另外,为了覆盖报考人从事检测的范围,应提供足够数量的包含自然缺陷或人工缺陷的代表性试样,用于实操考试的试样不应在培训时使用。为了确保报考人在实际操作中有足够的收获,用于培训的设备应和报考人在实际工作中使用的设备在性能上具有充分的可比性,培训时可以采用生产中使用的零件和无损检测设备。

TRAINING FACILITIES: Training facilities and classrooms shall provide an environment conducive to learning and shall be sufficiently well equipped with equipment and training aids, models, samples, etc., to ensure that all aspects of the training course requirements are met. In addition, a sufficient number of representative test samples containing natural or artificial features and/or flaws shall be available to cover the range of testing to be conducted by the candidate. Test samples used for practical examinations shall not be used for training purposes. To ensure the candidate fully benefits from the practical exercises, equipment used for training shall be sufficiently comparable to that which the candidate will use in the performance of their job. Production parts and NDT equipment may be used for training.

### 6.2 培训和考试人员

责任 3 级人员应对无损检测培训计划进行总体控制和审查,包括任命或批准合格的主考人、教师 and 外部机构。

TRAINING AND EXAMINATION PERSONNEL: The Responsible Level 3 shall maintain overall control and cognizance over the NDT training program, including designating or approving qualified Examiners, instructors and outside agencies.

#### 6.2.1 主考人

必要时,责任 3 级人员应以书面形式任命或批准主考人,所有主考人应按照本标准的规定进行认证。经责任 3 级人员决定和进行记录后,主考人即可实施无损检测的书面及操作考试和评分,并负责管理其已认证检测方法的整个或部分资格鉴定过程。

EXAMINERS: When necessary, Examiners shall be designated or approved in writing by the Responsible Level 3. All Examiners shall be certified in accordance with this standard. As determined and documented by the Responsible Level 3, an Examiner can prepare, administer and grade written or practical NDT examinations, and administer all or part of the qualification process in the method in which he/she is certified.

#### 6.2.2 教师

教师应具备依据批准的教学大纲进行计划、组织、提供课堂培训和实操操作的知识和技能。教师应由责任 3 级人员任命或批准。

INSTRUCTORS: Instructors shall have the skills and knowledge to plan, organize, and present classroom training and practical exercises in accordance with approved course outlines. Instructors shall be designated or approved by the Responsible Level 3.

#### 6.2.3 外部机构

当采用外部机构时，外部机构应向雇主提供其名称和资质证明材料，适用时，还应提供负责培训和考试人员的资格证书的证明材料。

OUTSIDE AGENCIES: When an outside agency is used, the outside agency shall provide the employer with the names, evidence of qualifications and, if applicable, evidence of certifications held by the personnel conducting the training and examination.

### 6.3 实践经验

有限 1 级、1 级、2 级及 3 级认证的报考人员应具备充足的实践经验，以确保他们能够履行所报考级别的职责。1 级和 2 级人员的最短经历要求如表 2 和表 2A 中所示。3 级人员的最短实践经验要求见表 3 和 6.4.2（适用时）。有限 1 级人员的实践经验要求应由责任 3 级人员确定，并进行书面记录，但不应少于相应检测方法 1 级人员的 10%。根据书面管理程序中的相关规定，为获得经历而进行的在岗培训，应在持证人员的指导下进行。应有文件记录学员实践经历的日期、任务、小时数和提供直接观察指导的持证人员，以备审查。

持有射线 3 级人员进行胶片和非胶片之间的转化时，应在主考人、教师或外部培训机构的监督指导下附加 240 学时的实践经验。

EXPERIENCE: Candidates for certification to Level 1-Limited, Level 1, Level 2 or Level 3 shall have sufficient practical experience to assure that they are capable of performing the duties of the level for which certification is sought. The minimum experience requirements for Level 1 and Level 2 are provided in Table II and Table IIA, as applicable. The requirements for Level 3 are in Table III and 6.4.2, as applicable. Experience requirements for Level 1-Limited shall be determined and documented by the Responsible Level 3, but shall not be less than 10% of those required for Level 1 in the applicable method. As documented in the written practice, on-the-job training for the purpose of gaining experience shall be overseen by personnel certified in accordance with this standard. For trainees gaining experience, documentation shall be available for review to indicate individual, date, task, hours, and certified personnel providing direct observation.

Additional experience requirements for current Level 3 radiography personnel transitioning to either film or non-film radiography are 240 hours with guidance or supervision from an examiner, instructor, or outside agency.

#### 6.3.1 前期实践经验

只有当报考人员的前期实践经验是有文件记录的且经过责任 3 级人员或主考人批准时，其从先前雇主那里获得的实践经验才能被现在的雇主接受。适用时，可以接受全部或部分前期经历的时数。前期经历的文字记录可以不是原始记录，只要责任 3 级人员或主考人确定了前期实践经历的充分性和等效性是可以接受的。

PREVIOUS EXPERIENCE: A candidate's experience with a previous employer may be accepted by the current employer only if such experience is documented and approved by the Responsible Level 3 or Examiner. All or a portion of previous hours may be accepted as applicable. For documentation of previous experience, records other than original records may be accepted if adequacy and equivalency have been determined to be acceptable by the Responsible Level 3 or Examiner.

#### 6.3.2 等效实践经验

对于根据 NAS410、EN4179 或其它无损检测程序认证的人员，其按照表 2、表 2A 和表 3 的要求的前期实践经历的充分性和等同性应由责任 3 级人员或主考人确定并形成记录。

EQUIVALENT EXPERIENCE: For personnel previously certified under NAS 410, EN 4179 or other recognized NDT qualification program, the adequacy and equivalency of their previous experience to the requirements of Table II, Table IIA or Table III shall be determined and documented by the Responsible Level 3 or Examiner.

表 2: 1 级和 2 级人员最短的实践经历要求

方法	实践经历时间（单位：小时）		
	1级（学员经历）	2级（有1级证书）	2级（无1级证书）

渗透检测	130	270	400
磁粉检测	130	400	530
红外成像检测	200	600	800
错位散斑检测	200	600	800
涡流检测	200	600	800
超声检测	200	600	800
射线检测（胶片或非胶片）	200	600	800
射线检测（胶片和胶片）	220	780	1000

表 2A: RT 胶片和胶片射线检测相互转化的实践经历要求

附加的最少实践经历时间（单位：小时）		
1级	2级	1级转换为胶片和胶片的2级
20	200	800

表 3: 常规无损检测方法中 3 级人员认证最少实践经历要求

大专或本科	2级实践经历
无	4年
在技术学校、专科学校或大学有2年理工科学习经历	2年
3~4年的理工科大学学位	1年

TABLE II: MINIMUM EXPERIENCE REQUIREMENTS FOR LEVEL 1 &amp; LEVEL 2

Method	Experience Time in Hours		
	Level 1 (Trainee experience)	Level 2 with previous Level 1 certification	Level 2 without previous Level 1 certification
PT	130	270	400
MT	130	400	530
IRT	200	600	800
ST	200	600	800
ET	200	600	800
UT	200	600	800
RT Film or NonFilm	200	600	800
RT Film & NonFilm	220	780	1000

TABLE II A: RT EXPERIENCE REQUIREMENTS FOR TRANSITION TO FILM AND NONFILM

Additional Minimum Experience Time in Hours		
Current Level 1	Current Level 2	Current Level 1 to Level 2 Film & NonFilm
20	200	800

TABLE III: MINIMUM EXPERIENCE REQUIREMENTS FOR LEVEL 3 IN COMMON METHODS

College or University	Level 2 Experience
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None	4 years
Two years of engineering or science study at a technical school, college or university	2 years
3-4 year science or engineering undergraduate degree	1 years

#### 6.4 无损检测新方法

雇主使用的但未在 1.3 节、表 1 和表 2 中列出的检测方法的最低培训要求和最低实践经历要求应由责任 3 级人员决定。

EMERGING NDT METHODS: The minimum required training and experience hours for methods used by the employer that are not listed in 1.3, Table I, and Table II shall be established by the Responsible Level 3.

##### 6.4.1 1 级和 2 级

确定表 1 和表 2 中未列出的新方法的培训或实践经历最低小时数方法数应参照表 1 和表 2 中列出的具有类似复杂程度的检测方法的要求。这仅适用于 1.3.1 节中定义的“其它”或新的检测方法，不适用于渗透、磁粉、超声、射线照相、红外热成像检测、错位散斑干涉检测和涡流检测。

LEVELS 1 AND 2: When determining training or experience hours for new methods not listed in Tables I and II, the minimum hours shall be based on the requirements for a method of similar complexity listed in Table I and II. This only applies to “other” or emerging methods as defined in 1.3.1 and cannot be applied to penetrant, magnetic particle, ultrasonic, radiography, thermography, shearography or eddy current testing.

##### 6.4.2 3 级

当经过认可的工程组织批准，且经雇主书面管理程序授权时，在下列情况下，雇主可以对未被列在 1.3 节内的无损检测新方法的首个 3 级人员进行资格鉴定和认证：

- 对于新方法，如采用的认证部有此程序则应使用，没有则不被采用。
- 报考人员具备履行 5.1.5 节中列出的 3 级人员职责的技能和能力。
- 满足表 4 中的所有要求。

在 6.4, 6.4.1 和 6.4.2 内的要求仅适用于 1.3.1 节中规定的“其它”或新的方法，并不适用于渗透、磁粉、超声、射线照相、红外热成像、错位散斑干涉或涡流检测。

LEVEL 3: When approved by the cognizant engineering organization and authorized by the employer's written practice, an employer may qualify and certify its first Level 3 in a new NDT method not listed in 1.3 provided:

- The applicable NANDTB does not have a process for qualifying a Level 3 in the new method. If the applicable NANDTB has such a process, it shall be used.
- The candidate has the skill and ability to carry out the Level 3 responsibilities in 5.1.5.
- All of the requirements in Table IV are met.

The requirements of 6.4, 6.4.1 and 6.4.2 only apply to “other” or emerging methods as defined in 1.3.1 and cannot be applied to penetrant, magnetic particle, ultrasonic, radiography, thermography, shearography or eddy current testing.

表4：无损检测新方法首个3级人员的最低要求

大专或本科	授课/学习	实践经历	其它认证的无损检测方法
没有在技术学校、专科学院或大学进行理工科学习的经历	80小时	300小时	先前至少获得一个3级或两个2级证书

在技术学校、专科学校或大学有2年理工科学习的经历	60小时	200小时	先前至少获得一个3级或两个2级证书
3~4年的理工科大学学位	40小时	200小时	先前至少获得一个2级证书

TABLE IV : MINIMUM REQUIREMENTS FOR FIRST LEVEL 3 IN AN EMERGING NDT METHOD

College or University	Instruction/Study	Experience	Other NDT Certifications
No engineering or science study at a technical school, college or university	80 hours	300 hours	At least one previous Level 3 or two Level 2 certifications held
Two years of engineering or science study at a technical school, college or university	60 hours	200 hours	At least one previous Level 3 or two Level 2 certifications held
3-4 year science or engineering undergraduate degree	40 hours	200 hours	At least one previous Level 2 certification held

## 7 考试 EXAMINATIONS

### 7.1 目的

对报考人进行认证的每种方法的资格鉴定考试应包括：基础考试、专业考试和实操考试。报考人在初次取证前应进行视力检查并在认证后定期进行。视力检查要求和基础考试和专业考试的试题或题库以及实操考试的检查单等应妥善保存，以便雇主的客户在审查时提供。考生只有在考试时才能接触到试题和试件，不允许对笔试试题进行口试或口译。

PURPOSE: Examinations to verify the technical qualifications of candidates shall consist of a general, specific and practical examination for each method in which the candidate is to be certified. An examination for visual acuity shall also be conducted prior to the candidate's first certification and periodically thereafter. The requirements for the vision examination, the questions or question database used for the general and specific examinations and the checklist for the practical examination shall be available for review by the employer's customers. Examinations and test samples shall be made available to the candidates only during administration of the examinations. An oral or verbal translation of written examinations is not permitted.

#### 7.1.1 视力

通过对学员、有限 1 级、1 级、2 级与 3 级无损检测人员进行视力检查，保证申请人的近视视力与辨色能力符合表 5 的要求。视力要求不适用于教师与审核人员。近视视力应每年检查一次，而辨色能力检查则至少每 5 年一次。雇主应确保表 5 中的要求传递所有必要人员和机构。Jeager 和 Snellen 的视力检查由经过责任 3 级人员指定的经过培训的人员或有资质的医务人员负责。ISO18490 的测试应按照该标准要求进行。如需进行视力纠正才能通过视力检查时，进行检测工作时应佩戴视力纠正装置。在认证前，人员辨色能力的任何局限性都需经过责任 3 级人员评估，且应以书面形式批准。

表5：视力要求

	检查要求
近距离视力	<ul style="list-style-type: none"> <li>- 按照 ISO18490</li> <li>- 16 英寸 (42cm) +/- 1" (2.54 cm)*距离下 20/25 (斯内伦视力表)</li> <li>- 12 英寸 (30.48cm) 外达到 Jaeger 1*</li> </ul>

辨色能力	检验人员应能准确识别与区分所从事检测专业涉及的颜色
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\*用单眼裸视或矫正视力。

VISION: The vision examination for trainee, Level 1-Limited, Level 1, Level 2, and Level 3 personnel shall assure that the applicant's near vision and color perception meet the requirements of Table V. Vision requirements do not apply to instructors or auditors. Near vision tests shall be administered annually and color perception tests shall be administered at least every 5 years. The employer shall ensure the flow-down of the Table V vision requirements to all necessary personnel and/or facilities. Snellen and Jaeger tests shall be administered by trained personnel designated by the Responsible Level 3 or by qualified medical personnel. ISO 18490 tests shall be administered in accordance with the requirements therein. When vision correction is necessary to pass the visual acuity exam, vision correction shall be worn during all testing/inspections. Any limitations in color perception shall be evaluated by the Responsible Level 3 prior to certification and must be approved in writing.

TABLE V: VISION REQUIREMENTS

	Examination Requirements
Near Vision Options	<ul style="list-style-type: none"> <li>- Tumbling E in accordance with ISO 18490</li> <li>- 20/25 (Snellen) at 16" (42 cm) +/- 1" (2.54 cm)*</li> <li>- Jaeger No.1 at not less than 12" (30.48 cm)*</li> </ul>
Color Perception	Personnel shall be capable of adequately distinguishing and differentiating colors used in the process involved

\*In at least one eye, natural or corrected.

### 7.1.2 基础考试

所有级别的基础考试应为闭卷考试，试题应在适当的水平上覆盖该方法的全部内容。有限1级的基础考试要求至少有10道试题。1级、2级或3级基础考试应至少有40道试题。对3级人员来讲，基础考试的试题除应包含该检测方法需要的理论知识外，还应包括本标准中定义的其它方法的基础知识。如在通过该无损检测方法的考试前，已通过了涵盖其它无损检测方法的“基础”考试，则认为涵盖其它无损检测方法的要求已被满足。如果雇主书面管理程序有规定，报考人持有现行有效相应级别的ASNT或ISO 9712证书可以作为基础考试达到要求的证明。

GENERAL: The general examination for all levels shall be a closed book examination covering the cross-section of the applicable method at the appropriate level. A minimum of 10 questions shall be administered for the general examination for Level 1-Limited. A minimum of 40 questions shall be administered for the general examination at Levels 1, 2 or 3. For Level 3, the general examination questions shall address the general knowledge of other methods as defined within this standard as well as the method for which certification is sought. Passing a “basic” examination covering the other NDT methods used before passing any NDT method examination shall be considered satisfactory evidence the other NDT methods have been satisfactorily covered. Possession of a current ASNT or ISO 9712 NDT certificate at the appropriate level by the candidate may be satisfactory evidence that the general examination requirement is satisfied as defined in the employer's written practice.

### 7.1.3 专业考试

所有级别的专业考试均应为开卷考试，内容应包括报考人在为其雇主工作期间使用到的规程、法规、设备、操作程序和检验技术要求等。有限1级的专业考试应至少有8道题。1级、2级和3级人员的专业考试应至少包括30道试题。由责任3级人员或主考人来确定考试需提供的参考资料，如规范、表格、公式等。试题应考查报考人掌握和理解资料中与试题相关的信息，而不是仅仅能够从参考资料中直接找到答案。

当使用认证部时，专业考试涉及的内容可能是该方法在航空航天工业内应用更宽泛的范围，考试范围可以比雇主的要求更宽泛。当认证部提供的考试范围更广时，雇主应负责对其进行有关雇主工艺掌握情况的补充考试。

**SPECIFIC:** The specific examination for all levels shall be an open book examination covering the requirements and use of the specifications, codes, equipment, operating procedures and test techniques the candidate may use in the performance of his/her duties with the employer. A minimum of 8 questions shall be administered for the specific examination for Level 1-Limited. A minimum of 30 questions shall be administered for the specific examination at Levels 1, 2, and 3. Reference material, as determined by the Responsible Level 3 or Examiner, such as specifications, tables, formulas, etc. shall be provided. Questions utilizing such material shall require understanding of the information contained therein rather than merely finding its location.

Where an NANDTB is used, the specific examination may cover a wider scope within the method used within the aerospace industry and may use examinations which cover more than the employer's requirements. When a wider scope is used by the NANDTB, the employer is responsible for administering a supplemental examination representative of the employer's processes.

#### 7.1.4 实操考试

实操考试应为考核报考人在履行其工作责任时，对进行典型的检测任务的熟练程度。如果报考人员既要求演示其对某种工艺的熟练程度，同时要求对结果进行解释，则实操考试用试件应该是实物试件，报考人员不应知晓试件和其中缺陷的位置。如报考人员只需要解释检测结果，并不需执行形成图像的检测过程时，考试试件也可以为图片，如：X射线底片或其它形成的检测数据。责任3级人员或主考人应编制和填写评分表，保证其覆盖下面各段描述的详细要点，并有助于考试的执行和评分。除使用该评分表外，责任3级或主考人需在文件中规定如何对报考人员作出的检测结果进行判断并记录（如：部分图纸、草图及书面说明等）。所有此类文件都将成为考试记录的一部分。

当使用认证部时，实操考试涉及的内容可能是该方法在航空航天工业内应用的更广泛的范围，考试范围比雇主的要求更广泛。如果确认认证部提供的考试范围更广时，则雇主负责对其进行补充考试，该考试考核对雇主产品检测的执行情况。

**PRACTICAL:** The practical examination shall consist of a demonstration of proficiency in performing tasks that are typical of those to be accomplished in the performance of the candidate's duties. If the candidate is required to demonstrate proficiency in the application of the process as well as interpretation of results, hardware test samples shall be used. The candidate shall not be familiar with the test sample and the location of the defects located therein. If the candidate is only required to interpret the results and not perform the process of generating the image, the test samples may be images, such as radiographs or other resultant test data. A written checklist covering the topics detailed in the following sub-paragraphs shall be developed and completed by the Responsible Level 3 or Examiner to assure adequate coverage and to assist in the administration and grading of the examination. In addition to using the checklist, the Responsible Level 3 or Examiner shall determine and document how the examination results obtained by the candidate are to be documented (e.g. part maps, drawings, sketches, written descriptions, etc.). All such documentation shall become part of the examination and filed accordingly.

Where an NANDTB is used, the practical examination may cover a wider scope within the method used within the aerospace industry. When a wider scope is used by the NANDTB, the employer is responsible for administering a supplemental examination representative of the employer's products.

##### 7.1.4.1 有限 1 级

报考人员应根据工艺卡检测（如果批准对零件进行验收）试件以证明其熟练程度，所认证的每种技术和产品形式至少有一个试件。该试件应符合第3.33条的规定，并能代表报考人在所履行雇主职责时遇到的特定产品。如责任3级人员批准其验收或拒收产品，则报考人员应对试件的检测结果进行解释并记录结果。评分表中应包括设备与材料的使用及其规范性和熟练程度，遵守程序的细节，适用时，还应包括解释和评定显示的准确性和完整性。

**LEVEL 1-LIMITED:** The candidate shall demonstrate proficiency by using a work instruction to process and, if approved to accept hardware, examine at least one test sample for each technique and part configuration for which certification is sought. The test samples shall meet the definition in 3.33 and be representative of the specific product to be encountered by the candidate in the performance of his/her duties with the employer. If approval to accept or reject hardware is to be granted by the Responsible Level 3, The checklist shall include proficiency in the use and standardization of equipment and materials, adherence to procedural details and, if applicable, proficiency

in the interpretation and evaluation of indications

#### 7.1.4.2 1 级

报考人应按照工艺卡对每种检测方法至少检测2个不同结构的试件，以证明其对检测方法的熟练程度，其中每个技术至少需要处理1个试件。当被认证的方法只需要检测一种结构的零件时，2个试件可以是同一种类型的。试件应符合第3.33条的规定，并能代表报考人在所履行雇主职责时遇到的典型产品。如责任3级人员批准其验收或拒绝产品，则报考人员应对试件的检测结果进行说明并以记录结果。评分表中应包括设备与材料的使用及其规范性和熟练程度，遵守程序的细节，适用时，还应包括解释和评定显示的准确性和完整性。

LEVEL 1: The candidate shall demonstrate proficiency by using a work instruction to process at least 2 test samples of differing configurations for each method, with at least one test sample for each technique for which certification is sought. When only one configuration of hardware is to be inspected upon certification, both test samples may be of the same configuration. The test samples shall meet the definition in 3.33 and shall be representative of the products to be encountered by the candidate in the performance of his/her duties with the employer. If approval to accept or reject hardware is to be granted by the Responsible Level 3, the candidate shall interpret and document the results of the inspection of the test samples. The checklist shall include proficiency in the use and standardization of equipment and materials, adherence to procedural details and, if applicable proficiency in the interpretation and evaluation of indications.

#### 7.1.4.3 2 级

报考人对每种检测方法至少检测2个不同结构的试件，其中每个技术至少需要处理1个试件以证明其对检测方法的熟练程度。当被认证的方法只需要检测一种结构的零件时，2个试件可以是相同结构。试件应符合第3.33条的规定，并能代表报考人在履行雇主职责时遇到的典型产品。除了至少检测2个含有已知不连续性的试件并记录结果外，还可增加不含有缺陷试样用于考试。报考人应依据适用的验收标准记录检测结果。评分表中应包括设备与材料的使用及其规范性和熟练程度，遵守程序的细节，适用时，还应包括解释和评定显示的准确性和完整性。

LEVEL 2: The candidate shall demonstrate proficiency by inspecting at least 2 test samples of differing configurations for each method, with at least one test sample for each technique for which certification is sought. When only one configuration is to be inspected upon certification, both test samples may be of the same configuration. The test samples shall meet the definition in 3.33 and shall be representative of the products to be encountered by the candidate in the performance of his/her duties with the employer. In addition to the two minimum known and documented test samples with discontinuities, specimens without discontinuities may be included. The candidate shall document the NDT results in accordance with the applicable acceptance criteria. The checklist shall include proficiency in the use and standardization of equipment and materials, adherence to procedural details, the accuracy and completeness of interpretation and evaluation of indications.

#### 7.1.4.4 3 级

报考人应通过编制适于雇主当前检测方法的无损检测工艺规程或工艺卡来证明其熟练程度。适用时，工艺规程或工艺卡的编制应与认证或更新认证所需要的基础考试和专业考试相匹配。实操考试的结果应有记录，应使用评分表判定其编制的程序或作业指导书技术的准确性、覆盖面和清晰性等。如报考人的职责包括产品的处理、验收或拒收产品，则报考人员需通过与第7.1.4.3中规定的与2级实操考试相同的考试，来证明其具备此方面的能力。

LEVEL 3: The candidate shall demonstrate proficiency by preparing an NDT procedure or work instruction appropriate to the employer's current requirements for the method. The procedure or work instruction shall be developed in conjunction with the general and/or specific examination(s) required for certification or recertification, as applicable. The results of the practical examination shall be documented and a checklist shall be used to address the technical accuracy, technical content, and clarity of the procedures or written instructions prepared by the candidate. When the candidate's duties will include processing and/or acceptance or rejection of products, proficiency in performing such tasks shall be demonstrated by a hands-on practical examination equivalent to

Level 2 in accordance with 7.1.4.3.

## 7.2 考试管理

所有考试的管理和评分都由责任3级人员或主考人负责。责任3级人员或主考人可以书面形式委托非主考人协助管理和对多项选择或判断正误类型试题进行评分。由责任3级或主考人管理所有的实操考试。问答题与填空题的回答应由责任3级人员或主考人进行评估，以证实报考人对试题内容理解的充分性。在任何情况下，考试的管理均不能由报考人本人或下属人员进行。

ADMINISTRATION OF EXAMINATIONS: The administration and grading of all examinations shall be the responsibility of the Responsible Level 3 or Examiner. The Responsible Level 3 or Examiner may delegate in writing the administration and grading of examinations using multiple choice or true/false type questions to non-Examiner personnel. All practical examinations shall be administered by the Responsible Level 3 or Examiner. Responses to essay and fill-in questions must be evaluated by the Responsible Level 3 or Examiner to verify the candidate's adequate understanding of the subject matter. In no case can an examination be administered by one's self or by a subordinate.

### 7.2.1 由外部机构管理

当使用外部机构管理考试时，雇主应确保所有实施考试管理的人员符合本标准的要求。在任何情况下，雇主对是否符合本标准负最终责任。

ADMINISTRATION BY AN OUTSIDE AGENCY: When an outside agency is used to administer examinations, the employer shall ensure that all individuals involved in the administration of the examinations meet the requirements of this standard. In all cases, the ultimate responsibility for compliance to this standard shall remain with the employer.

### 7.2.2 评分

申请认证的报考人应在每一独立科目的考试中获得至少70分（百分制）。另外，报考人应在实操考试中检测出由3级人员确定的所有不连续性、缺陷或状态，并至少获得70分（百分制）。报考人应不低于80的平均分，且每一项考试成绩在平均分中所占的权重是相同，才能获得资格证书。例如：更新认证时，仅进行了专业考试与实操考试，则这些分数应计入平均分。如果更新认证时也进行了基础考试，此分数也将被计入平均分。如果3级人员更新认证时根据附录A.1进行，实操考试成绩将被作为平均分。对于ASNT或ISO 9712无损检测证书的分数是按照“通过/失败”打分，取代了7.1.2条中的基础考试，因此该成绩应计为80分（百分制）。

SCORING: The candidate for certification must achieve a minimum score of 70% on each individual examination. In addition, the candidate must detect all discontinuities, flaws or conditions specified by the Level 3 during the practical examination and achieve a minimum score of 70%. The candidate must have an average score of no less than 80% in order to be eligible for certification. All examination scores shall be of equal weight in determining the average score. For example, if only specific and practical examinations are administered for recertification, only those scores shall be factored into the average score. If a general examination is also given for recertification, the general score shall also be factored into the average score. For a Level 3 recertified using Annex A.1, the score for the hands-on practical, if administered, will be used as the average score. Scores for ASNT or ISO 9712 NDT certificates scored as "pass/fail" and used in lieu of the general examination per 7.1.2 shall be assigned a value of 80%.

### 7.2.3 补充考试

在基础、专业或实操考试中的任何科目考试不及格时，报考人应在对失败科目补考之前接受补充培训，补充培训内容由主考人或责任3级人员确定。补充培训应有记录并应涉及报考人所欠缺的技能或知识。补考的试题或试件不应与失败的考试试题相同。补考试题应包括至少25%的新试题。如没有通过更新考试，其证书则被暂停。

RE-EXAMINATION: Candidates failing any general, specific or practical examination shall receive additional training as determined and documented by the Responsible Level 3 or Examiner before attempting re-examination

of the failed exam. The additional training shall be documented and shall address those areas found deficient in the candidate's skills or knowledge. The re-examination shall not use the same written tests or test samples that were used in the failed examination. The re-examination test must contain a minimum of 25% new questions. A current certification shall be suspended if an individual fails an examination for recertification.

## 8 认证 CERTIFICATION

### 8.1 概述

报考人在获得资格鉴定后,由雇主依据其书面管理程序进行认证。学员、教员、无损检测审核人员或采用直读式仪器的专项检测的人员都不需要进行认证。

GENERAL: Personnel who have demonstrated that they possess the appropriate qualifications are eligible for certification by their employer in accordance with the employer's written practice. Certification is not required for trainees, instructors, NDT auditors, or personnel performing specialized inspections using direct readout instruments.

### 8.2 记录

在证书的有效期内,雇主应保存其人员的认证记录。记录应至少包括下列内容:

- a) 认证人员的姓名;
- b) 认证人员的级别、方法和技术;
- c) 认证人员参加的最近一次笔试和实操考试资料,以及前一次考试的成绩;
- d) 3级人员的更新认证如采用附录A方式,则保留积分的证明文件。不需要保留最近一次笔试和实操考试结果;
- e) 当前证书的签发日期和有效期。证书被暂停或取消应有文件记录原因和日期。适用时,恢复认证的日期和措施也应有文件记录;
- f) 无损检测培训历史记录,并注明培训单位、培训类型、培训日期及培训课时数。适用时,还需按 6.1.2 和 6.1.3 的规定所要求的文件记录;
- g) 无损检测的工作经历,包括当前及以前所有雇主的实践经历记录(包括任何的认证的记录),以证明其满足认证的实践经历要求,适用时,还需按 6.1.2 和 6.1.3 的规定所要求的文件记录;
- h) 最近(当前)的视力和辨色能力检查结果证明;
- i) 满足资格鉴定要求的正式教育证明;
- j) 授权认证的雇主代表的姓名和签字;
- k) 对于有限1级认证,逐项由认证、认可工程组织的批准、培训时间与工作经历小时数、认证有效期(最多1年)、所执行的专项检测、被检测的具体零件,适用时可对验收或拒收零件的批准。

RECORDS. The employer shall maintain personnel certification records as long as the certification is in effect. The records maintained by the employer shall include, as a minimum:

- a) Name of the certified individual.
- b) Level, method, and technique(s) for which individual is certified.
- c) The latest written and practical examinations and the scores from the immediately previous exams.
- d) If Annex A is used, documentation of credit points used for Level 3 recertification. Last written and practical examinations need not be maintained.
- e) Date and expiration of current certification(s). Suspended or revoked certification(s) shall be documented for reason and date. If applicable, date and action to reinstate certification(s) shall also be documented.
- f) NDT training history that identifies the source, type of training, dates of training and course hours, and, if applicable, the documentation required by 6.1.2 and 6.1.3
- g) NDT experience history, including any previous certifications, both with current and previous employers

- sufficient to justify satisfaction of experience requirements for qualification, and, if applicable, the documentation required by 6.3.1 and 6.3.2
- h) Results of the most-recent (i.e. current) visual acuity and color perception examinations.
  - i) Extent and documentation of formal education when used to meet qualification requirements.
  - j) The name and signature of the employer's representative authorizing the certification.
  - k) For Level 1-Limited certifications, the case-by-case justification, the cognizant engineering organization's approval, the training and experience hours, the length of the certification (up to 1 year), the specific NDT test to be performed, the specific hardware to be tested, and, if applicable, the approval to accept reject hardware.

### 8.2.1 记录的可获得性

雇主应按照书面管理程序的要求保存好对雇员的培训、资格鉴定和认证信息的记录，并能提供给审核。采用认证部时，则雇主应保留最近一次的笔试和实操考试成绩，实际考试记录由认证部保存。所有此类记录（除实际考试记录外）都应在员工要求时或员工以任何原因离开公司时予以提供。

RECORD AVAILABILITY: All training, qualification, and certification records shall be maintained in accordance with the employer's written practice and shall be made available for audit. When an NANDTB is used, the scores for the latest written and practical examinations shall be kept by the employer but actual examinations may be kept by the NANDTB. All such records, except for actual examinations, shall be made available to the applicable employee upon request or upon leaving the company for any reason.

### 8.3 证书失效

证书可能过期、暂停使用或吊销

LOSS OF CERTIFICATION: NDT certifications may expire, be suspended, or be revoked.

#### 8.3.1 过期

证书到期前没有获得重新的认证，该证书将视为过期。所有认证、年度资格维护和视力检查的过期时间为该事件发生的对应月份的月底

EXPIRATION: Certifications shall expire when the certification interval has lapsed with no recertification issued. Certification, annual maintenance, and vision examinations are considered to expire at the end of the corresponding month in which the event began.

#### 8.3.2 暂停

当有以下情况时证书暂停使用：

- 视力检查过期
- 连续超过 12 个月未从事所认证的检测方法
- 未通过更新考试
- 在工作某些方面发现有欠缺时
- 年度资格维护过期

SUSPENSION: Certification shall be suspended when:

- Vision examination is expired.
- Individual does not perform in the method certified for at least 12 consecutive months.
- Individual fails recertification examination.
- Individual's performance is found to be deficient in any manner.
- Annual maintenance is expired

#### 8.3.3 吊销

当超过连续24个月没有为雇主从事所认证的检测方法、雇佣关系终止或发现其有违反职业道德行为或不能胜任此工作时，认证证书即被吊销。当这个人在24个月内被原雇主重新雇用，证书可以视为暂停使用。

REVOCAION: Certification shall be revoked when the individual does not perform in the certified method for the employer for at least 24 consecutive months, when employment has been terminated, or when the individual's conduct is found to be unethical or incompetent. When an individual is re-hired by the same employer within 24 months, certification may be considered as suspended.

#### 8.4 证书恢复

当认证证书暂停使用的原因被改正并由雇主核实, 或其技术的熟练程度由责任3级或主考人认可之后, 证书可恢复到原认证日期。过期或吊销的证书只有通过初次认证相同的专业考试与实操考试方可恢复。现行有效的认证部颁发的证书, 在新雇主组织了符合7.1.3和7.1.4要求代表其产品和工艺的专业考试和实操考试之后可以继续使用。

REINSTATEMENT OF CERTIFICATION: Certifications that have been suspended may be reinstated up to the original certification date when the cause for the suspension has been corrected and the correction verified by the employer or the individual's proficiency is verified by the Responsible Level 3 or Examiner. Certifications that have expired or been revoked may only be reinstated by specific and practical examination equivalent to initial certification. Current NANDTB certificates may be utilized for new employment provided that the new employer administers specific and practical examinations that are representative of their processes and product per 7.1.3 and 7.1.4.

#### 8.5 更新认证

下列人员可进行更新认证:

RECERTIFICATION: Personnel are eligible for recertification as follows:

##### 8.5.1 有限1级, 1级和2级

有限1级人员的更新认证周期不得超过一年, 按照本标准认证的1级和2级人员的更新认证周期不得超过五年。更新认证至少应通过与初次认证等同的专业考试和实操考试。

LEVEL 1-LIMITED, LEVEL 1 AND LEVEL 2: Level 1-Limited personnel shall be re-certified for each certification held at intervals not to exceed one year. Level 1 and 2 personnel certified to this standard shall be recertified at intervals not to exceed five years. Recertification shall at least be accomplished by successful completion of practical and specific examinations equivalent to those required for initial certification.

##### 8.5.2 3级人员

按照本标准认证的3级人员的更新认证周期不得超过五年。更新认证应按附录A或通过与初次认证等同的专业考试和实操考试方式进行。

LEVEL 3: Level 3 personnel certified to this standard shall be recertified at intervals not to exceed five years. Recertification shall be accomplished in accordance with Annex A or by successful completion of specific and practical examinations equivalent to initial certification.

##### 8.5.2.1 现场操作考试

如果3级无损检测人员的职责中包括设备操作或产品验收时, 则应进行与2级等同的现场操作考试。

HANDS-ON PRACTICAL EXAMINATION: If equipment operation or accepting hardware is required as a part of the Level 3's duties, an additional hands-on practical examination equivalent to Level 2 is required.

#### 8.6 年度资格维护

雇主应制定和实施年度检查程序, 对每种检测方法负责处理或检测产品的所有级别人员在其证书有效期内对其技术的掌握程度进行核查。

ANNUAL MAINTENANCE: The employer shall develop and implement a documented annual process to verify technical proficiency for each method during the certification cycle for all levels of personnel processing or inspecting hardware.

## 附录 A 无损检测 3 级人员更新认证信誉积分制

### Annex A Credit System for Recertification of Level 3 NDT Personnel

#### A.1 范围

A.1.1 本附录规定了使用积分制对无损检测3级人员进行更新认证的要求。这仅适用于更新认证时持有有效的无损检测3级人员证书的人员。

SCOPE: This annex specifies the requirements for recertification of Level 3 NDT personnel using the credit system. It applies only to those persons holding a valid Level 3 NDT certification at the time of recertification.

#### A.2 要求

A.2.1 在认证期满前的至少14天向责任3级人员或认证部提交更新认证文件资料。责任3级人员应直接向相关的管理机构、认证部或其雇主提交更新认证的申请以供指定的3级人员评审。

A.2.2 参加更新认证的人员应在前5年内，被认证的检测方法上至少有36个月（在最后24个月内至少有12个月）为雇主从事3级人员的工作经历。月份的数量是累加计算的，并不是连续的月数才有效。

A.2.3 应证明其连续从事该检测方法，报考人应提供一份列表，包括其在5年认证期内需重新认证的每一种无损检测方法的8个可被证实的3级人员不同的职责的证据。

A.2.4 报考人应通过参加在表A.1中列出的综合性活动，积累积分点数。无论认证方法的数量多少，5年认证周期内，针对所更新认证的检测方法上至少获得24个积分点，以此作为客观证据来证明其紧密跟踪当前无损检测技术。

A.2.5 由责任3级或认证部批准是否采用附录A，并且雇主应在书面管理程序中予以规定。附录A中对责任3级的更新认证应由雇主在文件中决定，在5年内单一事件仅能作为一次积分活动。

#### REQUIREMENTS

Documentation for recertification shall be submitted to the Responsible Level 3 or NANDTB at least 14 days prior to the expiration date of the certification. Application for recertification of the Responsible Level 3 shall be made directly to the applicable regulatory agency, NANDTB, or employer for review by a designated Level 3.

The candidate shall have been employed in a Level 3 function for a minimum of 36 months (at least 12 of which are in the last 24 months) within the previous five years in the method(s) for which recertification is sought. The number of months is cumulative and does not need to be consecutive months for validation purposes.

Continuity in the method shall be demonstrated. The candidate shall provide a list of 8 verifiable Level 3 tasks in each NDT method for which recertification is sought covering the 5 year period.

Candidates shall provide objective evidence that they have kept up to date with current NDT technology in the method(s) for which they are seeking recertification by obtaining a minimum of 24 points during the five year period of certification, irrespective of the number of certifications (methods) obtained, by engaging in a combination of activities listed in Table A.1.

The approval of Annex A activity documentation shall be determined and documented by the Responsible Level 3 or NANDTB as defined within the employer's written practice. Annex A recertification for the Responsible Level 3 shall be determined and documented by the employer. A single event shall only be used for one award credit activity during a five year period.

#### A.3 定义

**A.3.1 委员会或专家小组会议：**由地区、国家或国际无损检测组织机构或技术协会组织发起的会议，包括讨论会，座谈会，研讨会，贸易联合会，座谈会等。如果主办是国家的或国际的，则可以认定为外国或国际会议。

**A.3.2 委员会项目：**地区或国家技术协会，委员会或工作组的具体可确认的官方活动，例如循环实验组或个人研究，指导大纲的编制，附录，规范，推荐的实施方法，程序，法规或标准等官方活动。文件可包括备忘录或报告，委员会提出文件的草稿，或由报考人对该文件提出的正式书面意见。

#### DEFINITIONS

**COMMITTEE OR PANEL MEETINGS:** Meetings, conferences, symposia, seminars, trade association meetings, panels, etc. organized or sponsored by a regional, national or international NDT organization or technical society. Foreign or international meetings qualify if the sponsor(s) are national or international.

**COMMITTEE PROJECTS:** Specific identifiable official activities of regional or national technical societies, committees or work groups, such as round robins or individual studies, preparation of guidelines, appendices, specifications, recommended practices, procedures, codes or standards, etc. Documentation may include memos or reports, drafts of committee output documents, or official written comments submitted by the candidate on such documents.



表A. 1: 3级人员的积分活动

序号	活动	标准	点数分配	每5年最多点数
1.	编写或合著无损检测技术论文、文献或白皮书	独著	8	8
		合著	4	
2.	编写、合著或管理公司或工业无损检测规范或标准	每份标准/规范	2	8
3.	出席下列机构组织的无损检测技术会议、委员会或专家小组会议： a) 国家或国际技术协会、团体和学会 b) 有多地点的成员组成的公司间NDT小组。	1天或1次会议	1	8
		2天	2	
		3天或更多天	4	
4.	无损检测技术培训教师，专门为学生教授获取无损检测资格认证的课程	每授课8小时	4	8
5.	参加技术课程或研讨会	有书面说明的每8小时	2	8
6.	参与学术荣誉的技术课程或研讨会	继续教育学分 (CEUs) 或获得的学术荣誉	实际学分/荣誉	8
7.	从一个认可工业单位获得一个首次*3级认证（仅适用于首次专业认证，*不适用于专业更新认证）	对每种检测方法获得的认证	4	4
8.	无损检测主考人	每次鉴定考试	1	6
9.	由内部或外部发行的有关无损检测技术和/或科学出版物	每出版1次论文	4	8
10.	有文件记录的对公司、技术协会、或工业委员会项目的无损检测贡献	每次存档确定的贡献	4	8
11.	有文件记录的参与无损检测有关的研究、发展或调查	每次存档确定的贡献	4	8
12.	作为3级人员的连续满意表现记录	在认证期间对每种方法的书面证明	1	4
13.	参加设备和贸易展示会	每参加一次	1	4
14.	进行外部无损检测审核	每执行一次外部审核	2	6
15.	开发一种新的无损检测工艺、设备或系统	每记录1次贡献	4	8
16.	提交或获得无损检测产品或工艺方面的专利	独自发明	8	8
		合作发明	4	

TABLE A.1-LEVEL 3 AWARDED CREDIT ACTIVITY

Activity	Criteria	Point Allocation	Max points per 5 years
Authoring or co-authoring technical NDT papers, presentations, or white papers	Sole Author	8	8
	Co-author	4	
Authoring or co-authoring for company or industry NDT specifications or standards	Each Standard/Specification	2	8
Attending NDT technical sessions, committee or panel meetings organized by: a) National or international technical societies, associations and institutes b) Inter-company NDT teams comprised of members from several locations	1 day or 1 meeting	1	8
	2 days	2	
	3 or more days	4	
NDT instructor teaching academic courses, or courses designed to prepare students for NDT qualification	For each 8 hours of instruction	4	8
Participating in technical courses or seminars	For every 8 hours of Documented instruction	2	8
Participating in technical courses or seminars for which academic credit is given	For actual Continuing Education Units (CEUs) or academic credit earned	Actual CEUs/credit awarded	8
Obtaining an initial* Level 3 certificate from a recognized industry source (applicable only to initial professional certification. * This does not apply to professional recertification)	For each method obtained	4	4
Nondestructive testing Examiner	For each qualification examination	1	6
NDT related technical and/or scientific publications published either internally or externally	For each published paper	4	8
Documented NDT contributions to company, technical society, or industry committee projects	For each documented contribution	4	8
Documented participation in NDT-related studies, developments, or investigations	For each documented contribution	4	8
Documented continuous satisfactory performance as a Level 3.	Written testament for each method in the certification period	1	4
Attend NDT equipment or trade show	For each show attended	1	4
Conduct external NDT audits	For each external audit conducted	2	6
Development of new NDT processes, facilities, or systems	For each documented contribution	4	8
Submitting and/or obtaining a patent for an NDT product or process	Sole inventor	8	8
	Co-inventor	4	

## 附录 B NANDTB-CN 信誉积分制应用细则

### B.1 总则

B.1.1 应用细则的目的是为保证Ⅲ级人员资格更新信誉积分制的规范实施制定。

B.1.2 应用细则是基于附录A的基础上，明细了积分点的要求。当报考人采用信誉积分制进行资格更新，应按照本程序要求执行。

B.1.2 本文件的信誉积分制适用于在本机构获证后的3级更新认证的报考人采用。

### B.2 要求

B.2.1 在鉴定期满前应提前至少30天，但不要超过90天，向NANDTB-CN提交“资格更新申请表”、“Ⅲ级人员资格更新信誉积分制申请表（见表B.2）”、“积分证明材料列表（见表B.3）”及相关报名资料复印件，并提供雇主出具“工作不间断证明”。其中工作不间断证明应由工作期间的单位责任三级或雇主签字确认，如有单位变更应获得全部单位的证明。

B.2.2 采用信誉积分制更新资格的报考人应获得知识的更新选择参加当年的正式培训。如果报考人的职责范围里包括对NDT人员能力评定、操作考核培训、仪器操作或零件接受等内容，则在认证考核中需附加与Ⅱ级人员要求等同的实际操作考试。

B.2.3 评分：根据DiNDT-R02的附录A 进行Ⅲ级人员复证考试时，如果进行了实操考试，其上机操作考试与工艺编制考试的评定成绩，单项不低于70分且平均不低于80分为合格。

B.2.4 应提供满足规定点数的证明资料，提供的证据应客观真实能够予以采信，如不能采信或不符合要求的证明将予以作废，不予积分。提供的积分证明，应获得单位的责任3级签字确认，或由雇主（法人）签章。

B.2.5 重新鉴定的应试者应该在前5年内在被鉴定的方法上至少有36个月（在最后24个月至少有12个月）从事Ⅲ级人员的工作，月份的数量是累加计算的而并不是连续。所提供的证明应由当时所在雇主单位的三级或雇主签名确认。

B.2.6 应提供一份证明，证明其报考人连续从事申请的检测方法，证明应详细说明工作经历的列表，包括其在5年认证期内每一种无损检测方法的8个不同的3级人员职责的客观凭证（附表b2）。

B.2.7 应提供客观证据，证明其在5年认证期内，在该检测方法至少获得24个积分点，以表明其在所更新认证的方法上紧密跟踪当前的NDT技术，无论认证方法的数量多少。积分点的获得，可通过参加在表A.1中列出的综合项活动。积分要求规定在5年内单一事件仅能作为一个积分活动。

B.2.8 经审核未能通过不再接受补充资料审核。审核未能通过的报考人，应按要求参加与初始认证等同的规范及实操考试进行重新鉴定。

B.2.9 所提供的证明材料不得弄虚作假，一经发现将取消其更新资格，按照作弊规定处理。

## B.2 活动的积分说明



表B.1 积分说明表

序号	活 动	说明
1.	撰写或合著 NDT 技术论文、文献或白皮书	I 其论文需在全国发行的一级刊物上发表, 署名应排在前三名。 I 提供发表的刊物名称刊物号, 及证明其发表时间和编写人的复印件证明。 I 时间以文章发表的日期为准。
2.	撰写、合著或管理公司或工业 NDT 规范或标准	I 国家或行业级以上标准, 署名应排在前三名。公司规范应提供审批稿复印件。 I 提供相应的标准号及标准封面及有关编写人信息的复印件。 I 时间以标准封面发布日期为准。
3.	出席由下列机构组织的技术会议、委员会或专家小组会议: 1) 国家或国际 NDT 技术协会、团体、学会。2) 公司间来自于各单位人员组成的 NDT 小组。	I 由国家机关、国家级协会、团体、学会等组织召开的技术性会议, 在会议上进行了关于 NDT 相关的发言和演讲。其发言的内容不少于千字。 I 提供会议的时间、地点、组织者、证明人等信息, 并提供其发言稿副本。发言稿应是技术方面的报告。 I 时间以会议开始日计算。
4.	NDT 技术培训的教学老师, 培训的目的是为学生获得 NDT 资格或其它学术资格做准备。	I 行业领域内容的正规课堂式培训, 包括 NANDTB-CN 的培训。培训应符合相应的培训大纲, 培训结果学员多数满意。 I 提供具体的培训时间、地点、课程及证明人等信息。并提供相应的辅导材料。 I 时间以培训的开始日计算。
5.	参加专业课程或研讨会	I 提供会议或课程举办方的正式证明。 I 时间以课程结束日计算。
6.	参加有学术信誉的专业课程或研讨会	I 提供会议或课程举办方的正式证明。 I 时间以课程结束日计算。
7.	初次*获得公认的III级证书的业内人士 (仅适用于最初的专业认证。*并不包括更新认证)	I 提供其证书的复印件。 I 时间以证书日期为准。
8.	参加无损检测主考人	I 包括 NANDTB-CN 的考试。参加完整的命题和考试。 I 提供具体的考试时间、地点、科目及证明人等信息。 I 时间以培训开始日计算。
9.	由外部或内部出版的 NDT 专业和/或学科相关的出版物。	I 提供其出版物封面、目录及本人完成工作的证明。 I 时间以出版日期为准。
10.	有文件记载对公司、技术协会或工业委员会有贡献	I 指受到雇主、行业、国家级的奖励并有书面的证明。 I 提供其书面的证明。 I 时间以记载的文件日期为准。
11.	有文件记载参与 NDT 有关的研究、发展或调查	I 提供其书面的证明。 I 时间以记载的文件日期为准。
12.	有文件记载作为III级人员其行为一直令人满意	I 由雇主出具证明, 包括其工作的资质符合重新鉴定的资格。 I 提供其书面的证明, 雇主签字盖章认可。 I 时间以记载的文件日期为准。
13.	参加设备或贸易展	I 涉及无损检测相关领域的展览。 I 提供会议主办方出具的参会证明。
14.	进行外部 NDT 评审	I 包括无损检测专业实验室或体系审核。 I 提供正式的授权证明。
15.	开发一种新的无损检测工艺、设备或系统	I 无损检测新工艺、新设备或新系统的开发, 需要有相关鉴定证明
16.	提交或获得无损检测产品或工艺方面的专利	I 无损检测相关的专利证明, 专利证书或专利号

注: 同一项活动只可以用于一项积分, 不可重复使用。

表 B.2 NANDTB-CN III 级人员资格更新信誉积分制申请表

证书编号：

姓名：

序号	活 动	指 标	点数	得分	附件 页码
1	编写或合著无损检测技术论文、文献或白皮书	独著	8	8	
		合著	4		
2	编写、合著或管理公司或工业无损检测规范或标准	每份标准/规范	2	8	
3	出席下列机构组织的无损检测技术会议、委员会或专家小组会议： a) 国家或国际技术协会、团体和学会 b) 有几个地点的成员组成的公司间NDT小组。	1天或1次会议	1	8	
		2 天	2		
		3 天或更多天	4		
4	无损检测技术培训教师，专门为学生教授获取无损检测资格认证的课程	每授课8小时	4	8	
5	参加技术课程或研讨会	有书面说明的每8小时	2	8	
6	参与学术荣誉的技术课程或研讨会	有效继续教育学分 CEUs或获得学术荣誉	学分 /荣誉	8	
7	从一个认可工业单位获得一个最初*3级认证（仅适用于最初专业认证，*不适用于专业更新认证）	对每种检测方法获得的认证	4	4	
8	无损检测主考人	每次考试	1	6	
9	由内部或外部发行的有关无损检测技术和/或科学出版物	每出版1次论文	4	8	
10	有文件记录的对公司、技术协会、或工业委员会项目的无损检测贡献	每次存档确定的贡献	4	8	
11	有文件记录的参与无损检测有关的研究、发展或调查	每次存档确定的贡献	4	8	
12	作为3级人员的连续满意存档记录	在认证期间对每种方法的书面证明	1	4	
13	参加设备和贸易展示会	每参加一次	1	4	
14	进行外部无损检测审核	每执行一次外部审核	2	6	
15	开发一种新的无损检测方法、工具或系统	每记录1次贡献	4	8	
16	提交或获得无损检测方法或成果方面的专利	独著	8	8	
		合著	4		
			积分合计（≥24）		
<p>上述情况属实，特予证明！</p> <p>责任III级（签/章） _____ 雇主（签/章） _____</p> <p><input type="checkbox"/>通过      <input type="checkbox"/>未通过      审核人（签字）： _____</p>					

后附积分证明相关资料：（文件右上角统一顺序编写页码）

表 B.3 积分证明材料列表（每个申请方法不少于八个客观证据）

姓名：

证书编号：

序号	方法/技术	内容情况说明	证据页码
1.			
2.			
3.			
4.			
5.			
6.			
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注：需要提供在每种方法有八个证据证明从事该方法的工作，积分附件的内容需可采信。

## 附录 C 波音公司供应商的附加认证要求

### Annex C Additional qualification requirements for Boeing suppliers

#### C.1 总则 General Instructions

**C.1.1** 本文件的目的是使报考人在满足DiNDT-R02 (Equ.NAS410/EN4179) 资格的基础上,附加要求以符合波音客户的要求。

This standard defines additional requirement on the basis of the qualification against DiNDT-R02 (Equ.NAS40/EN4179) for Boeing suppliers.

**C.1.2** 波音公司的供应商 (D1-4426网站) 或潜在供应商应在满足DiNDT-R02文件的规定基础上, 按照本程序要求执行, 以获得波音认可的三级资格及二级资格。

To get the level 2 or level 3 qualification qualified by Boeing, the suppliers or potential suppliers shall implement this standard premised on meeting the requirement of DiNDT-R02.

注: 波音批准的供应商见 <http://active.boeing.com/doingbiz/d14426/GetAllProcessors.cfm>

**C.1.3** NANDTB-CN根据报考人情况与波音公司代表保持沟通, 波音公司代表有权根据需要在一定周期内审查其供应商的培训、资格鉴定及认证相关记录。

The NANDTB-CN organization will keep communication with the Boeing company representative according to the condition of candidates. The Boeing company representative have the right of reviewing the records involved in training, qualification and certification.

#### C.2 波音供应商的附加要求 Additional qualification requirements for Boeing suppliers

**C.2.1** 波音供应商的NDT三级人员认可应符合“D1-4426”中相关要求, 附加考试应采用波音特种工艺代表认可的三级人员作为主考人 (见附录1)

he approval for NDT level 3 of Boeing suppliers shall meet the related requirements of “D1-426”. The examiner of additional examination shall approved by Boeing special process representative( see attachment 1 ).

注 Note: <http://active.boeing.com/doingbiz/d14426/UserInstProcReq.cfm>

**C.2.2** 报考人在申请波音三级资格认证前, 应先获得波音二级的资格并获得认可。

Before applying for Boeing level 3 qualification, candidates shall have got Boeing level 2 qualification and be approved.

**C.2.3** 雇主规范考试: 波音供应商的无损检测人员应按照 (D1-4426网站) 要求向认证机构提供最新版次的波音公司的技术规范做为雇主规范, 并在文件上标明提供的文件仅用于NANDTB-CN认证考试。各级别的雇主规范考试应至少包括30个问题, 考试为闭卷, 问题要求对所包含的信息有足够理解而不是仅仅找到其出处;

Specific Examination: NDT stuff of Boeing suppliers shall submit the latest version of Boeing technical

specification to the certification organization as employer's specification refer to attachment 3 and the copy shall be identified for NANDTB-CN certification examination used only. For all levels, it shall be a close book examination containing a minimum of 30 questions that require understanding of the given information rather than merely finding its location.

注：波音的规范参见 D1-4426 网站 <http://active.boeing.com/doingbiz/d14426/specindex.cfm>

**C.2.4 实际操作考试：**在NANDTB-CN认可的培训考试机构开展本文件的波音人员认证，考试过程中应使用波音规范进行考核要求；

Practical examination: The practical examination against this document shall be administrated in a training and examining organization approved by NANDTB-CN. Performance of candidate shall be evaluated in accordance with Boeing specification.

**C.2.5 附加培训要求：**在进行任何资格认证考试前，NANDTB-CN应核报考人已完成附加培训并获得相关证明记录。注意：附加培训内容应包括：波音规范、图纸、工艺及现场实习等。编制培训大纲见附录2；

Additional training requirements: Before any certification examination, NANDTB-CN shall verify that candidate have completed additional training and gain related supporting record. Note: Additional training shall include: Boeing specification, drawing, process and on-the-job training. Attachment 2 shows the training program.

**C.2.6 资格证明：**按照本程序进行认证的报考人，在资格证书详细列出所报考的雇主规范及其版本号等信息，并注明本协议编号NAB-Boeing-R01 Rev.2015.01。

Certificate: For candidates certified according to this procedure, the qualification certificate shall indicate a detail list of employer's specification applied in the examination and relevant information such as the revision, as well as the number of this agreement.(NAB-Boeing-R01 Rev.2015.01)

**C.2.7 按照本文件考核通过的报考人具备获得波音三级资格，但不代表已经批准成为波音三级。只有经过波音客户现场审核认可后，方可正式批准成为波音授权的三级人员。**

Candidates who have passed the exam administrated refer to this document will approved to be Boeing level 3 only after passing the on-the-spot audit by Boeing supplier.