



U.S. Department  
of Transportation  
Federal Aviation  
Administration

# Advisory Circular

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**Subject:** Training, Qualification, and  
Certification of Nondestructive  
Inspection Personnel

**Date:** 2/24/14

**AC No:** 65-31B

**Initiated by:** AFS-300

**Change:**

**1. PURPOSE.** This advisory circular (AC) contains recommendations for the experience, training, qualification, examination, and certification of nondestructive inspection (NDI) personnel for the inspection of aircraft, engines, propellers, accessories, and other aviation components. It recommends criteria for the qualification of personnel requiring appropriate knowledge of the technical principles underlying the nondestructive tests they perform. This document applies to those individuals directly responsible for technical adequacy of the NDI methods used, as well as those persons or organizations providing training, supervision, or oversight of NDI personnel. Organizations should have a written program describing the guidelines used to train, qualify, and certify personnel. Inspection personnel qualified under this document may be eligible for Federal Aviation Administration (FAA) repairman's certification with an NDI rating.

**2. CANCELLATION.** This AC cancels AC 65-31A, Training, Qualification, and Certification of Nondestructive Inspection (NDI) Personnel, dated April 25, 2003.

**3. RELATED REGULATIONS.** Title 14 of the Code of Federal Regulations (14 CFR) parts 43, 65, 121, 135, 145, and 147.

#### **4. DISCUSSION.**

**a. Qualified NDI Personnel.** This AC recommends requirements for the qualification and certification of nondestructive personnel performing nondestructive testing (NDT) and NDI. Qualified personnel are required for reliable performance of NDT. Both the performance of tests and the interpretation of results require skill and must be accomplished by trained personnel. They must know the applications and limitations of the various NDT methods used to locate defects in aircraft structure and components. Persons performing NDT, NDI, or nondestructive evaluations may be qualified in accordance with one or more of the standards listed in paragraph 6. Other qualification documents may be used when they are included in the approved manual for the organization specified in the contractual document between the user of the NDI services and their provider. The applicable revision should be the latest unless otherwise specified. Qualification should be based on an examination and/or other demonstration of proficiency, competence, and experience, as set forth in the relevant documents.

**b. Records and Documentation of Administrative Practices.** An organization's records should include a description of the details to be recorded for each qualified individual and

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identification of those responsible for developing, administering, and maintaining the organization's qualification program.

**c. Requalification Requirements.** Requalification requirements should include provisions for the reexamination of employees. It should also include the conditions and requirements for the revocation and reinstatement of qualification of individuals and the documentation thereof.

**5. DEFINITIONS.** Terms included in this document are defined as follows:

**a. Acceptance Criteria.** The basis for acceptance of the results of an examination as noted in subparagraph 10c.

**b. Auditor.** An individual who reviews NDT facilities and general procedures for compliance with NDT technical requirements.

**c. Calibration (Instrument).** The comparison or adjustment of an instrument to known references, traceable to national metrological institutes, such as the National Institute of Standards and Technology (NIST); National Physical Laboratory, UK; or Physikalisch-Technische Bundesanstalt, while being processed through a metrology system. (See subparagraph 5cc for inspection of product.)

**d. Certification.** Written testimony of qualification that the employer typically issues as a written statement that the individual has met the requirements of an accepted standard. In the United States, there is no national certifying agency; therefore, most certifications are employer-based and are not transferrable. These certifications should be further broken down into limited or task qualifications (e.g., Level I Special).

**e. Certification Based on Previous Experience.** Certifications acceptable to the certifying organization of individuals who were certified under a previous qualification program. Documentation is required.

**f. Documentation.** Written or printed record furnishing information or evidence; a legal or official record in paper or electronic form.

**g. Evaluation.** A determination of the significance of indications.

**h. Examination.** A formal, controlled, and documented interrogation conducted in accordance with a procedure defined in an organization's program.

**i. Examiner.** A Level III or other qualified representative of the examining organization.

**j. Experience.** Actual performance or observation conducted in the work environment, resulting in the acquisition of knowledge and skill. This does not include classroom or laboratory training but does include on-the-job training (OJT).

**k. General Examination.** A written examination addressing the basic principles of the applicable NDI method.

**l. Grandfathered.** Certification of individuals that were certified to a previously acquired level as detailed in the written practice. The employer is still required to certify the individual by ensuring they meet the requirements of the certification standard.

**m. Indication.** An observation or indication that is the result of a test being performed that requires interpretation to determine its significance.

**n. Inspector.** A qualified individual designated by an organization to provide inspection services.

**o. Instructor.** An individual qualified and designated, in accordance with this guidance, to provide classroom or laboratory training for NDI personnel. The instructor:

(1) Should have the necessary skills and knowledge to plan, organize, and present classroom, laboratory, or OJT programs of instruction in accordance with approved course outlines, in the method for which he or she is qualified.

(2) Should be thoroughly familiar with the theory and practical applications of the method as utilized by the organization.

(3) Should not conduct NDIs for the acceptance of parts unless he or she is properly qualified.

**p. Interpretation.** The determination of whether indications are relevant or irrelevant.

**q. Method.** One of the disciplines of NDI, or NDT (e.g., radiography or ultrasonic), within which different techniques exist.

**r. Nondestructive Testing (NDT).** NDT is defined as inspections, tests, or evaluations which may be applied to a structure or component to determine its integrity, composition, electrical or thermal properties, or dimensions without causing a change in any of these characteristics.

**s. On-The-Job Training (OJT).** Training in the work environment. Learning objectives should include instrumentation setup, equipment operation, recognition of indications, and interpretation and should be accomplished under the technical guidance of an experienced Level II, Level III, or other designated individual.

**t. Organization.** A corporation or other similar entity established to provide or receive NDI services.

**u. Outside Agency.** An independent body under contract for NDI services which may include the training and examination of personnel to the requirements of a standard. Consultants and self-employed individuals are included in this definition.

**v. Practical Examination.** The hands-on examination used to demonstrate an individual's ability to practice the NDI methods that will be performed for the organization. Questions and

answers do not need to be written, but a checklist should be used and observations and results should be documented.

- w. Procedure.** A detailed, written instruction for conducting NDIs or qualifying personnel.
- x. Qualification.** Demonstrated skill, training, knowledge, and experience required for personnel to properly perform the duties of a specific job.
- y. Qualification Certificate.** A certificate issued by the organization/employer as evidence of qualification to NDI proficiency standards as defined in this document.
- z. Qualified Personnel.** Personnel qualified to perform NDIs in accordance with, and covered by, provisions of this document.
- aa. Quality Manual.** The organizational procedures describing the structure, processes, and resources needed to implement and maintain a quality system.
- bb. Specific Examination.** The written examination to determine an individual's understanding of procedures, codes, standards, and specifications for a given method used by the organization.
- cc. Standardization (Instrument).** Process by which the unit/equipment being used for the inspection is properly adjusted to a reference standard, procedure, and/or operation prior to using the equipment for the examination.
- dd. Technique.** A procedure within a method. For example: ultrasonic immersion testing used as a part of the ultrasonic method, or Fluorescent Penetrant Inspection (FPI) as a part of penetrant inspection.
- ee. Test Sample.** Item such as a part, image, and/or standard that has artificial or natural discontinuities, flaws, and/or conditions used for practical exams to demonstrate an individual's knowledge and proficiency in the method the individual is being tested for.
- ff. Trainee.** An individual participating in a training program for an NDI method who is not yet qualified. Trainees should obtain work experience only under the direct supervision of a qualified instructor, Level II, or Level III in the same method. Trainees should not independently conduct tests; make, accept, or reject decisions; or perform any other NDI functions.
- gg. Training.** An organized and documented program of activities designed to impart the knowledge and skills necessary for qualification. This program may be a mix of classroom, laboratory, programmed self-teaching, and OJT.

**6. STANDARDS FOR QUALIFICATION, CERTIFICATION, AND TRAINING OF NDI PERSONNEL.** Multiple aviation regulations require that organizations utilize competent/proficient individuals to ensure satisfactory maintenance. The training and qualifications of NDI individuals is critical, and NDI organizations should accomplish it in accordance with accepted industry standards. In the United States, there is no national certification requirement or standard to determine that NDI personnel are qualified to accomplish

NDIs. However, NDI organizations typically use multiple national or international standards to develop a training and qualification program. Individuals wishing to demonstrate competency to perform NDI should:

(1) Have OJT with an appropriately certified organization.

(2) Meet the criteria set forth in one of the following acceptable standards listed below:

(a) AIA-NAS-410, Aerospace Industries Association, National Aerospace Standard, NAS Certification & Qualification of Nondestructive Test Personnel.

(b) ATA Specification 105, Air Transport Association, Guidelines for Training and Qualifying Personnel in Nondestructive Testing Methods.

(c) Canadian National Regulations contained in CAN/CGSB-48.9712-95, Qualification and Certification of Nondestructive Testing Personnel.

(d) International Organization for Standards (ISO) Document: ISO 9712, Nondestructive Testing – Qualification and Certification of Personnel.

(e) MIL-STD-410E, Military Standard, Nondestructive Testing Personnel Qualification and Certification (acceptable, although now rescinded).

(f) American Society for Nondestructive Testing, Inc. (ASNT), Recommended Practice SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing.

**NOTE: This document is intended as a guideline for organizations to establish their own written practice for the qualification of NDT personnel. It is not intended to be used as a strict specification, but may be used as one.**

(g) Certain international NDI standards accepted by other approved regulatory agencies and national qualification programs have been, and may be considered to be, acceptable standards. In particular, European standard prEN 4179, Qualification and Approval of Personnel for Nondestructive Testing, is acceptable. (This document is now harmonized with AIA-NAS-410.)

(3) Other standards or alternative methods of qualification and certification as described in their quality manual may be satisfactory if found acceptable by the Administrator.

(4) Qualifications may be established by completing the qualification, examination, and reexamination requirements described in paragraphs 7 through 11.

**7. NONDESTRUCTIVE TESTING METHODS.** Qualification of personnel in accordance with this AC should be applicable to the following methods:

- Radiographic.
- Magnetic Particle.
- Ultrasonic.

- Liquid Penetrant.
- Eddy Current.
- Thermography/Infrared.

**NOTE: Methods other than those listed above, such as acoustic emission, neutron radiography, leak testing, holography, Computed Tomography (CT), or any other NDI method that can be used for inspection of aircraft, engines, accessories, or components, may be added if they become broadly applied within the organization and guidance exists as to their application. For example, if shearography becomes the subject of a manufacturer's Service Bulletins (SB), the Administrator would also require assurance that only qualified individuals perform those inspections.**

## 8. QUALIFICATIONS.

**a. Training, Experience, and Credentials.** To properly perform the necessary tasks, NDI personnel should have appropriate training and experience and, when required by the qualifying organization, hold a valid and current airframe and/or powerplant mechanic certificate or repairman certificate. Instructors are not required to hold such certificates unless it's a prerequisite of the qualifying organization. Possession of an FAA airframe and powerplant (A&P) mechanic certificate may be considered part of the required training experience.

**b. Competence.** NDI personnel should:

- (1) Be qualified to direct and perform inspections in the method required.
- (2) Be able to set up and standardize equipment (where applicable), read and interpret indications, and evaluate them with reference to applicable standards and specifications.
- (3) Be thoroughly familiar with the scope and limitations of the method.
- (4) Have the ability to apply detailed techniques to products or parts within the limitations of the qualifications requirements.
- (5) Be able to organize and report NDI results in a manner specified by the employing organization.

**NOTE: There is no specific certification or training required for the inspection of composites vs. metals; however, an organization should be aware that there are differences and curriculum should be adjusted accordingly.**

**c. Certification.** A certificate may be issued by the organization as evidence of qualification. This qualification certificate may define the level of qualification based on the requirements listed below. Additionally, by presenting documentation of previous training and experience to the cognizant Level III, an individual may be grandfathered to a requested level. Permanent personnel records should indicate when an individual has been grandfathered. Usually

there are three basic levels of personnel qualification: Level I, Level II, and Level III. These levels may be further subdivided for specific operations, when appropriate.

**(1) Level I Special (Optional).** Level I Special is the lowest qualification level and is task-specific. Personnel may be qualified to this level to perform a specific task on a particular component. Classroom instruction and OJT may be limited to the specific requirements to perform the task. Written evidence of qualification should be limited to a specific task and is not designed to replace higher qualification levels or for a method. An example of this level is the eddy current inspection of aircraft wheels.

**(2) Level I.** Level I should be granted for a specific method. To be qualified for Level I, an individual should have the skills and knowledge to perform specific tests, specific calibrations, specific interpretations, and evaluations for acceptance or rejection, and document the results in accordance with specific procedures. The individual should:

- (a)** Be knowledgeable of any necessary preparation of parts before or after inspection.
- (b)** Be able to follow procedures pertinent to the techniques for which he/she is qualified.
- (c)** Receive the necessary guidance or supervision from a qualified Level II, Level III, or other designated individual.
- (d)** Meet the training and experience guidelines in Table 1, Minimum Classroom Training and Experience Requirements.

**(3) Level II.** In addition to the requirements specified in the Level I qualification, the individual qualified to Level II should:

- (a)** Have the skills and knowledge to set up and standardize equipment, conduct tests, and interpret, evaluate, and document results in accordance with procedures in all techniques in the methods used by the organization.
- (b)** Be thoroughly familiar with the scope and limitations of the methods for which he or she is qualified.
- (c)** Be capable of providing OJT for trainees and other inspectors.
- (d)** Be able to organize and document NDI results.
- (e)** Be familiar with the codes, standards, and other regulatory documents which control the methods used by the organization.
- (f)** Meet the guidelines in Table 1.

**(4) Level III.** In addition to the requirements specified in the Level II qualification, individuals qualified to Level III should have the skills and knowledge to interpret codes, standards, and other regulatory documents that control the methods used by the organization.

A Level III may be qualified in one or more methods. Only individuals at this level should have the authority to approve procedures for the methods for which they are qualified. The individual should:

- (a) Be able to select the method and technique for a specific inspection.
- (b) Select and/or design equipment and reference standards.
- (c) Verify the adequacy of procedures.
- (d) Have general knowledge of all other NDI methods utilized by the organization.
- (e) Be capable of conducting or directing the training and examination of personnel in the methods for which they are qualified.

**d. Qualification Based on Previous Experience.** Personnel presently qualified to perform specific methods of NDI may request documentation citing evidence of Level I, Level II, or Level III qualification by their previous organization. By presenting documentation of previous training and experience as under a previously accepted qualification program for each NDI method, an individual may be deemed grandfathered to the requested level. It is the responsibility of the grandfathering organization to verify all requirements from the previous program meet the requirements of the new organization's program. Permanent personnel records should indicate when and to what level an individual has been qualified.

**TABLE 1. MINIMUM CLASSROOM TRAINING AND EXPERIENCE REQUIREMENTS**

NDI METHOD	LEVELS			
	CLASSROOM INSTRUCTION (HRS)		EXPERIENCE (HRS/MO.) <sup>[3]</sup>	
	Level I	Level II (with Level I Certification)	Level I	Level II <sup>[2]</sup>
EDDY CURRENT	40	40	480/3 mo. <sup>[1,4]</sup>	1440/9 mo.
ULTRASONIC	40	40	480/3 mo. <sup>[1,4]</sup>	1440/9 mo.
MAGNETIC PARTICLE	16	16	160/1 mo. <sup>[1]</sup>	480/3 mo.
PENETRANT	16	16	160/1 mo. <sup>[1]</sup>	480/3 mo.
RADIOGRAPHY	40	40	480/3 mo. <sup>[1,4]</sup>	1440/9 mo.
THERMOGRAPHY / INFRARED	40	40	210 hrs. <sup>[1,4]</sup>	1260 hrs.
OTHER <sup>5</sup>	40	40	480/3 mo.	1440/9 mo.

**NOTES:**

1. To be qualified, a trainee must complete the required classroom training and fulfill the requirements in paragraph 10, Examination.
2. A Level I may be upgraded to Level II after satisfactory completion of required experience in a method.
3. Initial experience may be gained simultaneously in two or more methods if:
  - a. The candidate spends a minimum of 25 percent of work time on each method for which evidence of qualification is sought, and
  - b. The remainder of work time claimed as experience is spent in NDI-related activities defined in the employer's written practice.
4. During the first 90 days, the individual should independently accomplish only procedures for which he or she has previously been qualified by OJT. Documentation is required.
5. The "Other" category is included as minimal guidance for anything else, such as shearography, holography, etc.

**9. REQUIREMENTS FOR QUALIFICATION.**

**a. Establishing a Written Program.** The organization should establish a written program for the control and administration of personnel training, examination, qualification, and documentation. This program should include a method for maintaining proficiency, including recurrent training and steps to decertify, retrain, or recertify as required.

**b. Providing Qualified Instructors.** The organization should provide qualified instructors who have satisfactorily completed an approved NDI program for the applicable testing method. Such individuals should have demonstrated practical experience and knowledge of the subject. At the option of the organization and as provided in their written practice, a qualified outside agency may be engaged to provide NDI training, qualification, and testing.

**c. Organized Training.** Qualified personnel should have completed sufficient organized training to become familiar with the principles and practices of the applicable test method. The training program should include OJT instructions in basic principles, products, equipment, operating procedures, test techniques, and review and analysis of inspection/test data that the

individual will encounter in his/her work assignment. Upon becoming qualified, personnel are entitled to notification within a reasonable amount of time.

**d. Determining Personnel Qualifications.** Qualification of personnel should be based on demonstration of satisfactory performance as determined by procedures outlined in paragraph 10. To be considered qualified, a candidate should satisfy one or more of the following criteria for the applicable NDI skills:

**(1) Level I Special.** Initial classroom hours and OJT experience should be sufficient to qualify an individual for a specific task. To be qualified, the individual must meet the requirements of the organization's written procedure.

**(2) Level I/Level II.** Table 1 lists the required classroom training hours and OJT/experience and testing requirements to be used in establishing written practices for initial qualification to Level I or Level II.

**(3) Level III.** In order to qualify for Level III, a candidate should, at a minimum, meet one of the following requirements:

**(a)** Have graduated from a minimum 4-year college or university curriculum with a degree in engineering or related science, plus 1 year minimum experience in NDI testing in an assignment comparable to that of an NDI Level II in the applicable NDI method(s).

**(b)** Have completed 2 years of engineering or related science study at a university, college, or technical school, plus 2 years' experience in assignments at least comparable to that for NDI Level II in the applicable NDI method(s).

**(c)** Have 4 years' experience in an assignment at least comparable to that of an NDI Level II in the applicable NDI method(s).

**10. EXAMINATION.** This paragraph outlines examination guidelines for Levels I, II, and III. The examination should consist of demonstrations in the following five segments to confirm physical and technical qualification:

**a. Required Examinations.**

**(1) Physical Examination.**

**(a) Vision.** An examination to ensure near vision of at least one eye, either corrected or uncorrected, such that the individual can read Snellen equivalent of 20/25 (Jaeger #1). The examination must be on a periodic basis, not to exceed 1 year.

**(b) Color Perception.** Distinguish and differentiate between colors necessary for the inspection method for which qualification is sought. Color vision testing need only be accomplished one time, usually at the initial vision examination. The responsible Level III qualified examiner should evaluate any limitations in color perception prior to certification and approve in writing.

(c) **Physical Requirements.** The physical requirements established by the organization as a condition of employment will normally suffice.

**(2) General Examination.**

(a) **Examination Requirements.** The general examination for all skill levels should be a closed-book examination consisting of questions that cover the basic inspection/test principles relative to the applicable method and the equipment, operating procedures, and techniques that the individual may encounter in his or her assignment.

(b) **Preparing the Examination.** In preparing the examination, the organization should select pertinent questions covering the applicable method. A minimum of 40 questions should be used for the general examination and should cover reading, interpreting findings (indications), knowledge of standards, etc.

(c) **NDI Procedures.** The examination should also cover the specifications and/or standards used by the organization in its NDI procedures.

(d) **Language Requirements.** Relevant standards and documentation upon which the examination is based should be available in both English and the language used in the documentation for which evidence of qualification is sought. The examination should be in English.

(3) **Specific Examination.** As part of the classroom training, the individual being considered for qualification should satisfactorily demonstrate that he or she is familiar with and can operate the necessary test equipment and interpret the resultant information to the degree required by the instructor. The practical examination should utilize a checklist detailing the items utilized during the practical examination as well as the results and observations. This checklist should be retained as part of an employee's training records.

(4) **Practical Examination.** This experience should be accomplished in the shop area on actual components under normal working conditions. The hours of OJT are defined in the experience section of Table 1. Only personnel who have demonstrated that they possess the required knowledge and ability to meet Level I, Level II, or Level III requirements should be considered qualified. Such demonstration should include demonstration of proficiency on test samples related to tasks identified by the qualifying organization.

(5) **FAA Certification.** An individual who meets the requesting organization's requirements for satisfactory completion of the required physical, classroom training, examinations, and shop OJT, as outlined in this AC, and upon receipt of a qualification statement by his or her organization, or by another process acceptable to the FAA Administrator, may apply to the FAA for certification as a repairman with the appropriate ratings and limitations.

**b. Grading of Examinations.**

(1) A Level III or other qualified examiner as provided for in the organization's written program should conduct and grade or evaluate the qualification examinations for each level.

(2) Examinations administered for qualification should result in a composite grade of at least 80 percent, with no individual examination having a grade less than 70 percent.

**c. Practical Hands-On Exam.** The candidate shall find all anomalies and correctly define the anomalies. A checklist should be used as guidelines to ensure the candidate has performed the test/inspection properly. The candidate should find all anomalies within the test standard and, if unable find and define the anomalies, he or she should not be certified. If the candidate fails the practical exam, the candidate should be provided remedial training before retesting to ensure a complete understanding of the inspection process and equipment.

**d. Acceptance Criteria.** If acceptance criteria (e.g., reference radiographs or test samples) are not included in a standard or procedure, they should be provided as a part of the examination.

**e. Reexamination.** Candidates failing the examinations may be given time for additional studies and be reexamined at the discretion of the organization, and as provided in the organization's written program. The reexamination should not utilize the same questions, test samples, or indications that were used in the initial examination.

**11. REQUALIFICATION/RECURRENT TRAINING.** Requalification examinations should consist of a demonstration of proficiency in the procedure for which the applicant is being examined. Level I Special personnel shall be recertified for each certification held at intervals not to exceed 1 year. Levels I and II personnel shall be recertified at intervals not to exceed 3 years. Level III personnel should be recertified at 5-year intervals. Personnel should be required to be retrained or reexamined and their qualification certification continued or revoked in accordance with the organization's written program or in accordance with the industry standard utilized by the certifying organization and at the discretion of the organization when an individual:

**a.** Demonstrates unsatisfactory performance, or where data indicates that performance of an individual is unsatisfactory. Unsatisfactory performance may be determined by the responsible person from the organization who originally qualified the individual or by some other documented method approved by the organization.

**b.** Has been inactive in the method for a 6-month period or other shorter interval as provided in the organization's written program.

**c.** The vision examination time limits per subparagraph 10a(1) have expired.

**12. RECORDS.** The organization should maintain appropriate personnel training records in accordance with their qualification program for as long as an inspector's qualification is in effect. Records must be available for audit by authorized personnel, and should at a minimum specify the date, time, and place of qualification, the employing organization, and the particular details applying to the certificate holder, such as level, special qualifications or limitations, and standards under which the holder is qualified. In addition, the records must include a copy of any FAA repairman certificates issued to the individual.



/s/

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