TECHNICAL COMISSION APPROVAL

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QUALIFICATION AND CERTIFICATION OF NDT PERSONNEL

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1. DOMAIN

The present procedure is applicable for the qualification in authorised CIE, of the personnel who perform non-destructive examinations in the aeronautical industry, by levels of competence (Level 1-Limited, Level 1, Level 2 and Level 3) and the certification of Level 3 personnel by issuing the Authorisation Certificate.

2. SCOP

2.1 According to this procedure, RO-NANDTB is an organization representing the national aeronautics industry in the field of NDT:

- organizes and conducts examination sessions in certified CIE for NDT Level 3 personnel
- authorize Outside and/or Inside Organisations for NDT personnel Training and Examination;
- may participate as an observer at the training and examination sessions for NDT Level 1- Limited, Level 1 and Level 2 personnel organised by authorized CIE;
- recognizes the qualifications / authorizations of NDT Level 1, Level 2 and Level 3 personnel, conducted in training and examination centers accreditated by the NANDTB's recognized by the Aerospace NDT Forum.
- issues the Authorisation Certificate for NDT Level 3 personnel

2.2 NDT personnel performing non-destructive examinations in the aeronautical industry and who, at the date of entry into force of this procedure, is holding a valid Authorization Certificate issued by AACR under the RACR-NDT, maintain that authorization until its expiry date

2.3 This procedure applies to personnel using NDT methods to test and / or accept materials, products, components, assemblies or subassemblies for both production and maintenance. The procedure applies to the personnel directly responsible for the technical adequacy of the NDT methods used, personnel approving instructions and / or work procedures, auditing facilities, or providing NDT technical support or training.

2.4 The procedure does not apply to persons who have only administrative authority, NDT staff surveillance authority or NDT personnel working on the development of NDT technologies for further implementation and to be approved by certified Level 3 personnel.

3. REFERENCE DOCUMENTS

EN 4179	Aerospaces series. Qualification and approval of personnel for non-destructive testing
NAS 410	NAS certification and qualification of non-destructive test personnel, standard practice
SR EN ISO 18490	Non-destructive testing. Evaluation of vision acuity of NDT personnel

SR EN ISO 9712	Nondestructive testing. Qualification and certification of NDT personnel
ANDTBF_08	Organisation, Duties and Responsibilities of NANDTB's as members of ANDTBF
RACR-NDT	Certification of NDT personnel in aeronautical industry and of Training and Examination Centre
RO-NANDTB 01	Documents control
RO-NANDTB 03	Archiving documents
RO-NANDTB 04	Certification of NDT personal training and examination centers
RO-NANDTB 05	CIE auditing

4. DEFINITIONS AND ABBREVIATIONS

4.1. DEFINITIONS

Authorization: Written statement given by RO-NANDTB that a Level 3 person or a CIE meets the requirements of this standard and implicitly of EN 4179/ NAS 410.

Basic examination: An examination to verify the Level 2 knowledge of Level 3 candidates in the methods used within the organization.

Candidate: a person who applies for certification in accordance with this procedure and who works in the field of non-destructive testing under the supervision of certified NDT personnel, in order to gain necessary experience to support the qualification examination.

Certification: Written declaration given by the employer that a person has met the requirements of EN-4179 / NAS-410.

Closed book examination: An examination administered without access to any reference materials.

Committee meetings panel meetings: Meetings, conferences, symposia, seminars, trade association meetings, panels, organized or sponsored by a regional, national or international NDT organization or technical society

Committee projects: Specific identifiable official activities of regional or national technical societies, committees or work groups

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

Direct-readout instrument instruments that physically display measurements in dimensional or electrical units (e.g. inches, millimetres 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

Documented: Condition of being recorded in written or electronic form

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

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

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.

Examiner: A Level 3 certified to EN-4179 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

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.

Formal education: Engineering or science studies at a technical school, college, or university

Formal training: An organized and documented program of learning activities designed to impart the knowledge and skills necessary to be qualified to EN-4179 / NAS-410 standard. Formal training may be a mix of classroom, practical and programmed self-instruction as approved by the Responsible Level 3 or Examiner.

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

Indication: Response or evidence of a condition resulting from an NDT inspection that requires interpretation

Instructor: Person who conducts the training of Level 1 or Level 2 personnel, designated or approved by the Level 3 Responsible or the Examiner.

Interpretation: determination of whether indications are relevant or non-relevant

NDT method: one of the disciplines of non-destructive examinations (eg ultrasound examination, radiography, etc.) in which there can be several techniques

NDT Technique: A category within a method (ex: ultrasonic immersion testing)

Non-film radiography: Radiographic imaging that does not use a film-based recording medium. Non-film X-ray includes but is not limited to Computed X-ray, Digital X-ray, Radioscopy or Computed Tomography.

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

Operating approval: written statement issued by the employer, based upon the scope of certification, authorizing the individual to carry out defined tasks

Operator / Personnel NDT: personnel performing nondestructive examinations in the field of aeronautics.

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.

Practical examination: An examination to demonstrate an individuals ability to conduct an NDT method as used by the employer. Questions and answers need not to be written, but a checklist must be used and observation and results must be documented.

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

Procedure: A written general “how to” instruction for conducting a given process. Procedures are then used to develop work instructions.

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

Responsible Level 3: Level 3 person designated by the employer with the responsibility and authority to ensure that the requirements of this document are met and to act on behalf of the employer

RO-NANDTB: An independent aerospace organization representing a nation's aerospace industry that is chartered by the participating of main organisations performing NDT and

recognized by the AACR and/or AAMN regulatory agencies to provide or support NDT qualification and/or examination services

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.

Sub-contractor: Organization responsible to the prime contractor for the manufacture or maintenance of aerospace products. For the purposes of this document, this includes suppliers and processors.

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.

Training and Examination Center for NDT personnel (CIE): an internal or external organization that is capable of training and examining NDT personnel in aeronautics in accordance with the requirements of this procedure. CIE must be authorised by RO-NANDTB.

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. ″aluminium extrusions″ or ″steel brackets″), or assembly. These are sometimes referred to in the industry as ″technique sheets″ or ″data cards″.

Written document: electronic or paper copy.

Written practice: a document that describes an employers requirements and methodology for controlling and administering the NDT personnel qualification and certification process.

4.2. ABBREVIATIONS

AACR	Romanian Civil Aeronautical Authority
AAMN	Romanian Military Aeronautical Authority
AC	Autorization Certificate
CIE	Training and Examination organization for NDT Personnel
RO-NANDTB	Romanian National Aerospace NDT Board
NDT	Nondestructive Examinations
RL 3	Responsible Level 3

5. APPLICATION FOR QUALIFICATION

The application for qualification for initial certification, extension of qualification or retraining for NDT Level 1-Limitat, Level 1, Level 2 sau Level 3, personnel will be submitted to the CIE authorized by the code form: Form 1 together with the following supporting documents, required for qualification:

- proof of completion of the theoretical qualification course in the desired method, conducted under the conditions specified in paragraph 8.2
- proof of practical experience gained in accordance with paragraph 9;
- the vision examination;
- the written procedure of the organization to which the candidate belongs / or standard applicable to EN4179 / NAS 410;
- proof of meeting the requirements presented in point 12.7.3, in the case of requalification through the credit system for Level 3 (Annex 1A).
- procedure specific to the method for which qualification is requested.

If no written procedure or method specific procedures are provided, the examination may be carried out in accordance with applicable international standards.

6. GENERAL REQUIREMENTS

6.1. RESPONSABILITIES

6.1.1. The employer

The employer is responsible both for the implementation and compliance with the requirements of EN4179/NAS 410, in compliance with this procedure, as well as for the certification of qualified personnel. Employers who use external CIE's for personnel qualification are responsible for ensuring that their own personnel are appropriately qualified. The employer is solely responsible for the certification of its employees and cannot certify personnel from another employer. Individuals cannot qualify themselves. Self- employed individuals certify themselves only if they have a written procedure and have been qualified according to this procedure by another Level 3 certified person in compliance with this this procedure. The employer must designate in writing a "Responsible Level 3 person" and a "Level 3 person" for each applicable NDT method in the organization.

6.1.2. Responsible Level 3

Designated person in writing by the employer, acting on behalf of the employer in matters relating to the process of qualification and certification of NDT personnel.
RL3 must be certified in accordance with this procedure as a Level 3 person in one or more NDT methods and must have a through knowledge of the written instructions, codes, specifications and standards used by the employer.
RL3 must also have a through knowledge of the materials, components, product technologies, NDT methods and NDT techniques used by the employer.

RL3 is responsible for implementation of this procedure and for entirely administration of the qualification and certification program.
Additional examiners may be identified and delegated in writing as necessary to provide coverage for all methods used by the employer.
The Responsible Level 3 person may be from an external CIE but in this case he/she can only qualify personnel, as only the employer can certify personnel.

6.1.3. External CIE

The employer may use Level 3 personnel, certified in accordance with the requirements of this procedure, from an external CIE to develope a certification program, acting as an RL3 person, in order to qualify and examine NDT personnel and perform other Level 3 functions. An external CIE may qualify but not certify/attest the personnel. The employer shall document the suitability of any external CIE selected to properly perform any functions in meeting the requirements of this procedure. The documentation shall be of sufficient detail to justify the external CIE's ability to perform the required Level 3 functions.

6.2. WRITTEN PRACTICE

The employer shall develop and maintain a written practice for the qualification and certification of NDT personnel that meets the requirements of EN 4179/ NAS 410 standards. 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:

- Identification of qualification and certification levels used within the organization;
- NDT personnel duties and responsibilities within the organisation, for each level of qualification;
- Identification of candidate training and experience requirements;
- Identification of requirements for certification and re-certification of personnel;
- Identificattion of record keeping and archiving requirements ;
- Requirements for expiration, suspension, revocation and reinstatement of certifications;
- Description of the annual personnel proficiency review process.

6.2.1 The written practice shall be approved by the organisation Responsible Level 3.

6.2.2 The written practice and applicable RO-NANDTB procedures shall be available for review by the employer's customer(s) and regulatory agencies.

6.2.3. The written practice shall include any additional requirements applied by the employer or cognizant engineering organization, such as additional certification levels or increased experience requirements.

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

6.2.5 The written practice shall reference or include the NDT training outlines used by the employer. If an external CIE is used to provide training, the Responsible Level 3 person shall verify that the training meets the employer's requirements.

6.2.6 The written practice shall include the designation of the individual(s) or CIE 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.

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

6.2.8 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.

6.3. NDT METHODS

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

- Penetrant Testing **(PT)**
- Magnetic Particle Testing **(MT)**
- Thermographic Testing **(TT)**
- Eddy Current Testing **(ET)**
- Ultrasonic Testing **(UT)**
- Radiographic Testing **(RT)**

For common methods, the minimum training, experience and examination requirements are detailed in Chapters 8, 9 and 10 of this procedure and serve as guidance for current methods or developing methods.

6.3.1. Other methods / Emerging methods

If there are requirements for qualifying NDT personnel for other NDT methods that are used to determine acceptance or suitability for a particular use of materials, parts, components, subassemblies or assemblies, RO-NANDTB may approve CIE's with appropriate facilities (see RO-NANDTB 04). The training and experience requirements for the new methods are presented in para. 9.4.

6.3.2. Requirements for personnel experience, training and examinations for these other methods must be documented by the employer in the written procedure.

7. LEVELS OF QUALIFICATION AND CERTIFICATION

7.1. GENERAL

NDT personnel from aeronautical industry must be qualified in accordance with this procedure, according to their studies, training, physical skills and practical experience. Independently of the qualification obtained in the authorized cie, the ndt personnel from the aeronautical industry must be certified by the employer.
If the employer does not wish to use all levels, those levels to be used shall be documented in the employer's written procedure.
Depending on their qualification, NDT personnel will be classified on one of the following levels:

7.2. 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, Level 2 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;
- not make decisions to accept or reject the products/parts submitted for inspection
- not independently conduct tests;
- not independently perform any other NDT function.

7.3. LEVEL 1

In the method in which is certified, Level 1 persons 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.

7.4. LEVEL 1- LIMITED

The requirements for Level 1- Limited are defined in Annex 4

7.5. LEVEL 2

In the method in which is 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 and their maintenance.

7.6. LEVEL 3

In the method in which is 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 able of assuming technical responsibility for the NDT facility and personnel;
- be capable of selecting the method and technique for a specific inspection;
- be able 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 and their 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 (CIE) to ensure the requirements of the written practice are met.

7.7. 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).

8. 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 para.7. Formal training shall be conducted prior to, or in conjunction with, on-the-job training. Any additional training will be documented.

8.1. THEORETICAL TRAINING

The theoretical training within the authorised CIE will be carried out by instructors who have the necessary knowledge to present the subjects they are going to support to the students and have the ability to plan and organize the theoretical and practical courses in accordance with the approved course outline. Instructors will be designated or approved by RL3. It is preferable that the instructors are qualified Level 3 in the method for which the course is sustained.

8.2. MINIMUM TRAINING HOURS

The minimum training hours for Level 1 and Level 2 are provided in Table 1 and Table 1A for the specified NDT methods. All completed NDT training shall be documented. For NDT methods not covered by Table1, the minimum training requirements are established by RL3. Military equivalency of training and experience can be determined by the RL3 person or Examiner in accordance with paragraphs 8.3, 9.2 and 9.3. for certification Level 3.
For current certified Level 3 radiography personnel transitioning to either film or non-film radiography is required 40 additional hours of training.
General, specific and practical training may be obtained with the employer or external CIE but shall always be supplemented by practical on-the-job training with the employer.

TABLE 1 – The minimum formal training hours for Level 1 and Level 2

Metodă	Nivel 1	Nivel 2 cu certificare anterioară Nivel 1	Nivel 2 fără certificare anterioară Nivel 1
PT	16	16	32
MT	16	16	32
TT	20	40	60
ET	40	40	80
UT	40	40	80
RT film or non-film	40	40	80
RT film and non-film	60	60	120

TABLE 1A – RT formal training hours for transition to film and non-film

Additional formal training hours		
Current level 1	Current level 2	Current level 1 to Level 2 film and non-film
20	40	80

Note: Additional training hours must be done in the appropriate manner.

8.2.1. All training shall be conducted in accordance with a detailed course outline approved by the Responsible Level 3 or Examiner. 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 regulations;
- applicable test techniques and the advantages and disadvantages of each;
- limitations and capabilities of each test method and test technique;
- applicable specifications, codes, operating procedures and work instructions;
- if applicable, evaluation, interpretation and documentation of test results.

If an outside agency (CIE) is used to provide training, the Responsible Level 3 person shall verify that the training meets the employer's requirements. A guidance for minimum training requirements is provided in Annex 3.

8.3. 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.

8.4. EQUIVALENT TRAINING

For personnel previously certified under NAS410, EN 4179 or other recognized NDT qualification program, the adequacy and equivalency of their previous training to the requirements of Table I and Table IA shall be determined and documented by the Responsible Level 3 or Examiner. All or aportion of previous hours may be accepted as applicable.

8.5. HEALTH AND SAFETY TRAINING.

8.5.1. All regulations relating to hazardous substances, accident prevention and safe working practice practices shall be strictly adhered to. Safety-related training requirements shall be determined in accordancewith Romanian codes and regulations

8.5.2. 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.

9. EXPERIENCE

9.1. ACCUMULATED EXPERIENCE

9.1.1. 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.

9.1.2. Minimum experience requirements for a candidate for Level 1, Level 2 certification withoutprior certification on Level 1 and Level 2, are listed in Table 2 and Table 2A. The requirements for Level 3 are shown in Table 3 or, as appropriate, in Table 4.

9.1.3. On-the-job training for the accumulation of experience must be supervised by certified personnel at least Level 2. For candidates who have experience, the documentation must be available to be checked for the person, date, task, and personnel who made the direct observation.

TABLE 2 – Minimum experience requirements for Level 1 & Level 2

	Experience time in hours		
Method	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
TT	200	400	600
ET	200	600	800
UT	200	600	800
RT film or non-film	200	600	800
RT film and non-film	220	780	1000

TABLE 2A – Experience requirements for transition to film and non-film

Additional Minimum Experience Time in Hours		
Current Level 1	Current Level 2	Current Level 1 to Level 2 film and non-film
20	200	800

Note: The previous hours of experience must be in the applicable technique.

TABLE 3 – Minimum experience requirements for Level 3 in Common Methods

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

Notes:
1. Additional experience required for Level 3 RT, moving from film to non-film or vice versa, is 240 hours with guidance or supervision from an Examiner, Instructor, or CIE.
2. The experience required for Level 3 authorization relates to the activity as a Level 2 certified NDT operator.

9.2. 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 organisation Responsible Level 3. 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.

9.3. 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 2, Table 2A, or Table 3 shall be determined and documented by the organisation Responsible Level 3.

9.4. EMERGING METHODS

9.4.1. The minimum required training and experience hours for test methods used by the employer that are not listed in para. 6.3 shall be established by the Responsible Level 3 person.

9.4.2. **Levels 1 and 2.** When determining training or experience hours for new test methods not listed in Table 1, Table 1A, Table 2 and Table 2A, the minimum hours shall be based on the requirements for a test method of similar complexity listed in the mentioned tabels.

This only applies to "other" or emerging test methods as defined in para.6.3.1 and cannot be applied to penetrant testing, magnetic particle testing, ultrasonic testing, radiographic testing, thermographic testing, or eddy current testing.

9.4.3. **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 with the following conditions:

- RO-NANDTB does not have a qualification process for Level 3 in the new method. RO-NANDTB will have to use this process if it has it.
- the candidate has the skill and ability to carry out the Level 3 responsibilities in 7.6.
- all of the requirements in Table 4 are met

TABLE 4 — Minimum requirements for first Level 3 person 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 h	300 h	At least 1 (one) previous Level 3 or 2 (two) Level 2 certifications held
2 (two) years of engineering or science study at a technical school, college or university	60 h	200 h	At least 1 (one) previous Level 3 or 2 (two) Level 2 certifications held
3–4 (three-four) year science or engineering undergraduate degree	40 h	200 h	At least 1 (one) previous Level 2 certification held.

10. EXAMINATION

10.1. REQUIREMENTS

10.1.1. Examinations to verify the technical qualifications of NDT personnel should include a vision examination, a general examination, a specific examination, and a practical examination for each method in which NDT personnel is to be certified.

The visual acuity examination must be performed before the first certification of the personnel and periodically thereafter.
Specific examinations shall be administered after a minimum of 75 % of Table 2 requirements have been completed.
The practical examination will be administered only after the experience requirements indicated in Table 2 have been fully met.

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 or regulatory agencies.

10.1.2. Questionnaires and test samples must be available to NDT personnel only during the examinations, in Romanian / English. Verbal translation of written examinations during the examination is not permitted.

10.1.3. The examination material consists of paper-based materials as well as test parts for examination.

10.1.4. The examination package includes:

- general questions about the method requested;
- specific questions about the method requested;
- reference materials if applicable (tables, specifications, standards, etc.);
- checklists for practical examinations.

10.1.5. Questions for theoretical examination valid at the time of the exam are randomly chosen by the examiner from the CIE collection of questions.

10.2. VISION EXAMINATION

10.2.1. Vision examination for NDT personnel shall assure that the applicants near vision and color perception meet the requirements of Table 5.

TABLE 5 – Requirements about vision examination

Examination Requirements	
Near vision options	• Tumbling E according to SR EN ISO 18490 • 20/25 (Snellen) at 40.64 cm ± 21.54 cm* • Jaeger No. 1 at no less than 30.48 cm*
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. Simulated vision test and distance is not permitted.

** For RT personnel, Dr.Kolbl's Shades of Gray differentiation test will be administered where at least 20 readings must be correctly performed.

10.2.2. Requirements for near vision should be administered annually, and those on color perception should be administered at a maximum of 5 years. Visual acuity examinations is not required for instructors or auditors.

10.2.3. The form used for the vision examination is determined by the organization to which the candidate belongs and must contain the requirements of Table 5.

10.2.4. Vision examination should be administered by trained personnel, designated by RL3 of the organization or by qualified medical personnel.

10.2.5. If a corecțiuni is required to pass the visual acuity exam, then this correction must be applied during all tests / inspections.

10.2.6. Any limitations on color perception must be evaluated by the organization's RL3 before certification and must be approved in writing, if applicable.

10.3. GENERAL EXAMINATION

10.3.1. The general examination for all levels shall be a ″closed book examination″.

10.3.2. A minimum of 40 questions shall be administered for the general examination at Levels 1 and 2.

10.3.3. The general examination of a candidate for Level 3 initial qualification includes a basic examination and a NDT method examination for which qualification is required. The basic examination questions shall address the general knowledge of other methods used at the employer as well as the method for which certification is sought. Passing a "basic" examination covering the other NDT methods used within the organisation, before passing any NDT method examination shall be considered satisfactory evidence the other NDT methods have been satisfactorily covered.

For each of these methods, a minimum of 15 „closed book" questions are administered. The minimum mark is 80%. This note does not count towards the final average.

The basic exam will be administered only once at the initial certification for the methods used by the employer. For new methods introduced by the employer, the Level 3 shall pass a new basic exam from the remaining methods introduced.
When changing the employer, Level 3 will take a new basic exam from the NDT methods applicable to that employer, if they are different from the ones he took the initial exam. When changing the employer, Level 3 will take a new basic exam from the NDT methods applicable to that employer, if they are different from those at which he took the initial exam. RL3 of the new employer will be responsible for organizing this basic exam, which will have to be performed within a maximum of 6 months after employment. A qualification course is not required for these methods.

A minimum of 40 questions must be administered on the NDT method exam for which certification is sought.

Possession of a current ASNT, ISO 9712, or NANDTB certificate at the appropriate level may be satisfactory evidence that the general examination requirement is satisfied as defined in the employer's written practice.

10.4. SPECIFIC EXAMINATION

10.4.1. 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.

10.4.2. A minimum of 30 questions shall be administered for the specific examination.

10.4.3. 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.

10.4.4. The reference materials provided during the examination will be clearly indicated on the specific examination questionnaire.

10.5. PRACTICAL EXAMINATION

10.5.1. 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.

10.5.2. 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. For this purpose, the parts used in the exam will be kept under lock and key and will be made available to the candidate only at the time of the exam.

10.5.3. Test pieces for examination shall be distinctly marked with the **E** letter and known defective parts used for training shall be marked with the **I** letter.

10.5.4. 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.

10.5.5. 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.

Note: A guideline for drawing up the checklist for the practical examination of Level 1, Level 2 and Level 3 personnel is presented in Annex 2A and Annex 2B.

10.5.6. Level 1- Limited

The requirements for Level 1- Limited are defined in Annex 4

10.5.7. Level 1

10.5.7.1. The candidate shall demonstrate proficiency by using a work instruction to process at least 2 (two) 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.

10.5.7.2. The test samples shall be representative of the products to be encountered by the candidate in the performance of his/her duties with the employer.

10.5.7.3. The checklist shall include proficiency in the use and standardization of equipment and materials, adherence to procedural details, according to Annex 2A.

10.5.8. Level 2

10.5.8.1. The candidate shall demonstrate proficiency by inspecting at least 2 (two) 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.

10.5.8.2. The test samples 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.

10.5.8.3. The candidate shall document the NDT results in accordance with the applicable acceptance criteria. An practical examination report shall be drawn up for recording the results.An example for practical examination report is presented by the code form: Form 4.

10.5.8.4. 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, according to Annex 2A.

10.5.9. Level 3

10.5.9.1. 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.

10.5.9.2. 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, according to Annex 2B.

10.5.9.3. 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. If the practical exam is administered at internal CIE, parts with known defects for the exam will be brought by the examiners from other CIE's and will not be among those known to Level 3.

11. ADMINISTRATION OF EXAMINATIONS

11.1. GENERAL

The administration and grading of all examinations shall be the responsibility of the RL 3 person or Examiner(s).
The Responsible Level 3 person 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 RL 3 person or Examiner(s). Responses to essay and fill-in questions shall be evaluated by the Responsible Level 3 person or Examiners 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.

11.1.1 Examiners

Examiners must be qualified Level 3 in accordance with this procedure for the method in which the examination is requested. An examiner can prepare, administer and grade written or practical NDT examinations and administer the qualification process in the method in which he/she is qualified.

Examiners must have a through knowledge and be familiar with the specifications, codes, NDT techniques, processes and products of the organization in which the candidates work. When an external CIE is used, the interested organization will provide the CIE with the specific documentation in order to prepare the specific questions.
RL3 will designate the examiners for Level 1, Level 1 – Limited, Level 2 personnel and RO-NANDTB for Level 3 personnel.

11.2. ADMINISTRATION OF EXAMINATIONS AT CIE

11.2.1. When an external CIE is used to administer examinations, the employer shall ensure that all individuals involved in the administration of the examinations meet the requirements of the current standards. The ultimate responsibility for compliance to this document shall remain with the employer.

11.2.2. Examinations for qualification at all levels (Level 1, Level 2 and Level 3) are organized according to therequirements of the present procedure. The logical flows of these activities are presented in paragraph 11.2.4.

11.2.3. When presenting the exam, each candidate must have a valid proof of his identity. It must be shown, on request, to the examiner or to the examination committee. Any candidate who, during the examination, does not comply with the rules or commits a fraudulent act or is an accomplice to such an act, is excluded from continuing the examination. The candidate must wait for at least one year before being able to submit a reexamination.

11.2.4. For the administration of the examinations, RO-NANDTB will use an **external** or **internal CIE**. It must be authorized by RO-NANDTB in accordance with the RO-NANDTB 04 procedure.

A. Administration of examinations for Level 1 and Level 2 personnel at the certified CIE

1. External CIE or Employer (internal CIE), shall send to RO-NANDTB a letter notifying the planning of an examination session at least 15 days in advance.
   The notification will indicate the personnel to be examined, the reason for the examination, the testing methods and the level for which the examination is being carried out and the examiners designated by the Responsible Level 3.
2. RO-NANDTB registers and archives information.
3. If it considers it necessary, the CIE may require clarification or additions to the file.
4. If deemed necessary, RO-NANDTB may send observers
5. The CIE administers training and general theory, specific and practical theories.
6. All training and examination documents are archived by the authorized CIE for a period of 10 years.
7. Following the examination, the authorized CIE sends to RO-NANDTB the minutes of the completion of the qualification process containing the names of the operators, the method, the level, the exam results, the names and qualifications of the examiners and the names of the observers, if any.
8. RO-NANDTB registers and archives the minutes

B. Administration of examinations for Level 3

1. For Level 2 personnel applying for Level 3 initial admission, the employer sends RO-NANDTB a letter of application for authorization (Form 1) and the supporting qualification file which consists of proof that the applicant has previous Level 2 Certification and meets the experience conditions shown in Table 3.
   For Level 3 personnel for which the employer requests the prolongation of the certification, the employer submits to RO-NANDTB the application letter for examination that must contain a reference to the Level's 3 certificate. The employer shall transmit the specific working documents in the non-destructive testing methods

for which the examination is requested. It is clearly specified if the employer wants practical examination "on the job". The specific requirements of the employer are indicated.

2. If deemed necessary, RO-NANDTB may request clarification or additions to the file.
3. When the file is complete, RO-NANDTB approves the examination
4. If there is only one application for the examination of Level 3 personnel, the examination will be administered at the Employer (internal CIE). If there are requests from several employers for the same period, RO-NANDTB will analyze the CIE's practical examination capabilities of the employing applicants and choose as the venue for the examination, that CIE which has the most active non-destructive examination. Those methods will prevail where stationary examination equipment (eg. MPI, FPI, RX lines or immersion ultrasound devices) will be available.
5. RO-NANDTB may require from other CIEs parts with known defects for the preparation of the practical examination. The use of pieces from own collections known by the Level 3, is strictly prohibited. The parts must reach the CIE where the examination will be performed.
6. RO-NANDTB designates an Examiner for each of the non-destructive testing methods for which the exam is administered.
7. The examiner receives the specific documentation and prepares based on it the set of specific questions that will be administrate to each candidate. The examiner chooses from the collection of parts with known defects the parts for the practical examination and prepares the check-lists for the evaluation of the processing applicable to the on-the-job examination or for evaluating the completeness of the prepared specifications/procedures.
8. The RO-NANDTB examiner administers the examination of general theory, specific theory and practical examination with all specific customer requirements.
9. Minutes containing exam results are sent to RO-NANDTB.
10. Examination Minutes shall be archived at RO-NANDTB, according to RO-NANDTB-03.

11.2.5. Scoring

Candidates must obtain a minimum mark of 70% on each exam. In addition, in the practical examination, if applicable, it must detect all discontinuities or conditions specified in the practical examination and obtain a minimum score of 70%. The average score for the exams (general, specific and practical) must be at least 80%. When determining the final score, the marks obtained in each of the general, specific and practical examination will have equal weight. For a Level 3 person recertified using credits, the score for the hands-on practical, if administered, will be used as the average score.

Scores for ASNT, NANDTB, or ISO 9712 NDT certificates scored as “pass/fail” and used in lieu of the general examination shall be assigned a value of 80 %.

11.2.6. Re-examination.

Candidates failing any general, specific or practical examination shall receive additional training as determined and documented by the RL 3 person or Examiner before attempting reexamination 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 tests shall contain at least 25% new questions.

12. CERTIFICATION

12.1. GENERAL

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

12.2. RECORDS

The employer shall maintain personnel certification records. The records maintained by the employer shall include the following:

- name of the certified individual;
- level, test method, and test technique(s) for which individual is certified;
- the latest written and practical examinations quizzes and the scores from the immediately previous exams;
- if Annex 1A is used, documentation of credit points used for Level 3 recertification.. Last written and practical examinations need not be maintained;
- 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;
- NDT training history that identifies the source, type of training, dates of training and course hours, and, if applicable, the documentation required by 8.3 and 8.4;
- 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 9.2 and 9.3;
- results of the most-recent (i.e. current) visual acuity and colour perception examinations;
- extent and documentation of formal education when used to meet qualification requirements;
- the name and signature of the employer's representative authorizing the certification;
- results of most recent annual proficiency review.

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 RO-NANDTB is used for qualification, all of the records listed above will be available at the employer except the current examinations which remain with RO-NANDTB.

12.3. GRANTING CERTIFICATION FOR LEVEL 1 AND LEVEL 2 PERSONNEL

For candidates admitted to the qualification exam, the authorized CIE issues a Qualification Diploma specifying qualification level and qualified methods.
Based on the Qualification Diploma and the organization's qualification and certification procedure, the employer certifies the personnel .

The validity of the Qualification Diploma and the certification is of maximum 5 years.
The records of qualification diplomas and certification documents is made by the employer according to the organization's qualification and certification procedure.

12.4. GRANTING CERTIFICATION FOR LEVEL 3 PERSONNEL

Individuals cannot certify to level 3 without prior certification to level 2 in the test method.
The valid certifications issued by RO-NANDTB can be used at a new employer only if they are supplemented with a specific and practical examinations representative for he/she specific processes and products.

12.4.1. For Level 3 personnel admitted to the exam for qualification, RO-NANDTB issues the Level 3 Personal Authorization Certificate (Form 6), specifying the qualified methods and whether they have the right to perform the non-destructive process in order to accept / reject the parts. Based on the Authorization Certificate and the organization's qualification and certification procedure, the employer certifies the personnel.

12.4.2. The validity of the Authorisation Certificate and the certification is a maximum of 5 years. The records of qualification diplomas and certification documents is made by the employer according to the organization’s qualification and certification procedure.

12.4.3. For Level 3 personnel who hold a valid Authorization Certificate for one or more NDT methods, and who request and obtain an extension of the scope of certification for other NDT methods, under the conditions of this procedure, a separate Authorization Certificate for the new method acquired is issued. If subsequently Level 3 wants to create a single Authorization Certificate, this can be done under the conditions of passing the qualification exams for the new method and aligning with the existing validity periods.

12.5. LOSS OF CERTIFICATION

Certifications may expire, be suspended, or be revoked.

12.5.1. Expiration

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

12.5.2. Suspension

Certification shall be suspended when:

- vision examination is expired;
- individual does not perform in the method certified for at least 12 consecutivemonths;
- individual fails recertification examination;
- individual's performance is found to be deficient in any manner;
- annual maintenance is expired.
- individual's performance is found to be deficient in any manner;

12.5.3. Revocation

The employer shall revoke a certification when:

- the individual does not perform in the certified method for the employer for at least 24 consecutive months;
- when employment has been terminated;
- 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.

12.6 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 person or Examiner. Certificates that have expired or have been revoked may be reinstated only by a specific and practical examination equivalent to that of the initial qualification.

12.7. RECERTIFICATION

12.7.1. The Level 1 and Level 2 certified personnel must be recertified at intervals that do not exceed 5 years. Recertification is done by successfully passing exams (specific and practical) equivalent to those given in the initial qualification.

If a recertification is also given a general examination, the result will be entered with an equal weight in the final score calculation.

12.7.2. Level 3 personnel certified to EN 4179 / NAS 410 standard, shall be recertified at intervals not to exceed five years. Recertification may be accomplished:

- by activity criteria points in accordance with Annex 1A.

or

- by successful completion of specific and practical examinations equivalent to initial certification.

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.

Note: Credit Points Interpretation for Level 3 Activity is defined in Annex 1B.

12.7.3. Credit system for recertification of Level 3 NDT personnel

Applies to NDT Level 3 personnel who hold a valid certification and does not have part acceptance / rejection duties.
Upon recertification of Level 3 with assignment acceptance / rejection tasks, using the credit system the candidate will additionally take a practical examination in one of the certified CIE's, according to para. 10.5.9.3.

a. 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.

b. 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.

c. 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 Annex 1A.

d. Level 3 personnel activity will be reported as outlined in Annex 1A, with objective evidence of the activities being carried out.

e. Approval of the activities carried out in accordance with Annex 1A must be detailed and documented in accordance with the written procedure of the organization to which the candidate belongs.

12.8. EQUIVALENCY

Equivalence of previously acquired qualifications to other employers will be in the following situations:

- the candidate was qualified by another accredited NANDTB recognized by ANDTBF, according to the requirements of EN 4179 or NAS 410, in which case the equivalence is automatic.
- the candidate was qualified by an aeronautical organization according to EN 4179 or NAS 410, in which case the qualifications (training, experience) are recognized and an exam must be passed, for certification in accordance with the organization's procedure.
- the candidate was qualified according to SNT-TC-1A or ISO 9712, in which case the qualifications are recognized and the candidate will pass an examination for certification in accordance with the organization's procedure, conditional on demonstrating the accumulation of aeronautical experience.

If the experience does not comply with the requirements of EN 4179 / NAS 410, the candidate will be admitted to the examination only after completing an internship of the organization decided by RL3.

12.9. ANNUAL MAINTENANCE

Annual maintenance for Level 1, Level 2, and Level 3, with duties in processing and/or inspecting part, is done by the employer in accordance with the organization's qualification and certification process by passing a practical exam for processing and / or inspecting parts from the organization's current products or test samples.
The performance evaluation of Level 1 or Level 2 personnel will be done by Level 3 in the method by completing the list for the practical examination presented in para. 10.5.6.
The performance evaluation of Level 3 personnel will be done by another Level 3 in the method within the organization.
The Level 3 performance assessment can be done by a Level 3 person from another organization, when delegated in writing by the employer (RL3 of the organization) if no other Level 3 in the requested method is available in the organization.
The results of these practical exams must be documented and maintained by the employer.
For its own Level 3 personnel, the employer will sends to RO-NANDTB, until the end of the month in which the certification exam had been performed, an address confirming that the Level 3 had continuous activity within the method for the last 12 months. The employer will also send the ophthalmological examination form and the results of the annual performance evaluation for personnel with inspection duties. Based on the submitted documents, RO-NANDTB completes the Annex to the Level 3 Authorisation Certificate (Form 7), applies the annual visa and sends a copy to the employer's RL3.

13. RECORDS

RO-NANDTB must maintain records for NDT personnel examinations in accordance with RONANDTB - 03.

13.1. The recordings that RO-NANDTB shall keep are:

- the information that the CIE has transmitted on the training period, the instructors, the operators, the methods, the levels and the date of the examination;
- the minutes of the completion of the training with the results of the examination complete qualification file for all examinations performed by RO-NANDTB for Level 3 personnel, at any of the certified CIEs.

13.2. Availability of records.

All records must be maintained and archived in accordance with RO-NANDTB 03, and may be submitted on request to regulatory agencies and customer organizations.

Annex 1A

LEVEL 3 AWARDED CREDIT ACTIVITY
Credit points cumulated for 5 years between year……. and year……..

Activity	Criteria	Point allocation	Max points per 5 (five) years	Y 1	Y 2	Y 3	Y 4	Y 5	Total	Max. total
Auhtoring or coauthoring technical NDT papers, presentations, or white papers	Sole Author	8	8							
	Co-author>30%)	4								
	Co-author <30%)	2								
Auhtoring, co-authoring or custodian for company or industry NDT specifications or standards	Each standard/ Specification	2	8							
Attending NDT technical sessions, committee or panel meetings organized by:	1 (one) day or 1 (one) meeting	1	8							
a. National NDT technical societies or institutes	2 (two) days	2								
b. Inter-company NDT teams comprised of members from several locations	3 (three) or more days	4								
NDT instructor teaching academic courses, or courses designated to prepare students for NDT qualification.	For each 8 (eight) hours of instruction	4	8							
Participating in technical courses or seminars	For every 8 (eight) hours of documented instruction	2	8							
Participating in technical courses or seminars for which academic credit is given	For academic credit earned	Actual 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							
NDT 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								

Total yearly										
Total cumulated for 5 years (minim 24 points)										

Annex 1B

CREDIT POINTS INTERPRETATION FOR LEVEL 3 ACTIVITY

The Credit Points table is by its nature brief and generalized. An interpretation of each category of activity is provided below to ensure a consistency of understanding by those seeking to renew their Level 3 recognition. The interpretations are as follows:

1. Authoring or co-authoring technical NDT papers and presentations

Meaning: Self-Explanatory, but the work must be published or presented at a recognized conference or seminar.

2. Authoring, co-authoring or custodian for company or industry NDT specifications or standards.

Meaning: Being tasked with the management of the development or amendment of NDT specifications. This could be chairing a Standards committee or similar. Acceptable evidence: A letter from the organisation indicating the NDT Standard or specification, date and author(s) is acceptable.

3. Attending technical sessions, seminars, committee or panel meetings of national or international technical NDT societies or institutes, inter-company NDT teams comprised of members from several locations.

Meaning: Self-explanatory. Intercompany means the participation of more than one company not simply the involvement of people from several locations or departments of the same company. Acceptable evidence: Minutes of meeting page showing attendance.

4. NDT Technical training instructor teaching courses which are designed to prepare students for NDT qualifications or other academic qualifications.

Meaning: Assisting Skills Training by delivering NDT courses or providing specialist training to staff on NDT methods and techniques. The training could be delivered internally or externally to the employer. Acceptable evidence is summary of courses delivered that includes course title, dates, client name and duration or course covers with the above information.

5. Participating in technical courses or seminars.

Meaning: Attending courses or seminars to gain knowledge on an NDT subject, or participating in the delivery of the course or seminar. Certificates of attendance are acceptable evidence.

6. Participating in technical courses or seminars for which academic credit is given.

Meaning: Training which is identified in a national framework as part of an award or qualification. Copies of results from the Institute are acceptable evidence.

7. NDT Examiner

Meaning: Developing and marking a written examination or developing, administering and marking a practical examination. Statement from Examining body detailing subject, level and date of paper is acceptable.

8. NDT related technical and/or scientific publications published either internally or externally.

Meaning: Producing an NDT paper for publication either within the Level 3's employment or externally. Acceptable evidence: Copy of paper showing title, Author(s), place of publication (journal, book, etc.) date of publication and page numbers.

9. Documented NDT contributions to company, technical society or industry committee projects.

Meaning: Contributions to NDT standards development or other NDT related projects which result from the contributions from several persons or departments.

10. Documented participation in NDT related studies, developments or investigations.

Meaning: Producing detailed NDT investigations, evaluations or reports for engineering or management consideration. It does not mean a routine NDT report. It could include assessment of new NDT equipment. Copy of front page showing project name, participants, dates and summary of work done is acceptable evidence.

11. Documented continuous satisfactory performance as a Level 3.

Meaning: Annual successful revalidation of Level 3 company authorisation. This is mostly based on the attaining of sufficient points as outlined above. Accordingly, any points allocated for this are to be considered as extra to the 24 points rolling aggregate.

12. Conduct external NDT audit.

Meaning: Audits of non-company NDT facilities. Acceptable evidence is front page of audit sheet showing name of company audited and standard against which audit was carried out.

13. Attend equipment or trade displays.

Meaning: Self-explanatory. However if a trade display is associated with a seminar, conference or other NDT technical meeting, only the meeting points may be credited. Copies of Trade Display entry passes or note from exhibitor are acceptable.

Annex 2A

CHECKING GUIDE FOR PRACTICAL EXAMINATION
LEVEL: _____ METHOD:_____

Candidate Name: **Date:**

Test Sample Code:

Max. allowable score	Actual Score	Steps targeted by the examiner	Obs.
KNOWING THE NDT EQUIPMENT			
5		System performance and functional checking	
5		Checking the parameters	
NDT METHOD APPLICATION			
5		Preparing the part (i.e. surface condition), including visual inspection	
10		Selection of the NDT technique and working conditions	
10		Adjusting the NDT and measure instruments	
20		Inspection performing – attention will be paid to handling of the parts	
5		Procedures after inspection (i.e.demagnetization, cleaning, preserving)	
DETECTING AND REPORTING OF DISCONTINUITIES / MEASUREMENTS			
10		Detecting of discontinuities	
10		Caracterization (type, position, orientation, sizing, etc.)	
10		Level 2 assesment of discontinuities according to criteria from valid specifications	
10		Drafting the inspection report	
Media			
Max. possible 100 %	**Achieved:**		

Annex 2B

CHECKING GUIDE FOR INSTRUCTION/PROCEDURE
LEVEL: _____ METHOD:_____

Candidate Name: **Date:**

Test Sample Code:

Max. Score allowable	Actual Score	Steps targeted by the examiner	Obs.
DRAFTING AN WORK INSTRUCTION for NDT (acc. to EN4179, par. 3.38)			
5		Preamble (domain, reference documents, etc.)	
5		Authorised personnel	
10		Instruments to be used, including settings	
10		Data about inspected part (description or drawing, including area of interest or scope of the inspection)	
10		Inspection conditions including preparing for inspection	
20		Process checks	
20		Detailed instructions for performing NDT	
10		Recording and classification for the inspection results	
5		Reporting of the inspection results	
5		Personnel and environment safety	
Max.possible 100 %	**Achieved:**		

Annex 3

MINIMUM RECOMMENDED THEMATICS FOR TRAINING COURSES

RADIOGRAPHY (RT)

1. **Radiographic examination (physical principles)**
2. **Equipment, sources of radiation**
3. **Radiography**
   - 3.1. Radiant image
   - 3.2. Scattered radiation. Mandatory backscatter radiation check using the letter "B" of Pb.
   - 3.3. Lead intensive screens
   - 3.4. Radiation filtering
   - 3.5. Geometric factors that influence the exposure / incident angle of the beam
   - 3.6. Geometric unsharpness / requirements
   - 3.7. Sensitometry, Contrast, Radiographic Sensitivity / Sensitivity Levels Required
   - 3.8. Exposure diagrams
   - 3.9. Factors that the density depend on
   - 3.10. Use of exposure charts (exposure calculation, exposure factors)
   - 3.11 X-ray diffraction (limiting its effects)
   - 3.12 Surface preparation for radiographic examination
4. **Film**
5. **Interpretation of radiographic films, facilities**
6. **Personal safety**
7. **Glossary of terms used in radiography**
8. **Inspection techniques**
9. **Penetrameter / IQI**
10. **Checks**

LIQUID PENETRANT (PT)

1. **Introduction to inspection with penetrant liquids, physical principles**
   - 1.1. Material discontinuities and their origin
   - 1.2. Basic principles of penetrant testing
   - 1.3. Purpose and scope of penetrant testing
   - 1.4. Comparison with other NDT methods
   - 1.5. Advantages and limitations
2. **Physical properties of the materials used**
   - 2.1. Physical quantities of physico-chemical properties of materials used in penetrant testing
     - 2.1.1. Viscosity, surface tension, penetration, wetability, solubility, toxicity, visibility, stability, volatility.
3. **Materials used for penetrant testing**
   - 3.1. Penetrants
   - 3.2. Materials used to remove penetrant in excess

3.3. Developer
3.4. Symbols for materials used for penetrating liquids
3.5. Penetrant systems and applicable sensitivity levels
3.6. Penetrant testing lines

4. Phases of Penetrant Liquids Examination

4.1. Preparing the surface to be examined. Physical and mechanical cleaning methods. Cooling parts. Surface preparation by acid attack. Methods of application of acidic attackers. Acid attack local
4.2. Application of penetrants, penetration time. Parameters
4.3. Remove excess penetrant. Use of emulsifiers. Machinery, times, temperatures, pressures specific to the organization.
4.4. Drying. Temperatures
4.5. Application of developers
4.6. Examination and evaluation. Adapting to darkness, a prerequisite for a trusted inspection. Observation conditions: white and UV light. Inspection spaces, visual aids, handling and cleaning conditions
4.7. Post-cleaning and corrosion protection

5. Examination methods

5.1. Groups of materials, commodities, material compatibility
5.2. Examination methods. Special methods
5.3. Advantages and disadvantages

6. Equipment for examination with penetrating liquids

6.1. Conventional Methods
6.2. Semiautomatic and automatic equipment
6.3. Special Equipment
6.4. Illumination conditions: white and UV light
6.5. Materials: types and quality control of products
6.6. Product protection, toxicity.

7. Indications obtained from penetrating control

7.1. General
7.2. Indications of shapes and dimensions
7.3. Development time
7.4. Persistence of indications
7.5. Cracks, overlaps, porosities, lack of adhesion
7.6. Factors affecting the appearance of irrelevant indications

8. Checks

8.1 Verification of processing materials: penetrants / emulsifiers / developer / PSM 5
8.2 Equipment check: drying tanks / inspection booth / UV lamps and white light
8.3 Periodic calibration of equipment: radiometers / thermometers / pressure gauges / regulators temperature / uniformity of drying vats / instruments for determining the size of the indications.

9. Personal and environment safety

MAGNETIC PARTICLE (MT)

1. **Introduction**
   1.1. General - Nature of defects
   1.2. General principles - ferromagnetic materials, examination with magnetic particles
   1.3. Comparison with other NDT methods
2. **Classification of materials**
   2.1. Ferromagnetic, diamagnetic, paramagnetic materials
3. **Defects**
   3.1. Defects of typical materials detected by magnetic particle examination
   3.2. Surface and sub-surface defects
   3.3. Forged, machined, cast, molded parts
4. **Magnets, magnetic fields, electric theory**
   4.1. Nature of the fields, lines of force, flow density
   4.2. The theory of magnetism, atoms, domains
   4.3. Field strength, magnetization force.
5. **Leakage fields**
   5.1. Causes, nature
   5.2. Density, direction, positioning
   5.3. Measurement
6. **Producing magnetic fields**
   6.1. Currents, circular magnetism, fields in and around a conductor
   6.2. Magnetism longitudinal
   6.3. Right hand rule, effect on the magnetic compass
   6.4. Strength of magnetic field for effective magnetization.
7. **Hysteresis**
   7.1. Full description, B / H ratio
   7.2. Permeability, retention, reluctance
   7.3. Coercive force
8. **Types of current**
   8.1. Currents and production mode, displayed currents, values
   8.2. Depth of penetration, waveform influence, skin effect.
9. **Defects orientation**
   9.1. Maximum Sensitivity, Angle, Size, Shape, Depth
   9.2. Leakage flow lines, analogy to flow theory
10. **Methods of magnetization**
    10.1. Current flow, coil, auxiliary conductor
    10.2. Induction, applied coil, flexible cable
    10.3. The magnetization direction for each method, the preferred defect orientation for obtaining to a maximum sensitivity
11. **Magnetisation equipment**
    11.1. Installations using AC / CC, pulsating, fully rectified, half-wave rectified
    11.2. Power supplies
    11.3. Portable equipment

11.4. Contact surfaces, arching
11.5. Central conductors, insulation
11.6. Magnetic Impulse
11.7. Magnetisation equipment

12. Magnetic suspensions

12.1. Types / materials applicable
12.2. Wet / Dry Methods / Continuous Method
12.3. Fluorescent methods
12.4. Stirring, visibility, mobility, concentration
12.5. Carrier liquids, ignition points
12.6. Methods of application

13. Operating phases

13.1. Basic Principles
13.2. Choosing the right flow density value
13.3. Triggered current

14. Preparing the parts

14.1. Degreasing, demagnetization, surface finishing
14.2. Colors, background, sprays
14.3. Shot peening / sand jet cleaning, pickling.

15. Inspection

15.1. Lighting conditions in the darkroom. Adapting to darkness, a prerequisite for a trusted inspection.
15.2. Instruments / aids for viewing, light levels
15.3. Corrosion protection
15.4. Number and frequency of examinations

16. Interpretation of indications

16.1. Relevant and irrelevant indications
16.2. Grinding operations, fatigue, heat treatments, cracks, inclusions

17. Demagnetisation

17.1. Decreasing CA coils, CC / CA yokes
17.2. Basic methods
17.3. Object material, geometry, homogeneity, hardness
17.4. Field strength during demagnetization, coercive force, Curie Point
17.5. Residual field checks and appropriate equipment
17.6. Executed steps and explanation

18. Checks for process control

18.1. Checking the lighting conditions: the intensity of the UV lamps and white light / white light ambient light and white light emission of UV lamps
18.2. Verification of magnetic suspension: concentration / reduction of fluorescence / contamination / viscosity
18.3. Verification of magnetization equipment: system performance, functional tests / efficacy test KETOS and AS5282 / internal short circuit / capacity test / quick break
18.4. Calibration: ampermeters / shunt / timers / indicators

19. Limits of magnetic particle examination
19.1. Penetrability, section variations, holes
19.2. Puncture holes in electron beam welding, welding
20. Documents in NDT Laboratory
20.1. Tracking Sheet. Operations plan. Operations tab. Checklists. Marking of the pieces. Acceptance standards applicable to customers.
21. Personal and environment safety

ULTRASONIC (UT)

1. Introduction
1.1. Definitions of origin of defects
1.2. General principles of ultrasound examination
1.3. Scope of application
1.4. Comparison with other NDT methods
2. Wave properties
2.1. Relationship between speed, wavelength and frequency
3. Propagation velocity
3.1. Speed for each waveform
4. Ultrasound properties
4.1. Relationship between sound pressure and particle velocity
4.2. Relationship between acoustic impedance and particle oscillation amplitude
5. Effects on sound propagation at smooth / rough surfaces
6. Incidence of waves
6.1. Normal wavelength incidence
6.2. Calculation of reflexion and transmission coefficients
6.3. Angled incidence, critical angles
7. Sonic fields and their characteristics
7.1. Beam divergence, near field, far field
8. Piezo-electricity
8.1. Piezoelectric materials, quartz
8.2. Piezoelectric effects in ceramics
8.3. Curie Temperature
9. Sound attenuation
10. Assessment of defect
10.1. Comparison with flat-bottomed artificial defects
11 Ultrasonic defectoscope
11.1. Impulse Generator
11.2. Display unit
11.3. Cathode tube
11.4. Amplifier
12 Characteristics of the equipment
12.1. Signal / Noise Ratio
12.2. Resolution

12.3. Linear Amplifier
12.4. Beam divergence

13 Transducers
13.1. Choosing the support material for the piezoelectric plate, membranes
13.2. Impedance matching with defectoscope

14 Characteristics of the transducer
14.1. Resonance frequency, spectrum, bandwidth
14.2. Sensitivity, resolution power, field of work
14.3. Focused transducers

15 Immersion examination of stepped parts

16 Automation
16.1. Distance-amplitude correction, gates, dynamic tests, calibration

17 Documents in NDT Laboratory
17.1. Tracking sheet. FCAN. Operations plan. Operations tab. Checklists. Marking of the pieces. Acceptance standards applicable to customers

18 Personal and environment safety

TERMOGRAPHY (TT)

1. Introduction.
1.1. General principles
1.2. Thermographic image
1.3. Applications
1.4. Advantages

2. Thermographic camera
2.1. Overview
2.2. Image control
2.3. Measurement functions
2.4. Capturing an thermographic image. Temperature range. Optical focusing. Image composition. Storage devices. Practical tips.

3. Principles of thermography
3.1. The difference between heat and temperature
3.2. The electromagnetic spectrum
3.3. Atmospheric transmission
3.4. Rules in thermal science

4. Heat transfer
4.1. Basic heat transfer. Heat transfer modes.
4.2. Thermal conduction.
4.2.1. Thermal conductivity.
4.2.2. Conductive heat transfer formula. Law of heat Conduction. Fourier's laws
4.2.3. Types of heat transfer. Steady state. Transient heat transfer.
4.2.4. Thermal capacity.
4.2.5. Volumetric heat capacity.
4.2.6. Thermal inertia
4.2.7. Thermal diffusivity

4.3. Convection
4.3.1. Definition. Forms of convection
4.3.2. Newton's law of cooling.
4.3.3. Wind effect.
4.4. Evaporation and condensation
4.5. Latent heat

5. Radiation heat transfer
5.1. General principles. Radiation energy exchange modes.
5.2. Incident radiation.
5.2.1. Incident radiation properties. Reflections off specular and diffuse surfaces.
5.3. Exitant radiations. Properties of existing radiation. Emissivity and absorptivity.
5.4. Blackbodies.
5.5. Planck's law. Planck curves. Wien's displacement law. Stefan-Boltzmann law.

6. Thermal image interpretation
6.1. Thermographic camera. Operating principles. Filters. Calibration
6.2. Differences between visual and infrared.
6.3. The thermal image. Field of View (FOV) and Instantaneous Field of View (IFOV)
6.4. Apparent temperature. Measuring. Compensation
6.5. Emissivity. Emissivity effects..
6.5.1. Solutions for solving emissivity problems.
6.5.2. Estimation and measurement of emissivity.
6.5.3. Factors influencing emissivity.

7. Thermal image analysis
7.1. Description. Thermal gradient.
7.2. Camera tools for pattern enhacement. Thermal tunning. Isotherm. Color palettes.
7.3. Misleading patterns.

8. Active thermography and passive thermography

9. Personal and environment safety

10. Practical training.

EDDY CURRENTS (ET)

1. The basic principles of eddy currents
1.1. Generalities. Definition.
1.2. Applications
1.3. Capabilities
1.4. Advantages
1.5. Limitations
1.6. Alternating current in a coil
1.7. Magnetic coupling
1.8. Production of eddy currents
1.9. Lenz's law
1.10. Eddy current inspection
1.11. Equipment calibration
1.12. Use of equipment

2. Factors affecting eddy currents

2.1. Conductivity Units. Resistance. Resistivity
2.2. Permeability. Magnetic field theory. Hysteresis loop. Relative permeability
2.3. Ferrous, non-ferrous, paramagnetic and diamagnetic materials
2.4. Frequency in an excitation coil.
2.5. Proximity
2.6. Geometry
2.7. Probe handling
2.8. Types of discontinuities. Standards.
2.9. Depth of penetration.

3. Coils and transducers

3.1. Surface coils High and low frequency transducers.
3.2. Circular coils.
3.3. Internal coils.
3.4. Coil arrangement types. Comparisons.
3.5. Fill factor
3.6. Coil magnetic fields
3.7. Probe types.
3.8. Factors affecting the eddy current probe performance

4. Electrical theory

4.1. Direct current. Conductors. Electricity. Electromotive force. Potential difference.Electrical energy and power. Resistance. Capacitor. Inductance and Impedance. Circuits.
4.2. Direct current theory. Ohm's law. Potential dividers. Resistance bridge..
4.3. Alternating current theory. Phase angles. Effect of pure resistance, inductance and capacitance. Resonant frequency. Impedance

5. Phase analysis

5.1. General
5.2. Current/Voltage phase relationship
5.3. Conductivity changes
5.6. Dimensional changes. Geometry. Lift-off.
5.7. Changes in frequency
5.8. Changes in permeability
5.9. Changes in probes
5.10. Characteristic frequency

6. Practical impedance plane analysis

6.1. General.
6.2. Conductivity changes presentation
6.3. Changes presentation
6.4. Selection of frequency
6.5. Geometry changes.
6.6. Corrosion and cracks in subsurface layers
6.7. Change of probe
6.8. Changes in permeability.

7. Work security rules

8. Practical training

9. Personal and environment safety

Annex 4

QUALIFICATION AND CERTIFICATION OF LEVEL 1-LIMITED

1. SCOPE

This Annex specifies the requirements for qualification and certification of Level 1-Limited NDT personnel in addition to all specified requirements within this document.

This Annex only applies when authorized by the cognizant engineering organization and the employer's written practice.

2. REQUIREMENTS

2.1 GENERAl

2.1.1 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.

2.1.2 Each use of Level 1-Limited is a separate certification and shall be approved by the cognizant engineering organization.

2.1.3 An individual shall not possess more than 3 (three) Level 1-Limited certifications at any given time.

2.1.4 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 products to be tested;
- the authority to accept or reject products, if applicable.

2.2 CERTIFICATION

2.2.1 Level 1-Limited is a limited certification allowing only the performance of a specific NDT test on a specified part, part feature, or assembly.

2.2.2 In the test technique and test 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 person in the test 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 testing 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 person.

2.3 TRAINING

The minimum training hours for Level 1-Limited shall be determined and documented by the Responsible Level 3 person, but Level 1-Limited hours shall not be less than 25 % of those required for Level 1 in the applicable test method.

2.4 EXPERIENCE

Experience requirements for Level 1-Limited shall be determined and documented by the Responsible Level 3 person, but shall not be less than 10 % of those required for Level 1 in the applicable test method.

2.5 EXAMINATION

2.5.1 Types of examinations

Examinations for Level 1-Limited qualification shall consist of a general, specific, practical, and visual acuity in accordance with the requirements of this document.

2.5.2 General examination

A minimum of 10 questions shall be administered for the general examination for Level 1-Limited.

2.5.3 Specific examination

A minimum of 8 (eight) questions shall be administered for the specific examination for Level 1Limited.

2.5.4 Practical examination

2.5.4.1 The Level 1-Limited candidate shall demonstrate proficiency by using a work instruction to process at least 1 (one) test sample for each test technique and part configuration for which certification is sought.

2.5.4.2 The test sample(s) shall meet the definition in this document and be representative of the specific product to be encountered by the candidate in the performance of his/her duties with the employer.

2.5.4.3 If approval to accept or reject products is to be granted by the Responsible Level 3 person, the candidate shall interpret and document the results of the inspection of the test sample(s).

2.5.4.4 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, in accordance with Annex 2A.

2.6 RECORDS

2.6.1 The employer will maintain a record of Level 1-Limited certified NDT personnel as long as the certification is in effect.

2.6.2 The NDT Level 1-Limited personnel certification file must contain at least:

- name of the certified individual;
- the latest written and practical examinations and the scores from the immediately previous exams;
- 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;
- training and experience hours;
- case-by-case justification and cognizant engineering organization's approval;
- length of the certification (up to 2 years);
- specific NDT test to be performed;
- specific products to be tested, and, if applicable, the approval to accept or reject products;
- results of the most-recent (i.e. current) visual acuity and colour perception examinations;
- the name and signature of the employer's representative authorizing the certification;
- results of most recent annual proficiency review.

2.6.3 All training, qualification, and certification records shall be maintained in accordance with the employer's written practice and shall be made available for audit.

2.6.4 When the qualification is made through RO-NANDTB, all the records indicated above shall be available at the employer, except for the current examinations that remain at RO-NANDTB.

2.7 RECERTIFICATION

2.7.1 Level 1-Limited personnel shall be recertified for each certification held at intervals not to exceed 2 (two) years

2.7.2 Recertification is done by successfully completion of specific and practical examinations equivalent to those sustained at the initial qualification.