

# WRITTEN PRATICE N° SIMB 01\11 REV0

## FOR THE QUALIFICATION AND CERTIFICATION OF NDE PERSONNEL

Date: 03\08\2011

Based on the American Society for Non-destructive Testing

Recommended Practice No. SNT-TC-1A, Ed. 2006

Lev. III Examiner:  *L. Rossi* Date: *09/08/2011*

Quality Manager: *M. Bombardieri* Date: *03/08/2010*



- 1. SCOPE**
- 2. DEFINITIONS**
- 3. NON DESTRUCTIVE TESTING METHODS**
- 4. LEVELS OF QUALIFICATION**
- 5. WRITTEN PRACTICE**
- 6. EDUCATION, TRAINING, AND EXPERIENCE FOR INITIAL QUALIFICATION**
- 7. TRAINING PROGRAMS**
- 8. EXAMINATIONS**
- 9. CERTIFICATION**
- 10. TECHNICAL PERFORMANCE EVALUATION**
- 11. INTERRUPTED SERVICE**
- 12. RECERTIFICATION**
- 13 TERMINATIONS**
- 14 REINSTATEMENT**

## **1. SCOPE**

1.1 It is recognized that the effectiveness of non destructive testing (NDE) application depends upon the capabilities of the persons who are responsible for, and perform, non destructive testing.

This Written Practice has been prepared to establish guidelines for the qualifications and certifications of the personnel performing non destructive testing whose specific jobs require appropriate knowledge of the technical principles underlying the non destructive tests they perform and evaluate, in accordance with the requirements applicable Code Section.

## **2. DEFINITIONS**

2.1 Terms included in this document are defined as follows:

2.1.1 Certification: written testimony of qualification.

2.1.2 Certifying Authority: the person or persons properly designated in this written practice to sign certifications on behalf of Studio di Ingegneria Marco Boscolo, General Manager, for Level III and the Level III for Level I and Level II.

2.1.3 Closed book Examination: an examination administered without access to reference material except for materials supplied with or in the examination (See 8.7).

2.1.4 Comparable: being at an equivalent or similar level of NDT responsibility and difficulty as determined by the Company's Lev.III.

2.1.5 Documented: the condition of being in the written form.

2.1.6 Experience: work activities accomplished in a specific NDT method under the direction of qualified supervision activities, including the performance of NDT method and related activities but not including time spent in organized training programs.

2.1.7 Employer: the private or public entity which employs personnel for salary, fees or other considerations.

2.1.8 Recommended Practice: a set of guidelines to assist the employer in developing uniform procedures for the qualification and certification of NDT personnel to satisfy the employer's specific requirements.

2.1.9 Training: the organized program developed to impart the knowledge and skills necessary for qualification.

2.2.0 Non destructive Testing: a process that involves the inspections, or testing, of material, components for evaluation of their integrity without destroying or impairing the parts serviceability. In this document the NDT term is applied both to NDT inspection method and to predictive maintenance applications (PdM).

2.2.1 Outside Agency: a company or individual who provides NDT Level III services and whose qualifications have been reviewed and approved by the employer engaging the company or individual.

2.2.2 Qualification: demonstrated skill and knowledge required with documented training and experience required for personnel to properly perform the duties of a specific job.

2.2.3 Recommended Practice: a guideline to assist the employer in developing procedures for the qualification and certification of NDT personnel to satisfy the employer's specific requirements.

2.2.4 Training: an organized program developed to impart the knowledge and skills necessary for qualification

2.2.5 Written Practice: a written procedure developed by the employer that details the requirements for qualification and certification of their personnel.

### **3. NON DESTRUCTIVE TESTING METHODS**

3.1 Qualification and certification of non destructive testing personnel in accordance with this Written Practice is applicable to each of the following methods:

3.1.1 Radiographic testing (RT)

3.1.2 Ultrasonic testing (UT)

3.1.3 Magnetic particle testing (MT)

3.1.4 Liquid penetrant testing (PT)

3.1.5 Visual testing (VT)

### **4. LEVELS OF QUALIFICATION**

4.1 There are three basic levels of qualification.

4.2 While in the process of being initially trained, qualified and certified, an individual is considered a trainee.

4.2.1 A trainee shall not independently conduct, interpret, evaluate, or report the results of any test.

4.3 The three basic levels of qualification are as follows:

4.3.1 NDT Level I: an NDT Level I individual is qualified to properly perform specific calibrations, specific NDT, and specific evaluations for acceptance or rejection determination according to written instructions and to record results. The NDT Level I receives the necessary instruction or supervision from a certified NDE Level II or Level III individual.

4.3.2 NDT Level II: an NDT Level II individual is qualified to set up and calibrate equipment and to interpret and evaluate results with respect to applicable codes, standards, and specifications. The NDT Level II is thoroughly familiar with the scope and limitations of the methods for which he is qualified and exercises assigned responsibility for on-the-job training and guidance of trainees and NDT Level I personnel. The NDE Level II is able to organize and report the results of NDT.

4.3.3 NDT Level III: an NDT Level III individual is capable of developing, qualifying, and approving procedures, establishing and approving techniques, interpreting codes, standards, specifications and procedures; and designating the particular NDT methods, techniques, and procedures to be used. The NDT Level III is responsible for the NDT operations for which qualified and assigned, and is capable of interpreting and evaluating results in terms of existing codes, standards, and specifications. The NDT Level III has sufficient practical background in applicable materials, fabrication, and product technology to establish techniques and to assist in establishing acceptance criteria where none are otherwise available.

The NDT Level III shall have general familiarity with all NDT methods listed in Par.3, as demonstrated by an ASNT Level III Basic examination or other means. The NDT Level III, in the methods in which is certified, is capable of training and examining NDT Level I and II personnel for certification in those methods.

## **5. WRITTEN PRACTICE**

5.1 Studio di ingegneria Marco Boscolo has established this Written Practice, based on the American Society for Non destructive Testing (ASNT) Recommended Practice No. SNT-TC-IA-ED.2006, for the control and administration of NDT personnel training, examination, and certification.

5.2 This Written Practice describes the responsibility of each level of certification for determining the acceptability of materials or components in accordance with applicable codes, standards, specifications, and procedures.

5.3 This Written Practice describes the training. Experience and examination requirements for each level of qualification.

5.4 This Written Practice shall be reviewed and approved by Studio di ingegneria Marco Boscolo NDT Level III.

5.5 This written practice shall be maintained on file.

## **6. EDUCATION, TRAINING, AND EXPERIENCE FOR INITIAL QUALIFICATION**

6.1 Personnel considered for certification in NDT shall have sufficient education, training, and experience to ensure qualification in those NDT methods in which they are being considered for certification. Documentation of prior certification may be used as evidence of qualification for comparable levels of certification.

6.2 Documented training and/or experience gained in positions and activities comparable to those of Levels I, II, and/or III before joining the Company, or in the Company prior to establishment of this written practice, is considered in satisfying the criteria of Section 6.3.

6.3 To be considered for certification a candidate shall satisfy one of the following criteria for the applicable NDT level:

6.3.1 NDT Levels I and II

Table 6.3.1 B lists the required training and experience factors considered by the Company for initial qualification of Level I and Level II individuals.

6.3.2 NDT Level III

a- Have graduated from a minimum four-year college or university curriculum with a degree in engineering or science, plus one additional year of experience

beyond the level II requirements in NDT in an assignment comparable to that of an NDT Lev. II in the applicable NDT method(s), or:

b- Have completed with passing grades at least two years of university in engineering or science study or technical school, plus two additional years of experience beyond the level II requirements in NDT in an assignment at least comparable to that of an NDT Lev. II in the applicable NDT method(s), or:

c- Have four years experience beyond the level II requirements in NDT in an assignment at least comparable to that of an NDT Lev. II in the applicable NDT method(s). The above Level III requirements may be partially replaced by experience as a certified NDT Level II or by assignment at least comparable to NDT Level II as defined in this Written Practice.

## **7. TRAINING PROGRAMS**

7.1 Personnel being considered for initial certification shall complete sufficient organized training to become thoroughly familiar with the principles and practices of the specified NDT method related to the level of certification desired and applicable to the processes to be used and to the products to be tested.

7.2 The training program includes sufficient examinations to assure that the necessary information has been comprehended.

7.2.1 The training course outlines for NDT Level I, Level II and Level III personnel are listed in the Table 6.3.1B.

References to be used as technical source material are available in the Company's library; additional technical sources shall be used at the option of the NDT Level III conducting the training course.

Every eventual outside training, shall be in accordance with this Written Practice.

## **8. EXAMINATIONS**

8.1 Administration and grading

8.1.1 The administration and grading of examinations specified in Section 8.3 through 8.8 for NDT Level I, Level II and other Level III shall be performed by the NDT Level III Examiner certified by examination in accordance with this Written Practice.

8.1.2 For Level I and Level II personnel, a composite grade should be determined by simple averaging of the result of the general, specific and practical examinations described below. For Level III personnel, the composite grade should be determined by simple averaging of the result of the basic, method and specific examinations described below.

8.1.3 Examinations administered for qualification shall result in a passing grade of at least 80 percent, with no individual examination having a passing grade less than 70 percent.

8.1.4 When an examination is administered and graded for the Company by an outside agency and the outside agency issues grades of pass or non fail only, on a certified report, then the Q.C. Manager accepts the passing grade as 80 percent for that particular examination.

8.1.5 Studio di ingegneria Marco Boscolo Q.C. Manager, is also responsible for assuring that the examination services are in accordance with this Written Practice

8.2 Vision Examination.

8.2.1 Near Vision Acuity. The examination shall assure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading minimum of Jaeger Number 2 or equivalent type and size letter at a distance of not less than 12 inches (30.5 cm) on a standard Jaeger test chart.

The ability to perceive an Ortho-Rather minimum of 8 or similar test pattern is also acceptable. This shall be administered annually.

8.2.2 Colour Contrast Differentiation. The examination shall demonstrate the capability of distinguishing and differentiating contrast among colours or shades of grey used in the method. This shall be conducted upon initial certification and repeated annually. ISHIARA Test (3 Plates) for colour contrast test, or 10 steps of grey between 0,1 to 4 in density on step-wedge calibration film, shall be used.

8.3 General (Written - For NDT Levels I and II)

8.3.1 The general examinations are addressed to the basic principles of the applicable method.

8.3.2 In preparing the examination, the Level III shall select or devise appropriate questions covering the applicable method to the degree required by this Written Practice.

8.3.3 The questions for the development of the general examinations are prepared by the Level III Examiner.

8.3.4 The minimum number of questions which shall be given is as follows:

Test Method	Number of Level I Questions	Number of Level II Questions
Radiographic Testing	40	40
Ultrasonic Testing	40	40
*Magnetic Particle Testing	40	40
*Liquid Penetrant Testing	40	40
*Visual Testing	40	40

\*MT, PT, VT Examiners may be certified competent following specific program.

#### 8.4 Specific (Written - For NDT Levels I and II)

8.4.1 The specific examination addresses the equipment, operating procedures, and NDT techniques that the individual may encounter during specific assignments to the degree required by this Written Practice.

8.4.2 The specific examination also covers the specifications or codes and acceptance criteria used in the NDT procedures of the Company.

8.4.3 The minimum number of questions which shall be given is as follows:

Test Method	Number of Level I Questions	Number of Level II Questions
Radiographic Testing	20	20
Ultrasonic Testing	20	20
*Magnetic Particle Testing	20	20
*Liquid Penetrant Testing	20	20
*Visual Testing	20	20

\* MT, PT, VT Examiners may be certified competent following specific program.

## 8.5 Practical (For NDT Level I and II)

8.5.1 The candidate shall demonstrate familiarity with and ability to operate the necessary NDT equipment, record, and analyze the resultant information to the degree required.

8.5.2 At least one flawed selected specimen or component shall be tested and the result of the NDT analyzed by the candidate.

8.5.3 The description of the specimen, the NDT procedure, including check points, and the results of the examination shall be documented.

8.5.4 NDT Level I Practical Examination. Proficiency should be demonstrated in performing the applicable NDT on one or more samples or machine problems approved by the NDT Level III and in evaluating the results to the degree of responsibility as described in the Written Practice. At least ten (10) different checkpoints requiring an understanding of test variables and the Company's procedural requirements shall be included in this practical examination.

8.5.5 NDT Level II Practical Examination. Proficiency should be demonstrated in selecting and performing the applicable NDT technique within the method and interpreting and evaluating the result on one or more samples or machine problems approved by the NDT Level III. At least ten (10) different checkpoints requiring an understanding of NDT variables and the Company's procedural requirements shall be included in this practical examination.

8.6 Questions for general examinations shall be prepared by the NDT Level III Examiner who administers the examination: relevant ASNT Questions Booklets may be used as guidelines although the sample questions given in the booklets shall not be used verbatim for qualification examinations.

8.7 All Level I, Level II and Level III written examinations shall be closed book except that necessary data, such as graphs, tables, specifications, procedures, codes etc. may be provided with or in the examination. Questions utilizing such reference materials shall require an understanding of the information rather than

merely locating the appropriate answer. All questions used for Level I and Level II examinations should be approved by the responsible Level III.

## 8.8 NDT Level III Examinations

8.8.1 Basic Examination (required only once when more than one method examination is taken). The minimum number of questions which shall be given is as follows:

- a- Fifteen (15) questions relating to understanding the SNT-TC-IA document.
- b- Twenty (20) questions relating to applicable materials, fabrication and product technology.
- c- Twenty (20) questions that are similar to Level II questions for other appropriate RT methods.

### 8.8.2 Method Examination (for each method)

- a- Thirty (30) questions relating to fundamentals and principles that are similar to published ASNT Level III questions for each method;
- b- Fifteen (15) questions relating to application and establishment of techniques and procedures that are similar to published ASNT Level III questions for each method;
- c- Twenty (20) questions relating to capability for interpreting codes, standards and specifications relating to the method.

### 8.8.3 Specific Examination (for each method)

- a- Twenty (20) questions relating to specifications, equipment techniques and procedures applicable to the material, products and methods for which the Company's is requested to perform NDT and relating to the administration of this Written Practice.
- b- Specific examinations are deleted if the candidate has a valid ASNT NDT Level III certificate in the method and a documented evidence of experience, including the preparation of NDT procedures to codes, standards, or specifications and the evaluation of test results.

8.8.4 A valid endorsement on an ASNT NDT Level III certificate fulfils the examination criteria described in 8.8(1) and 8.8(2) for each applicable NDT method.

#### 8.9 Re-examination

Those failing to attain the required grades shall wait at least thirty (30) days or receive suitable additional training as determined by the NDT Level III before examination.

### **9. CERTIFICATION**

9.1 Certification of all levels of NDT personnel is the responsibility of the Quality Manager.

9.2 Certification of NDT personnel shall be based on demonstration of satisfactory qualification in accordance with Sections 6, 7 and 8.

9.3 Administration of training courses and examinations for Level I, Level II and Level III candidates may be delegated to an outside Agency which employ Level III Examiners certified by the ASNT with a valid endorsement. The Agency release a Certificate on the basis of which the Managing Director certifies the NDT personnel. In such instances, the responsibility of certification of the employees shall be retained by the employer.

9.4 Personnel certification records shall be maintained on file by the Quality Manager and includes the following:

1. Name of certified individual.
2. Level of certification and NDT method.
3. Educational background and experience of certified individuals.
4. Statement indicating satisfactory completion of training in accordance with this Written Practice.
5. Results of the vision examinations prescribed in 8.2 for the current certification period.
6. Current examination copy(ies) or evidence of successful completion of examinations.
7. Other suitable evidence of satisfactory qualifications when such qualifications are used in lieu of examinations prescribed in 8.8(3)(b).

8. Composite grade(s) or suitable evidence of grades.
9. Signature of the Level III that verified qualifications of candidate for certification.
10. Dates of certification and/or re-certification and the dates of assignment to NDT.
11. Certification expiration date.
12. Signature of the Quality Manager, for the Level III examiner and of Level III, for Level I and Level II examiner.

## **10. TECHNICAL PERFORMANCE EVALUATION**

10.1 NDT personnel may be re-examined any time at the discretion of Studio di ingegneria Marco Boscolo General Manager and have their certificate extended or revoked.

10.2 Periodically, every five years, the technical performance of Level I and Level II personnel, should be evaluated and documented by an NDT level III. The evaluation and documentation should follow the guidelines and format described in section 8.5.

## **11. INTERRUPTED SERVICE**

11.1 Re-examination and recertification are required when a NDT Examiner has interrupted his service in the method for more than one year.

11.2 Requirements for recertification should be in accordance with guidelines described in section 12.

## **12. RECERTIFICATION**

12.1 All levels of NDT personnel shall be recertified periodically in accordance with one of the following criteria:

- a- Evidence of continuing satisfactory technical performance
- b- Re-examinations in those portions of the examinations in Section 8 deemed necessary by Level III Examiner.

12.2 Maximum recertification intervals are five years for all certifications levels.

### 13. TERMINATION

13.1 The certification shall be deemed revoked when the employment is terminated.

13.2 A Level I, Level II or Level III employee whose certification has been terminated may be certified to the former NDT level by a new employer based on examination, as described in Section 8, provided all of the following conditions are met to the new employer's satisfaction:

- a- The employee proof of prior certification.
- b- The employee was working in the capacity to which certified six (6) months of termination.
- c- The employer is being recertified within six (6) months of termination.
- d- Prior to being examined for certification, employees not meeting the above requirements should receive additional training as deemed appropriate by the NDT Level III.

### 14. REINSTATEMENT

14.1 A Level I, Level II, or Level III whose certification has been terminated may be reinstated to the former NDT level, without a new examination, provided all of the following conditions are met:

14.2 The employer has maintained the personnel certification records required in section 9.4

14.3 The employee's certification did not expire during termination

14.4 The employee is being reinstated within (6) months of termination.

TABLE 6.3.1 B INITIAL TRAINING AND EXPERIENCE LEVELS

#### INITIAL TRAINING COURSE HOURS

EXAM. METHOD	RT		UT		MT		PT		VT	
	I	II	I	II	I	II	I	II	I	II
ENG.UNIVERSITY	30	35	30	40	8	4	4	4	4	8
TECH.HIGH SCH.	40	40	40	40	12	8	4	8	8	16

## MONTHS OF WORK EXPERIENCE

EXAM. METHOD	RT		UT		MT		PT		VT	
	I	II	I	II	I	II	I	II	I	II
ALL EDUC.	3	9	3	9	1	3	1	2	1	2

### NOTES

For level II certification, the experience shall consist of time as level I or equivalent. If a person is being qualified directly to Level II, with no time at Level I, the required experience shall consist of the sum of the times required for Level I and Level II and the required training shall consist of the sum of the hours required for Level I and Level II.

For Level III certification, the required experience shall consist of the sum of the time required for Level I and Level II, and the additional requirements listed in 6.3.2. The required formal training shall consist of the Level I and Level II training, plus any additional formal training as defined in Studio di ingegneria Marco Boscolo Written Practice.

Listed training hours may be adjusted as described in this Written Practice depending on the candidate's actual education level.

Initial experience may be gained simultaneously in two or more methods if:

The candidate spends a minimum of 25% of his work time on each method for which certification is sought, and the remainder of his work time claimed as experience is spent in NDT related activities defined in this Written Practice.

Training course arguments are outlined in this Written Practice.