

## SARA SAE PRIVATE LIMITED.

## Management System Document Control Cover Sheet

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WRITTEN PRACTICE FOR TRAINING, QUALIFICATION & CERTIFICATION OF NON-DESTRUCTIVE TESTING PERSONNEL	SES-26-743	2

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## 1.0 SCOPE

This procedure sets out the minimum training Qualification and certification requirements of Non-destructive Testing personnel as per ASNT Recommended Practice SNT-TC-1A -2006. The procedure also includes details of how the certification process is controlled by International Reliability Services (referred to as SARA SAE PRIVATE LIMITED or “the Company”).

## 2.0 REFERENCES

- 2.1 ASNT Recommended Practice No. SNT - TC - 1A -2006 of the American Society of Non - Destructive Testing (ASNT)
- 2.2 Training Course references include the following;

- ASNT NDT Hand books – 3 rd edition
- ASNT Metals Handbook Volume 11 - Eighth Edition
- ASNT Question & Answer Books (Level I, II & III)
- ASNT Classroom Training Handbooks

- 2.3 Training courses shall be based on the recommendations of ASNT;

- |                             |   |         |
|-----------------------------|---|---------|
| • Radiographic Testing      | - | RT-TC-1 |
| • Magnetic Particle Testing | - | MT-TC-2 |
| • Ultrasonic Testing        | - | UT-TC-3 |
| • Liquid Penetrant Testing  | - | LP-TC-4 |
| • Electromagnetic Testing   | - | ET-TC-5 |
| • Leak Testing              | - | LT-TC-7 |
| • Acoustic Emission Testing | - | AE-TC-8 |
| • Visual Testing            | - | VT-TC-9 |

## 3.0 METHODS OF NON - DESTRUCTIVE EVALUATION

Qualification & Certification of NDT Personnel in accordance with this procedure shall be applicable to each of the following methods.

- |                             |    |
|-----------------------------|----|
| • Acoustic Emission Testing | AE |
| • Electromagnetic Testing   | ET |
| • Leak Testing              | LT |
| • Liquid Penetrant Testing  | PT |
| • Magnetic Particle Testing | MT |
| • Radiographic Testing      | RT |
| • Ultrasonic Testing        | UT |
| • Visual Testing            | VT |

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## 4.0 LEVELS OF QUALIFICATION

There shall be three (3) levels of Qualification.

- 4.1 **NDT Level I** - Technicians shall have the skill and knowledge to properly perform specific calibrations, specific NDT and evaluations for acceptance and rejection, according to written instructions and to record results. The NDT Level I Technician shall receive the necessary instruction and / or supervision from a certified NDT Level or NDT Level III Technician.
- 4.2 **NDT Level II** - Technicians shall be qualified to set up and calibrate equipment, and interpret and evaluate test results in accordance with the applicable codes, standards or specifications, and prepare a written report of the test results. Each Level II Technician shall be familiar with the scope of work and limitations of the NDT method he is certified for. He shall exercise the assigned responsibility for on-the-job training and supervision of "Trainees and Level I Technicians."
- 4.3 **NDT Level III** - Technicians shall be capable and responsible for establishing techniques and procedures, interpreting code standards and specifications and shall designate the particular test method and technique to be used. Where no acceptance criteria are available, the Level III shall assist in establishing the acceptance criteria for the NDT. He shall be qualified to train and examine NDT Level I and II personnel for certification.
- 4.4 **NDT Trainee's** - All NDT personnel shall be considered as trainees until they have satisfied the requirements of Para 11.0 "Minimum Requirements of Training and Experience." A trainee shall work with a certified technician and shall not independently conduct any tests.

## 5.0 EDUCATION TRAINING & EXPERIENCE

- 5.1 All personnel considered for certification in Non-Destructive evaluation shall satisfy the minimum requirements for qualification, training and experience, as per Para 11.0.
- 5.2 The minimum requirements for NDT trainees in all disciplines shall be school graduation or equivalent with demonstrated proficiency or documented technical training.
- 5.3 The minimum requirements for the Level I and II personnel are as per Para 11.0
- 5.4 On-the-job training may be given credit in lieu of actual classroom training hours. This however shall be limited to the extent of 10 hours for each complete continuous engagement period of 12 months subject to a maximum credit of 40 hours.
- 5.5 For Level II certification, the required experience shall consist of work time as Level I. If a person is being qualified directly to level II with no time spent at Level I, the required experience shall consist of the sum of the time required for Level I and II.
- 5.6 Credit for experience may be gained simultaneously in two or more disciplines provided the candidate works at least 25% of the time on each discipline for which experience is being claimed.
- 5.7 **NDT Level III**
  - Graduate from a minimum four year college or university curriculum, with a degree in engineering or science, plus one year experience NDT, comparable to a Level II in the applicable NDT method(s). OR
  - Completed with passes, two years of engineering or science at a university, college or technical school plus two years NDT experience, comparable to a Level II in the applicable NDT method(s). OR
  - Four Years experience comparable to that of an NDT Level II in the applicable test methods.

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## **6.0 EXAMINATION**

6.1 Company ASNT NDT Level III, or an independent ASNT NDT Level III examiner or an ASNT NDT level III belongs to an approved external agency shall conduct and grade all examination for NDT Level I,II and III personnel. The examination process consists three (3) parts. Each candidate must successfully complete all three (3) parts, with a composite grade of 80% and individual exam passes not less than 70%. The parts shall be as follows:

### **6.2 General Examination - (Level I & II)**

- 6.2.1 General examinations shall be closed book written test, pertaining to the basic principle of the applicable NDT method.
- 6.2.2 The number of test questions shall be as shown in Paragraph 12.0 of this document for the applicable NDT method.

### **6.3 Specific Examination - (Level I & II)**

- 6.3.1 Specific examination's shall be a written test, either closed book or open book at the discretion of the NDT Level III examiner. It shall cover the equipment, operating procedure, codes, standards and / or specification that the candidate may encounter during his employment.
- 6.3.2 The number of test questions shall be as per Paragraph 12.0 of this procedure.

### **6.4 Practical Examination - (Level I & II)**

- 6.4.1 Each candidate shall demonstrate to the satisfaction of the Level III examiner, familiarity with and operation of the necessary test equipment. The candidate must be able to analyse test results to the level necessary and ensure compliance with the requirements of the applicable code, standard and / or specification.
- 6.4.2 At least one (1) selected specimen shall be tested for the applicable NDT Technique within the method and results of the test recorded by the candidate attempting to qualify.
- 6.4.3 The description of the specimen, the test procedure, including at least 10 check points for level I & level II, and the result of the examination shall be recorded.

## **6.5 NDT Level III Examinations**

- 6.5.1 Basic Examination (required only once when more than one test method is being undertaken)
  - a) (15) questions relating to the understanding of ASNT-TC-1A document.
  - b) (20) questions relating to applicable materials, fabrication & product technology.
  - c) (20) questions selected from or similar to the Level II published by ASNT for the applicable NDT methods.
- 6.5.2 Method Examination (for each method)
  - a) (30) questions relating to the fundamentals and principles of NDT, similar to the ASNT Level III questions for each method.
  - b) (15) questions relating to the application and establishment of techniques and procedures, similar to the ASNT Level III questions for each method.
  - c) (20) questions relating to the interpretation of codes, standards and specifications relating to the test method.
- 6.5.3 Specific Examination (for each method)
  - (20) Questions relating to specifications, equipment, techniques and procedures applicable to the test methods employed, in accordance with this written practice.

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#### 6.5.4 Waiver of NDT Examinations.

Company may waive the Level III examinations, if the candidate has a valid ASNT or ACCP Level III certificate in the applicable NDT methods.

Company may waive the Level II examinations, if the candidates have a valid PCN/CSWIP/Third party SNT-TC-1A /ISO 9712 Level II & for the marking & training requirement shall follow the valid certificates.

#### 6.6 Vision Examinations.

At time of examination or re - certification, and annually thereafter, a qualified oculist or Optometrist or ASNT NDT level 3 shall carry out the following eye tests;

- a) Natural or corrected near distance acuity, in at least one eye, as determined by the ability to read the Jaeger No. 2 eye chart or equivalent, at a distance of 12" or 30.5 cm.  
The "Ortho-Ratter" No.8 test pattern is also acceptable.
- b) Colour vision examination to verify their capability of distinguishing colour and differentiating contrast between the colours normally used in the applicable method.

*Note: This test shall be at initial certification and then (5) yearly thereafter.*

### 7.0 GRADING OF EXAMINATION

- 7.1 A minimum grade of 70% shall be required for general, specific and practical exams, with a minimum composite grade of 80%. "Composite Grades" are determined by simple averaging.
- 7.2 When examinations are administered by outside agencies and "Pass or Fail" is given, the employer may accept the pass as 80%.

### 8.0 RE-EXAMINATION

Any candidate, who fails to obtain the required grades, must wait at least thirty (30) days or show documented evidence of having additional training by the Level III before re-examination.

### 9.0 QUALIFICATION / CERTIFICATION

Certification of all candidates shall be the responsibility of the employer. If third party is used for examination and certification, the certificate issued by third party shall have the details of method, level, Type, technique, Category, material, date of issue and validity to satisfy the requirement of Para 9.3.

- 9.1 Candidate's who have successfully fulfilled the requirements of this procedure for education, training, experience and examination shall be eligible for Company certification.
  - 9.2 Valid certification from ASNT / C.S.W.I.P. / P.C.N. / AINDT, RTC, DGZfp (German Society), or any equivalent society may be considered for acceptance by the company without further written examinations, if the candidate is assessed by the Managing Director / Quality Manager or Operations Manager or company Level III and found to be suitable and competent for job.
  - 9.3 Qualification / Certification Records
- 9.3.1 All certification records shall be controlled and maintained by company. These original records shall be maintained on file and updated or re-certified as required.

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9.3.2 Qualification / Certification records shall include, but not be limited to the following:

- Name of certified individual.
- Level of certification and NDT method.
- Education background and experience of certified individuals.
- Results of NDT training.
- Results of vision examinations.
- NDT examination results.
- Suitable evidence of satisfactory qualifications.
- Details of method, level, Type, technique, Category, and material.
- Composite grades or suitable evidence of grades.
- Dates of certification and/or re-certification.
- Signature of the employers certifying authority and stamp.
- Signature of NDT Level III & Company stamp.

9.4 NDT Certificates

9.4.1 All Level I and II personnel who are certified by company shall be issued a certificate for each applicable test method.

9.4.2 The information contained on the certificate shall include details as in the sample certificate.

9.4.3 Upon termination of employment from company the certificate shall be annulled.

9.5 Renewal of Certification.

9.5.1 All NDT personnel in the continuous employment of the Company shall be re-examined and re-certified every (5) years.

9.5.2 At the discretion of the Quality Manager or Company Level III, re-certification may be granted without examination for uninterrupted service, provided that the concerned individual has demonstrated satisfactory performance in the methods certified for.

9.5.3 All NDT personnel terminated by Company and possibly re-employed by the Company shall be re-qualified by re-examination if the candidate cannot prove continuous NDT service, since initially departing from the Company.

9.5.4 Interrupted Service

Personnel who have been terminated and re-hired by the Company within a six (6) month period following termination, may be re-certified without re-examination providing they can show documented proof of continuous, satisfactory performance in the applicable NDT methods during their period away from company. This requirement shall also apply to prospective new employees who have previous work experience. In this case, the concerned individuals shall be required to produce documented evidence of previous certification (if any)

9.5.5 New certification, Renewal of certification for uninterrupted service or re-certification for interrupted service with or without examination shall be endorsed by company level III, or Re-certification shall be endorsed by a client approved independent third party ASNT NDT level 3 if any client requirements states in such a way.

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## 9.6 Level III Certification

- 9.6.1 Company shall appoint by issuance of a letter of appointment from the management, the NDT Level III who shall fulfil the requirements listed below:
- 9.6.2 Level III certification shall satisfy at least one of the following requirements:
- Complete, with a passing grade, a Level III General examination and Specific examination conducted by an independent ASNT certified NDT Level III and Company Level III practical examination for each of the applicable disciplines.
  - Complete, with a passing grade, company Level III General, Specific and Practical examination for each of the applicable disciplines.
  - Have valid and concurrent certification to Level III certification, endorsed by a recognised body of NDT (Such as ASNT or equivalent) and documented evidence of relevant work experience.

## 10.0 SUB-CONTRACTORS

- 10.1 NDT Sub-contractors may be used by the Company as deemed necessary and approved by Management & Client.
- 10.2 Sub-contractors shall be required to submit their qualification procedures including the company's written practice for control and administration of NDT personnel and Level III documentation for approval.

## 11.0 MINIMUM REQUIREMENT OF TRAINING AND EXPERIENCE

### 11.1 ACOUSTIC EMISSION – UT

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	40	40
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	32	40
Total Work Time Experience (Months) per level for all of the above	3	9

### 11.2 ULTRASONIC TESTING - UT

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	40	40
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	30	40
Total Work Time Experience (Months) per level for all of the above	3	9

## 11.3 RADIOGRAPHIC TESTING - RT

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	39	40
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	30	35
Total Work Time Experience (Months) per level for all of the above	3	9

## 11.4 MAGNETIC PARTICLE TESTING - MT

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	12	8
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	8	4
Total Work Time Experience (Months) per level for all of the above	1	3

## 11.5 LIQUID PENETRANT TESTING - PT

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	4	8
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	4	4
Total Work Time Experience (Months) per level for all of the above	1	2

## 11.6 ELECTRO-MAGNETIC TESTING - ET

Formal Training (Hours) & Experience (Months)

<b>Education &amp; Experience Pre-qualification</b>	<b>Level I</b>	<b>Level II</b>
High School Graduation, Diploma or its equivalent (Hrs)	40	40
Completion with a passing grade of at least two (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	24	40
Total Work Time Experience (Months) per level for all of the above	3	9

## 11.7 LEAK TESTING - LT

Formal Training (Hours) & Experience (Months)

Education Pre-qualification	Level I		Level II	
	BT	PCT	BT	PCT
High School Graduation, Diploma or its equivalent (Hrs)	2	24	4	16
Completion with a passing grade of at least (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	2	16	2	12
Total Work Time Experience (Months) per level for all of the above	Nil	1½	½	4

Abbreviations: **BT** : Bubble Test, **PCT** : Pressure Change Test

## 11.8 VISUAL TESTING - VT

Formal Training (Hours) & Experience (Months)

Education Pre-qualification	Level I	Level II
High School Graduation, Diploma or its equivalent (Hrs)	8	16
Completion with a passing grade of at least (2) years of Engineering or Science study at a University, College or Technical School (Hrs)	4	8
Total Work Time Experience (Months) per level for all of the above	1	2

## 12.0 MINIMUM EXAMINATION QUESTION REQUIREMENTS

12.1 The NDT Level III shall approve all questions used in Company examination

12.2 NDT Level I & II - Theory

NDT Test Methods	Number of Questions			
	General		Specific	
	Level I	Level II	Level I	Level II
Acoustic Emission	40	40	20	20
Electro Magnetic	40	40	20	20
Liquid Penetrant	40	40	20	20
Leak Testing	20	20	15	15
Magnetic Particle	40	40	20	20
Radiography	40	40	20	20
Ultrasonic	40	40	20	20
Visual testing	40	40	20	20

## **13.0 MINIMUM QUALIFICATION'S**

The minimum qualification of NDT Personnel within the Company shall be at least ASNT Level I, qualified by an ASNT Level III personnel or Level II certified from an equivalent independent certification bodies like PCN, AINDT, RTC and ASNT.

## **14.0 APPOINTED ASNT Level III CONSULTANT'S**

The company management as required in support of personal certification shall appoint ASNT NDT Level III Consultant. All relevant documentation shall be maintained on file for reference.

## **15.0 RESPONSIBILITY FOR TRAINING RECORDS AND CERTIFICATION**

The Quality Manager or designated person shall be responsible for maintaining records of training & certification to ensure that re-certification of operators are performed prior to the five (5) years duration. All training and experience received shall be documented on a regular basis.

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