

Training, Competency Assessment and Certification of Personnel in Nondestructive Testing to American Society of NDT's: SNT-TC-1A (2001 Edition)

ETP-00-01

Applicability

ARTC Network Wide SMS

Publication Requirement

Internal / External

Document Status

Version #	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.1	23 Jan 23	Standards Document Controller	Manager Track and Civil Standards	Manager Track and Civil Standards	Head of Engineering Standards 10/02/2023

Amendment Record

Amendment Version #	Date Reviewed	Clause	Description of Amendment
1.0	27 Mar 08		First issue
1.1	23 Jan 23		Minor text corrections, document owner heading and rebranded

© Australian Rail Track Corporation Limited (ARTC)

Disclaimer

This document has been prepared by ARTC for internal use and may not be relied on by any other party without ARTC's prior written consent. Use of this document shall be subject to the terms of the relevant contract with ARTC.

ARTC and its employees shall have no liability to unauthorised users of the information for any loss, damage, cost or expense incurred or arising by reason of an unauthorised user using or relying upon the information in this document, whether caused by error, negligence, omission or misrepresentation in this document.

This document is uncontrolled when printed.

Authorised users of this document should visit ARTC's intranet or extranet (www.artc.com.au) to access the latest version of this document.

Table of Contents

Table of Contents	2
1 Purpose	3
2 Scope	3
3 Document Owner	3
4 Referenced Documents	3
5 Definitions	3
6 Levels of Qualification	5
6.1 Trainee	5
6.2 ARTC Ultrasonics Level I	5
6.3 ARTC Ultrasonic Level II	5
6.4 ARTC Ultrasonic Level III	5
7 Education, Training and Experience for Qualification and Certification	6
7.1 Criteria for Qualification – NDT - ARTC Ultrasonic Levels I & II	6
7.2 Criteria for Initial Qualification – ARTC Ultrasonic Level III	6
8 Training Programs	7
9 Examinations	7
9.1 Visual Capability	7
9.2 Examinations – ARTC Ultrasonic Level I and II	7
9.2.1 <i>Written Examinations</i>	7
9.2.2 <i>Practical Examinations</i>	8
9.3 Examinations – ARTC Ultrasonic Level III	8
9.4 Marking and Grading	9
9.5 Re Examination (all levels)	9
9.6 Appointment of External ARTC Ultrasonic Level III	9
9.7 Purchases of External Training	9
10 Certification	10
10.1 Eligibility	10
10.2 Records	10
10.3 Re Certification	10
11 Termination	11

1 Purpose

The purpose of this document is to describe the training, examination and competency assessment required for certification of employees undertaking Ultrasonic Testing, either employed by or contracted by Australian Rail Track Corporation Ltd, in accordance with SNT-TC-1A.

Note: The reason for working in accordance with SNT-TC-1A is that it is an international standard that allows companies to train people in their specific needs. SNT-TC-1A is in essence very similar to AINDT's AS 3998: however, at this stage, there is no provision for a rail specific qualification under AS 3998.

2 Scope

This document is the written practice, in accordance with SNT-TC-1A, for the control and administration of NDT training, examination, competency assessment and certification of employees engaged in ultrasonic testing of track and rail.

ARTC's requirement is that employees of ARTC undertaking ultrasonic testing of rail and track components are certified to at least ARTC Ultrasonic Level I in accordance with this Written Practice.

The test method covered by this document is

- Ultrasonics (UT)

Ultrasonics is deemed to include weld geometry testing and visual inspection.

3 Document Owner

The Head of Engineering Standards is the Document Owner. Queries should be directed to standards@artc.com.au in the first instance.

4 Referenced Documents

- SNT-TC-1A American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A (2001 Edition)

5 Definitions

For purposes of this document only, the following terms are defined as follows:

AINDT	Australian Institute for Nondestructive Testing
Certification	Written testimony of qualification and competency to carry out Ultrasonic Testing for ARTC
Certifying Agency	ARTC and their designated ARTC Ultrasonic Level III
Comparable	Equivalent or similar level of Ultrasonic Testing responsibility and difficulty as determined by a ARTC Ultrasonic Level III
Documented	Evidence in written or electronic form
Employer	Australian Rail Track Corporation (ARTC) or approved contractors

Employee	A person, who is employed by ARTC, under contract to ARTC, seconded to ARTC or employed by an approved contractor to ARTC and needs certification to carry out Ultrasonic Testing on behalf of ARTC
Experience (On Job Training)	Work activities accomplished in a specific NDT method according to the Testing Procedures described in the ARTC Engineering Standards under the supervision of a certified person.
Competent	The ability to consistently apply skills and knowledge to the required standard
Qualification	An award granted when a person is deemed competent
Outside Agency	A company or individual that provides ARTC Ultrasonic Level III services, and whose qualifications to provide these services have been reviewed by the employer that engages the Outside Agency. At present CCI Pope Pty Ltd are one such appointed Outside Agency.
Recommended Practice (SNT-TC-1A)	A set of guidelines to assist the employer in developing uniform procedures for qualifying and certifying team members carrying out NDT to satisfy the employer's requirements.
Shall and Should	The word 'shall' indicates a mandatory requirement. The word 'should' indicates a recommended requirement.
TAFE	Technical and Further Education Institutes incorporated in Australian States
Training	A systematic program developed to impart the knowledge and skills necessary to qualify employees as competent.
Trainee	An employee without certification working under the supervision of a certified employee.

Note: These definitions apply to this document only. They may have different meanings in relation to Australian and other International Standards.

6 Levels of Qualification

There are three basic levels of qualification. While in the process of being qualified to ARTC Ultrasonic Level I, an employee shall be considered a trainee.

6.1 Trainee

A person employed by ARTC or an approved contractor who is undertaking training in accordance with this document to become certified to ARTC Ultrasonic Level 1. When completing on job training a trainee should work under the supervision of a certified employee and shall not independently conduct any tests, interpret or evaluate results, or report test results of Ultrasonic Testing.

6.2 ARTC Ultrasonics Level I

An ARTC Ultrasonic Level I employee shall be qualified to perform specific calibrations, specific Ultrasonic Tests and specific evaluations for acceptance/rejection according to written procedures, and to record results. If encountering issues due to, or beyond, the procedure the A I shall seek instruction from the designated ARTC Ultrasonic Level III through their Team Manager. The Team Manager will have responsibility for assigning a certified employee to assist trainees to complete their On Job Workbook as part of their training.

6.3 ARTC Ultrasonic Level II

An ARTC Ultrasonic Level II employee shall be qualified to set up and calibrate equipment and to interpret and evaluate results with respect to applicable codes, specifications and standards. The ARTC Ultrasonic Level /II shall be thoroughly familiar with the scope and limitations of the methods for which they are qualified

The ARTC Ultrasonic Level II shall be able to organise and report the results of Ultrasonic Testing.

6.4 ARTC Ultrasonic Level III

An ARTC Ultrasonic Level III employee shall be capable of establishing techniques and procedures; interpreting codes and standards, specifications and procedures; and designating the particular test methods, techniques and procedures to be used. The ARTC Ultrasonic Level III shall be responsible for the NDT operations for which they are assigned and qualified. They shall be capable of interpreting results in terms of codes, specification and standards.

The ARTC Ultrasonic Level III shall have sufficient practical background in applicable materials, fabrication and product / process technology to establish test techniques and assist in establishing acceptance criteria where none are otherwise available.

The ARTC Ultrasonic Level III shall have general familiarity with other appropriate NDT methods and should be qualified to train and examine ARTC Ultrasonic Level I & ARTC Ultrasonic Level II employees for certification.

7 Education, Training and Experience for Qualification and Certification

Employees considered for certification will have a good understanding of the principles and procedures in Ultrasonic Testing. They will have completed both Off and On the Job Training and satisfied a Competency Assessment in Ultrasonic Testing. On the job experience and competency shall be primarily focussed on testing rails and rail welds.

Documented training and/or experience in positions and activities equivalent to those of ARTC Ultrasonic Levels I, II and/or III prior to the establishment of this written practice, or satisfactory completion of a TAFE or AINDT training course, or equivalent, may be considered in satisfying the requirements of paragraphs 7.1 and 7.2.

7.1 Criteria for Qualification – NDT - ARTC Ultrasonic Levels I & II

Table 1 lists the in house training and experience (on the job training) factors to be undertaken.

Table 1 – Minimum Training Hours and Experience Requirements

Method	ARTC Ultrasonic Level	Training Hours		Required Experience / On Job training		Alternative Experience Months
		High School Only	2 year University, Engineering or Science Certificate	Hours	Permitted Time Frame (to obtain required work experience in months)	
UT	I	40	30	210	1.5 - 9	3
	II	40	40	840	4.5 – 27	9

Note:

- If certifying directly to ARTC Ultrasonic Level II, training and experience shall comprise the sum of requirements for ARTC Ultrasonic Levels I and II.
- Training comprises classroom instruction and practical laboratory exercises with written handouts, in a training centre and/or other locations. On Job training must be logged and verified by and the employees' Team Manager or delegate.

7.2 Criteria for Initial Qualification – ARTC Ultrasonic Level III

An ARTC Ultrasonic Level III candidate shall have at least one of the following qualifications.

- A graduate degree in science, or engineering from a recognised university plus one years experience comparable to a ARTC Ultrasonic Level II, or
- Passed 2 years of university in science, or engineering, plus two years experience comparable to a ARTC Ultrasonic Level II, or
- Hold an engineering or science certificate from the TAFE, plus two years experience comparable to a ARTC Ultrasonic Level II, or
- Have a minimum of four years experience comparable to a ARTC Ultrasonic Level II.

8 Training Programs

Employees being considered for certification should complete sufficient organized training to become thoroughly familiar with the principles and practices of ultrasonic testing related to the level of certification desired. This should include Off Job training and On Job training.

The training program should include sufficient examinations to ensure understanding of the necessary information.

The courses shall be developed to meet the requirements of Australian State Legislation, Terminology, Technical Specifications, and the metric system of measurement.

9 Examinations

An ARTC Ultrasonic Level III or his designated representative shall administer examinations. Appointment of a designated representative shall be in writing.

9.1 Visual Capability

Visual tests shall be administered annually. All candidates shall demonstrate the ability to read a minimum of Times New Roman N4.5 or Jaeger Number 1 or equivalent type and size letters, (e.g. Times New Roman of 4.5 points vertical height where 1 point = 0.3528mm) at a distance of not less than 300mm in at least one eye, either uncorrected or corrected. If corrected it shall be shown on certification that corrective lenses must be worn while undertaking Ultrasonic work.

Individuals shall also be capable of distinguishing and differentiating contrast between colours or shades of grey used in the method.

The examination shall be carried out by a medical practitioner or qualified optometrist.

Visual test results must be recorded.

9.2 Examinations – ARTC Ultrasonic Level I and II

9.2.1 Written Examinations

Written Examinations will be carried out at the completion of 'Off Job training'. Written Examinations will comprise of two parts

- a. General Written Examinations address general test basic principles.
- b. Specific Written Examinations address specific equipment, testing procedures, techniques and rail industry principles

The number of written questions required are shown in Table 2.

Table 2 – Written Questions Required

Method	ARTC Ultrasonic Level I		ARTC Ultrasonic Level II	
	General (see 9.2.1a)	Specific (see 9.2.1a)	General (see 9.2.1a)	Specific (see 9.2.1a)
Ultrasonic	40	20	40	20
Weld Geometry		5		5
Visual		5		5

Note:

- *ASNT question booklets and past TAFE examinations can be used to develop the examinations.*
 - *Written Examinations may be administered by computer*
 - *Employees who need assistance with reading and writing during Written Examinations may apply for such assistance to the ARTC Ultrasonic Level III. The Level III will appoint an aide to assist the candidate*
 - *All Written Examinations shall be closed book with the exception that reference tables, codes, standards and procedures may be supplied for reference*
-

9.2.2 Practical Examinations

2. Practical Examinations in the form of Competency Assessment using an approved Competency Assessment tool will be carried out at the completion of On the Job Training
 - a. The candidate should demonstrate familiarity with and ability to operate the necessary NDT equipment, record, and analyse the resultant information to the degree required.
 - b. Competency should be demonstrated in performing ultrasonic testing on several specimens approved by the ARTC Ultrasonic Level III. At least two rail flaws should be tested
 - c. At least ten different check points requiring an understanding of ultrasonic variables or procedural requirements should be included in the Competency Assessment.

9.3 Examinations – ARTC Ultrasonic Level III

Questions for examination of ARTC Ultrasonic Level III candidates may be drawn from ASNT booklets as applicable for the ultrasonic test method. Written examinations shall be closed book with the exception that reference tables, codes, standards, and procedures may be supplied.

The examination shall comprise as a minimum:

- i. Basic Examination
 - Fifteen (15) questions relating to SNT-TC-1A.
 - Twenty (20) questions relating to rail, and weld materials fabrication and product technology.
 - Twenty (20) questions randomly selected from Level II questions in relevant NDT methods.
- ii. Method Examination
 - Thirty (30) general questions at ARTC Ultrasonic Level III relating to fundamentals and principles of ultrasonics
 - Fifteen (15) technique questions at ARTC Ultrasonic Level III, relating to application and establishment of techniques and procedures
 - Twenty (20) questions relating to capability for interpreting ultrasonic codes, standards and specifications.
- iii. Specific Examination
 - At least Twenty (20) questions relating to the ARTC's applications, practices and procedures and the administration of this document.

Examinations

The employer may exempt the need for a specific ARTC Level III examination where the Level III candidate is already certificated to AINDT Level III or SNT Level III in addition to considerable rail testing experience. In such instances the exemption from examination of the employee shall be retained by the employer with the certification record of the employee.

9.4 Marking and Grading

For ARTC Ultrasonic Level I and II examinations administered by ARTC the final mark shall be the simple average of the general examinations.

For ARTC Ultrasonic Level III the composite mark shall be the simple average of the marks from the basic, method, and specific examinations.

The pass mark shall be 80% for the composite score, with no individual mark less than 70%.

9.5 Re Examination (all levels)

Where failing to achieve the required pass grade, a candidate must wait at least 30 days for re-examination or have undertaken no less than sixteen (16) hours of additional training before re-examination.

9.6 Appointment of External ARTC Ultrasonic Level III

At the option of the employer, an outside agency may be engaged to provide NDT ARTC Ultrasonic Level III services. In such instances the responsibility of certification of the employees shall be retained by the employer.

9.7 Purchases of External Training

ARTC may purchase outside training services to deliver off job training. In such cases it is the responsibility of ARTC to ensure such services meet the requirements of this written practice. This assurance shall be through the appointed ARTC Ultrasonic Level III.

10 Certification

10.1 Eligibility

Certification shall be by ARTC, and shall be in accordance with this document, after satisfying the requirements education, training and examination of this document. Any employee holding ARTC Ultrasonic Level III certification may certify ARTC Ultrasonic Levels I and II.

Note:

-
- *Certificate numbers shall be taken sequentially from a Certificate Register*
 - *Certificate shall be issued to successful candidate on a formatted certificate*
-

10.2 Records

Records shall be kept with respect to each certification of:

- Name of certified employee
- Level of certification method
- Procedures that they have been assessed competent
- Examination results
- Competency Assessment Tool
- Results of visual ability tests.
- Copy(s) of successful examination papers (as per clause 10.2 and 10.3)
- Dates of Certification
- Signature of ARTC's representative

10.3 Re Certification

Certified employees shall be recertified at intervals of no more than 5 years for all ARTC Ultrasonic Levels. Re-certification may be made on the basis of continued satisfactory performance, but for ARTC Ultrasonic Levels I and II it must include a practical, Performance Checklist in the relevant method.

The duration of any formal retraining is at the discretion of the RTO and or ARTC Ultrasonic Level III.

Re-certification using an approved Performance Checklist may be undertaken at any time at the discretion of ARTC where the scope of work changes, there is concern that performance has deteriorated, or technological change necessitates re-certification. Where an employee has had no practical hands on experience more than one year, re-certification should be undertaken before the team member resumes testing activity.

As a result of such re-certification, the team member's certification may be extended or revoked.

Visual Ability tests shall be conducted annually.

11 Termination

This certification is recognised within ARTC only. Certification shall be terminated when the employee fails to meet requirements for re-certification in accordance with paragraph 10.3.