



NON DESTRUCTIVE TESTING (NDT) TRAINING, QUALIFICATION & CERTIFICATION GUIDE

Non-Destructive Testing Technicians examine an object or material in a way that will not impair its usefulness using a range of science based tests. Non-Destructive Testing can be applied to any material but has its greatest uses in the aerospace, power generation and metal fabrication industries.

Non-Destructive Testing Technicians perform the following tasks:

- test castings, both ferrous and non-ferrous;
- test welds in the manufacture of pressure vessels and other critical structures;
- test aircraft and power generation components of various alloy types;
- monitor integrity of equipment in petrochemical and other industrial plants;
- choose the most suitable specific type of test;
- write reports outlining results of testing; and
- may give verbal explanation and interpretation of data to other technical personnel.

In order to carry out this work effectively Technicians must meet set levels of personal, education and training requirements, in accordance with AS3998/ISO9712.

These requirements are:

Personal Requirements:

Non-Destructive Testing Technicians need good eyesight and the ability to concentrate over long periods. A good standard of English is essential as Technicians are required to prepare written reports containing figures and technical words. The ability to work unsupervised is essential as is meticulous attention to detail.

Education & Training:

Currently there are no formal requirements for employment. However to pursue a career, tertiary qualifications are an advantage in the field of metallurgy or a related science.

To obtain an Australian Institute for Non-Destructive Testing (AINDT) qualification or certification to AS 3998-2006, requires a mixture of academic and practical experience, thus it is necessary to be employed in the industry as a Trainee, either before or after formal training.

DEFINITIONS:

Authorized Qualifying Body (AQB)

Body, independent of the employer, authorised by the Certification Body to prepare and administer qualification examinations under AS3998.

ATTAR is an Authorised Qualifying Body

Certification

Procedure, used by the Certification Body to confirm that the qualification requirements for a method, level and sector have been fulfilled, leading to the issuing of a certificate.

Note: The issuing of a certificate does not authorise the holder to operate; this authority can only be given by the employer.

Certification Body

Body that administers procedures for certification according to the requirements of this International Standard (AS3998/ISO9712).

AINDT is an Australian Certifying Body

Examination Centre

Centre approved by the Certification Body where qualification examinations will be carried out.

ATTAR is an Approved Examination Centre

NDT Training

Process of instruction in theory and practice in the NDT method in which certification is sought, which takes the form of training courses to a syllabus approved by the certification body.

Qualification

Demonstration of physical attributes, knowledge, skill, training and experience required to properly perform NDT tasks.

Qualification Examination

Examination, administered by the certification body or the authorized qualifying body, which assesses the general, specific and practical knowledge and the skill of the candidate.

LEVELS OF COMPETENCE

Under AS 3998-2006 there are three Levels of Competence, they are:

NDT Level 1:

An individual certified to Level 1 shall have demonstrated competence to carry out NDT according to NDT instructions and under the supervision of Level 2 or Level 3 personnel. Within the scope of the competence defined on the certificate, Level 1 personnel may be authorised by the employer to perform the following in accordance with NDT instructions:

- a) set up NDT equipment;
- b) perform the tests;
- c) record and classify the results of the tests;
- d) report the results.

Level 1 certified personnel shall not be responsible for the choice of test method or technique to be used, nor for the assessment of test results.

NDT Level 2:

An individual certified to Level 2 shall have demonstrated competence to perform Non-Destructive Testing according to established procedures. Within the scope of the competence defined on the certificate, Level 2 personnel may be authorised by the employer to:

- a) select the NDT technique for the test method to be used;
- b) define the limitations of application of the testing method;
- c) translate NDT codes, standards, specifications and procedures into NDT instructions adapted to the actual working conditions;
- d) set up and verify equipment settings;
- e) perform and supervise tests;
- f) interpret and evaluate results according to applicable codes, standards, specifications or procedures;
- g) prepare NDT instructions;
- h) carry out and supervise all tasks at or below Level 2;
- i) provide guidance for personnel at or below Level 2; and
- j) report the results of non-destructive tests.

NDT Level 3:

An individual certified to Level 3 shall have demonstrated competence to perform and direct Non-Destructive Testing operations for which he is certified. Within the scope of the competence defined on the certificate, an individual certified to Level 3 may be authorised by the employer to:

- a) assume full responsibility for a test facility or examination centre and staff;
- b) establish, review for editorial and technical correctness, and validate NDT instructions and procedures;
- c) interpret codes, standards, specifications and procedures;
- d) designate the particular test methods, procedures and NDT instructions to be used;
- e) carry out and supervise all tasks at all levels; and
- f) provide guidance for personnel at all levels.

Level 3 personnel shall have demonstrated:

- a) competence to evaluate and interpret results in terms of existing codes; standards, specifications and procedures;
- b) sufficient practical knowledge of applicable materials, fabrication and process technology to select NDT methods, establish NDT techniques, and assist in establishing acceptance criteria where none are otherwise available; and
- c) a general familiarity with other NDT methods.

CERTIFICATION PRE-REQUISITES:

1. Training and Experience

The courses run by ATTAR are based on the requirements of AS 3998-2006. This requires the following hours of training and experience before certification by AINDT:

Level 1

NDT Method	Training (hours)	Experience (months)
Eddy current testing (ET1)	40	3
Magnetic particle testing (MT1)	16	1
Penetrant testing (PT1)	16	1
Radiation safety (RT1)	40	3
Ultrasonic testing (UT1)	40	3

Level 2

NDT Method	Training (hours)		Experience (months)	
	With Level 1	Without Level 1	With Level 1	Without Level 1
Eddy Current testing (ET2)	64	104	9	12
Magnetic Particle testing (MT2)	24	40	3	4
Penetrant testing (PT2)	24	40	3	4
Radiographic testing (RT2)	80	120	9	12
Ultrasonic testing (UT2)	80	120	9	12

Level 3

NDT Method	Training (hours)	Experience (months)
	Inclusive of Level 2	Inclusive of Level 2
Eddy Current testing (ET2)	150	30
Magnetic Particle testing (MT2)	60	16
Penetrant testing (PT2)	60	16
Radiographic testing (RT2)	160	30
Ultrasonic testing (UT2)	160	30

These also meet or exceed the requirements of AS 3669-2006.

Candidates who have passed the examination requirements but have not yet attained the experience required for Certification at Level 1 or Level 2 may be registered as Trainees by the AINDT.

2. Vision

The candidate shall meet the following requirements:

- near-vision acuity shall permit reading, a minimum of Times Roman N4.5 or equivalent letters (Times New Roman of 4.5 points vertical height where 1 point = 1/72 in, at not less than 30 cm with one or both eyes, either corrected or uncorrected;
- colour vision shall be sufficient that the candidate can distinguish contrast between the colours used in the NDT method concerned as specified by the employer.

TRAINING PRE-REQUISITES:

Minimum Prerequisite

All courses have a **minimum pre-requisite** of Language, Literacy and Numeracy (LL&N), and basic knowledge of materials and processes.

Specific Course Prerequisites

Please note that study for the required Industrial Sector must be done before or at the same time as the NDT method course to enable candidates to be eligible for the Industrial Sector examination.

NDT Method	Pre-requisite
Eddy Current Level 1	Math ²
Eddy Current Level 2	Eddy Current Level 1 Math ² Multisector*
Magnetic Flux Leakage	Ultrasonics Level 2 Welds or UT Corrosion
Magnetic Particle Level 1	Minimum Prerequisite
Magnetic Particle Level 2	Multisector* Math ¹
Liquid Penetrant Level 1	Minimum Prerequisite
Liquid Penetrant Level 2	Multisector*
Radiation Safety	Math ²
Radiography Level 2	Current Radiation Safety License Math ²
Ultrasonics Level 1	Math ²
Ultrasonics Level 2	Ultrasonics Level 1 Math ²
UT2 Castings, Forgings, Nodes	UT2 General or Welds

Math¹ = Mathematical knowledge and skills, including Algebra.

Math² = Mathematical knowledge and skills, including Algebra and Trigonometry.

*Completion of a Multi-Sector course is not compulsory. However most students without a formal background in materials Engineering or metallurgy may find aspects of the industry specific exams (PT 2, MT 2 & ET 2) difficult without completion of the multi-sector course.

UT2 Castings, Forgings and Nodes/Nozzles and Magnetic Flux Leakage courses are specialist courses for Technicians with UT2 Welds.

INDUSTRIAL SECTORS:

The Industrial Sectors in which AINDT offers Certification are:

Eddy Current:	Multi-Sector Aerospace
Magnetic Particle:	General Engineering (Level 1 Only) Multi Sector Aerospace Underwater
Magnetic Flux Leakage:	Tank Bottom Testing
Dye Penetrant:	General Engineering (Level 1 Only) Multi-Sector Aerospace
Radiography:	Welds Castings Forgings
Ultrasonics:	General Engineering (Level 1 Only) Corrosion Mapping Welds Castings Forgings Nozzles Nodes

EXAMINATIONS:

The following examinations must be passed before Certification by AINDT:
The Pass mark for all exams is 70% (Including individual parts of Level 3 Exams).

Level 1:

General Exam		Closed Book
Specific Exam	- Industry Sector Specific	Closed Book
Practical Exam	- Industry Sector Specific	Open Book

Level 2:

General Exam		Closed Book
Specific Exam	- Industry Sector Specific	Closed Book
Practical Exam	- Industry Sector Specific	Open Book

Level 3:

Basic Exam

The basic examination should be passed first and remains valid, providing that the first main-method examination is passed within five years after passing the basic examination.

Part A 25 Questions

Technical knowledge in materials science, process technology, and types of discontinuities.

Part B 10 Questions

Knowledge of the certification body's qualification and certification system based on this International Standard. This may be an open book examination.

Part C 15 Questions Per Method (60 Total)

General knowledge of at least four methods as required for Level 2 and chosen by the candidate from methods within the Scope of this International Standard. These four methods shall include at least one volumetric method (UT or RT).

Main Method Exam

Part D 30 Questions

Level 3 knowledge relating to the test method.

Part E 20 Questions

Application of the NDT method in the sector concerned, including the applicable codes, standards, specifications and procedures.

Part F

Drafting of one or more NDT procedures in the relevant sector. The applicable codes, standards, specifications and procedures shall be available to the candidate.

Employment Opportunities:

Non-Destructive Testing is essentially a service industry so most employment opportunities are found with inspection and testing laboratories that hire out their services. The major airlines, power generation authorities and many large firms employ their own NDT Technicians.

RECOGNITION:

AINDT Certification to AS 3998/ISO 9712 is accepted throughout Europe including PCN.

REFERENCES:

1. AS 3998-2006/ISO 9712:2005, Non-Destructive Testing Qualification and Certification of Personnel
2. AS 3669-2006, Non-Destructive Testing Qualification and Registration of Personnel - Aerospace

ADDITIONAL INFORMATION:

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