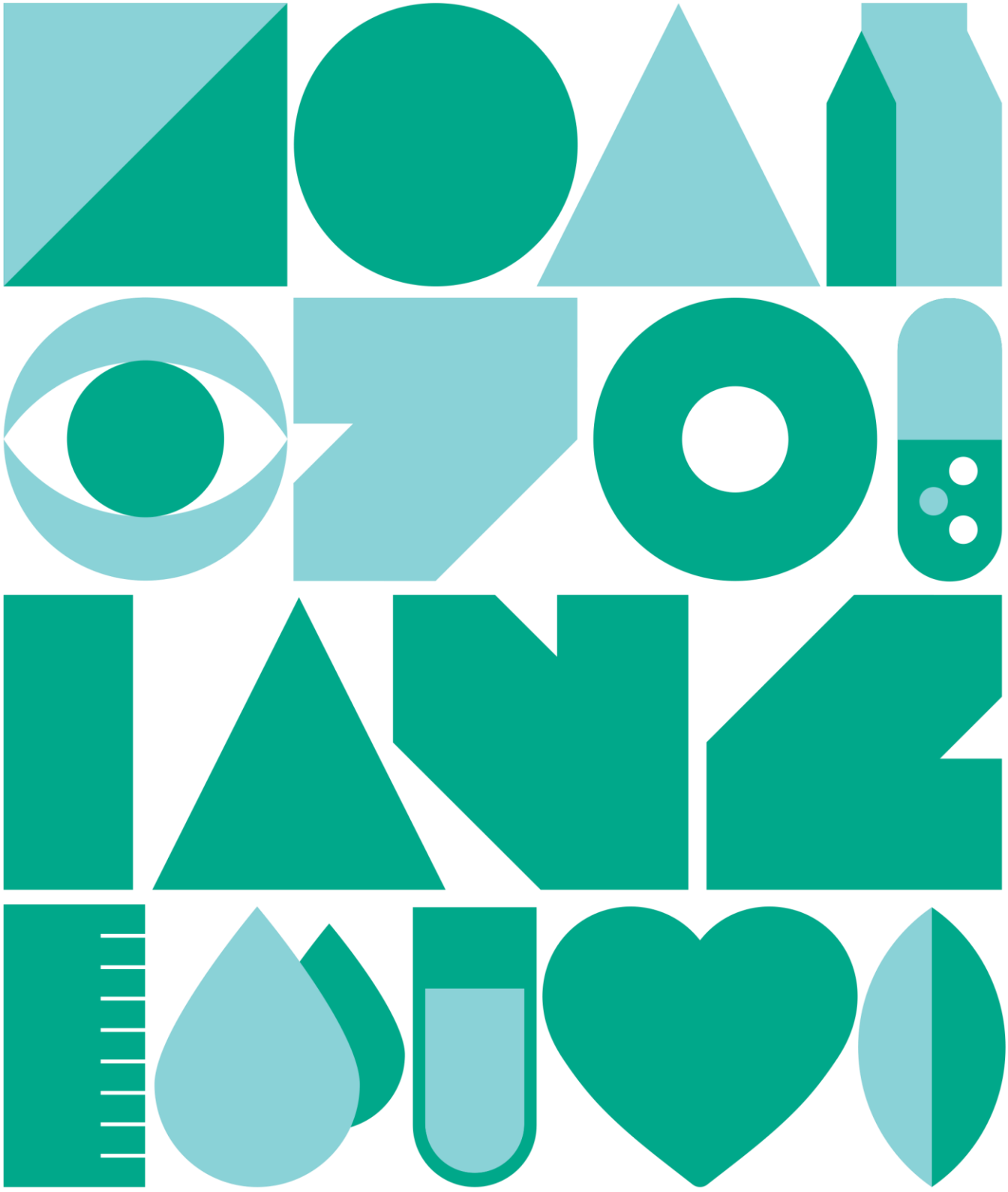

Supplementary Criteria for Accreditation
Non-Destructive Testing

Fifth Edition July 2020

The NZ mark of competence
Tohu Matatau Aotearoa

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Supplementary Criteria for Accreditation

Mechanical Testing Laboratory Accreditation Programme
Inspection Body Accreditation Programme

Non-Destructive Testing

AS LAB C4.1 / AS IB C1.3

Fifth Edition July 2020

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Contents

1 Introduction

The Supplementary Criteria provide additional or more specific detail about the particular requirements in a given area of testing or inspection. This document describes the requirements that apply to Non-destructive Testing (NDT), which can be accredited by IANZ as either (mechanical) testing activity or an inspection activity.

The generic criteria for accreditation are given in:

(a) ISO/IEC 17025 *General requirements for the competence of testing and calibration laboratories*, or;

(b) ISO/IEC 17020 *Conformity assessment – Requirements for the operation of various types of bodies performing inspection*, and;

(c) *Procedures and Conditions for Accreditation* (AS 1).

The Specific Criteria for accreditation are given in:

(a) AS LAB C4 *Specific Criteria for Accreditation – Mechanical Testing*, or;

(b) AS IB C1 *Specific Criteria for Accreditation - Application of ISO/IEC 17020:2012*, and;

(c) AS IB C2 *Specific Procedures and Conditions for Inspection Body Accreditation*, and;

(d) AS IB C3 *Specific Criteria for Accreditation – Competency Model Requirements*.

They do not qualify, detract from, or in any other way modify, the technical requirements specified in NDT methods or in other technical inspection directives.

The requirements for use of the IANZ logo on test or inspection reports are given in the IANZ document *Procedures and Conditions for Accreditation* (AS 1).

2 Definitions

CBIP
Certification Board for Inspection Personnel - a New Zealand personnel certification body.

Standards of Proficiency administered by CBIP:

AINDT RT - Radiographic Testing

AINDT PT - Penetrant Testing

AINDT MT - Magnetic Particle Testing

AINDT UT - Ultrasonic Testing

AINDT ET - Eddy Current Testing

CBIP WI & SWI - Weld Inspector & Senior Weld Inspector.

Note: Qualification by CBIP is a requirement for regulatory approval to carry out tests and inspections in a number of regulated areas in New Zealand.

AINDT
Australian Institute for Non-Destructive Testing.

Supervisor
An appropriately qualified senior staff member who is directing the technical work of other staff members.

Staff
Persons employed or contracted by the laboratory or inspection body.

Technician
The trained and qualified person performing the test or inspection.

Supervision
The act of directing the application of the test or inspection (NDT) being performed by other technicians, that includes the control of actions involved in the selection of method, preparation, selection of equipment, performance of the work and reporting of the results.

Direct supervision
The supervisor will be personally involved at the site of the test or inspection and is responsible for directing the technical aspects of the job. Direct supervision of field work means the supervisor will be on the site supervising the technician(s).

Endorsement
Is the application of the IANZ accreditation symbol to a final test or inspection report after checking of the report content by an Approved Signatory to ensure all the IANZ requirements have been met.

Or equivalent
A qualification that is equivalent to the CBIP qualification or recognised by CBIP. A list of personnel certification bodies considered by IANZ to be equivalent to CBIP is given in Appendix 1. This does not preclude the acceptance of other qualifications by IANZ from time to time. As already noted, some regulatory inspections/tests in New Zealand require specific CBIP qualifications.

Test
The application of a specified procedure, usually with the aid of specified equipment, to arrive at an objective physical characteristic of the item being “tested”.

Inspection
The application of a specified procedure, usually with the aid of minimal equipment, to assess conformity with specified requirements.

Note: The terms "test" and "inspection" are used interchangeably in this document.

Laboratory
An all-encompassing term used to describe the organisation and/or location where testing or inspection work is carried out (including field work, dark rooms, etc.)

Note: The term Laboratory can refer to an accredited inspection body or laboratory.

Personal Qualification
A term used to describe the certificate issued by an appropriately recognised body, such as CBIP or those listed in Appendix 1, which demonstrates the successful completion of a relevant and current training course and examination process.

ACFM
Alternating Current Field Measurement (see section 11).

TOFD
Ultrasonic time of flight diffraction (see section 11).

3 Scope

The criteria described here relate to both inspection and testing accreditation by IANZ.

The criteria are applicable to all sites where NDT inspection or testing is carried out. This includes the customer’s site, all mobile facilities, as well as specialist workshops and laboratories.

Accreditation is available for a wide range of national and international published test and inspection methods, for manufacturer's methods and for in-house methods that have been validated.

4 Classes of Test

This document covers the supplementary criteria required to accredit an organisation for the provision of non-destructive testing/inspection in the following classes of test:

Mechanical Testing/Inspection

Class	Title
4.81	Radiography
4.82	Ultrasonics
4.83	Visual Inspection
4.84	Dye Penetrant

4.85 Magnetic Particle

4.86 Eddy Current

4.87 Specialised Techniques.

This list is not exhaustive and may be added to from time to time.

5 General Requirements for Accreditation for NDT

5.1 Staff

The emphasis of IANZ accreditation in the field of NDT is on the assurance that effective technical supervision is being exercised over all applicable work and that all relevant personnel involved in each job are appropriately qualified and trained.

5.1.1 Approved Signatories

For IANZ endorsement of test/inspection reports, the organisation will need to have at least one staff member holding the requisite personal qualification(s) who has been awarded IANZ Approved Signatory status in the class of test being reported. The general requirements for an approved signatory are stated in Appendix 2 of the IANZ Specific Criteria AS LAB C4: *Mechanical Testing*. These general requirements are applicable in both Inspection Body Accreditation and Laboratory Accreditation.

Each IANZ endorsed report must be signed by an Approved Signatory who has been awarded IANZ signatory approval status in the applicable class of test.

Except for specialised techniques such as ACFM and TOFD (see section 11), it is no longer a requirement for the Approved Signatory to have personally performed the work. An appropriately trained and qualified technician (see 5.1.2 Technician below) who is not an Approved Signatory may have performed the work with little, if any, knowledge of the requirements for IANZ endorsement of the final test/inspection report. It is the responsibility of the Approved Signatory to ensure that all applicable work has been performed satisfactorily by appropriately trained and qualified technician(s) using proper procedures and calibrated equipment, that all records are completed accordingly, and that all associated requirements for accreditation have been met.

IANZ Approved Signatory's assessments will not only focus on the technical competence of the applicant Approved Signatory concerned, but also on their understanding of the requirements for accreditation, including their knowledge of the following documents:

(a) IANZ *Procedures & Conditions for Accreditation* (AS 1)

(b) ISO/IEC 17025 *General Requirements for the Competence of Testing and Calibration Laboratories* (for accredited laboratories)

(c) ISO/IEC 17020 *General Criteria for the Operation of Various Types of Bodies Performing Inspection* (for accredited Inspection Bodies)

(d) IANZ Specific Criteria AS LAB C 4 *Mechanical Testing*

(e) IANZ Supplementary Criteria AS LAB C4.1 / AS IB C1.3 *Non Destructive Testing* (this document).

An Approved Signatory may be a full time employee or be a contractor for specific areas of responsibility. The contracted signatory must meet the details set out for contracted staff below, and the contract document will ensure that they can perform their role as effectively as if they were an employee (e.g. assigning sufficient authority to direct staff where appropriate, and to make necessary changes/enhancements to documents such as test records and reports, etc)..

The contract document will include, but not be limited to:

(a) Adequate definition of all assigned authority and responsibility, including the limitations (e.g. signing of test/inspection reports)

(b) Identification and declaration of any conflicts of interest (real or potential)

(c) Limits of liability for both parties in the event of something going wrong.

5.1.2 Technicians

Technicians must hold the relevant personal qualifications, particularly for regulatory inspections. Knowledge of the materials and fabrication techniques being used will often assist with interpretation. The Approved Signatory (or supervisor) shall ensure that the technician carrying out the testing has the required knowledge and personal qualifications in respect of each job they are assigned.

Work may be carried out by personnel not holding the requisite personal qualifications, but their work must be directly supervised on the job by an appropriately qualified technician. The qualified technician will sign off all work carried out under their direct supervision.

5.1.3 Contracted staff and technicians

IANZ recognises that the NDT industry relies heavily on the use of contracted staff. Test/Inspection reports for work carried out by staff employed on contract may be IANZ endorsed providing the following have been implemented:

(a) Contracted technicians performing the work hold current personal qualifications in the relevant discipline

(b) Contracted technicians should have been introduced to the employing organisation and its quality management system e.g. company structure, safety policies and requirements, job recording and reporting requirements (forms), etc.

(c) A contract document, as discussed above, shall be in place, and be signed by both parties

(d) Records should be maintained to confirm the above requirements have been met, (e.g. a personal file containing copies of personal qualifications, a copy of the contract, a record that shows induction training in the employing organisation's systems, etc).

5.1.4 Vision

The test result from NDT using Visual Inspection, class of test 4.83 (see Section 8) and, in part other inspection techniques covered by this document (radiographic interpretation for example), relies on the ability of the technician to be able to see the imperfections and flaws, or lack of them. It is the responsibility of management of the NDT facility to ensure the required visual acuity, normal or corrected, has been met for all relevant technicians.

To assure the adequacy of vision acuity, the eyesight check should be carried out by an appropriate professional (e.g. medical nurse, doctor or an optometrist).

For IANZ accreditation, it is expected that management will have a documented policy for the frequency of eyesight examinations which is appropriate for the technicians being employed.

5.2 Equipment and Accommodation

A testing service must be fully equipped for the performance of all work for which IANZ accreditation is sought. If work is performed to a code or standard that defines particular items or types of equipment, possession of that equipment becomes mandatory. All equipment is to be maintained in good condition and be in calibration at the time of carrying out the test or inspection. Calibration records need to show that the item met the minimum requirements of the test specification or code being used, or where no calibration requirements are stated, the most stringent requirements of either the manufacturer or those listed in Appendix 2.

Fixed and mobile facilities need to provide adequate accommodation for performance of the work. Adequate storage facilities need to be available for equipment and records.

5.3 Test/Inspection Procedures

When the code or standard (or client) for a project requires a specific procedure, that procedure needs to be followed. When the procedure is not specified, the supervisor in charge of the job should discuss the job with the client and select an appropriate procedure.

A copy of the code, standard or test/inspection procedure needs to be available to all relevant technicians **at the time of performing the work**.

NDT facilities are often asked to carry out work to procedures (codes or standards) which are not held by the laboratory. In this case, the job records should show that the procedure was available and where it was obtained from (e.g. HERA library, client supplied, etc). If possible, when work procedures are not part of the laboratory's library, a copy of the procedure should be retained with the job records.

Any variation from the specified procedure must be recorded and reported in the work documents.

The facility's reference library should include recommended practices, codes for identification of imperfections and defects and a selection of reference books relevant to the NDT techniques being carried out. A routine arrangement for keeping codes and standards up-to-date shall be in place.

5.4 Test/Inspection Record System

An adequate job recording system is fundamental to the operation of an accredited NDT facility. The records system should ensure that sufficient information is recorded on each job to permit another technician to locate the test piece (test site, etc), repeat the work using the same techniques and produce a comparable result.

Guidance for reporting requirements is stated in 5.5. Generally, the records system needs to identify the item under test/inspection, state the client's instructions, identify who carried out the work, state what procedure was used, present the test results recorded at the time the test/inspection was carried out and identify who completed the checking process. All records, including radiographs, must be traceable to the item under test. See Records in each following section.

All job records need to be retained as primary data from the work performed. If technicians are using individual workbooks rather than worksheets specific to the job, the books need to remain the property of the organisation and be controlled to ensure they do not become mislaid. All records within the workbook need to contain all of the required information for each job to ensure traceability to the item that has been tested/inspected.

5.5 Test/Inspection Reports

Test reports need to give the client all of the relevant information required and every effort should be made to ensure that the report is unambiguous. The records pertaining to that test need to support all the information in the report. Unless exceptional circumstances apply, there will be no information in the final test report which has not been previously documented in the records system. All reporting requirements of the test/inspection specification must be included in the report.

When recording and reporting an imperfection or defect indication, a standard code of terminology may be used. This code should be normal industry accepted practice and be based on a published standard or code. The code of terminology needs to be quoted in the test report.

If the identification of the imperfection/indication is doubtful, reference to the indication should be appropriately qualified. Reports need to avoid the implication that no imperfections exist merely because none have been found.

Reports must specify any limitations or deviations from the procedure that could affect the test results.

5.6 Safety

Since the introduction of the Health & Safety in Employment Act (H & SE) the responsibility for safety rests solely with the organisation's management and staff. Safety has taken on a greater emphasis and the inclusion of safety as an aspect of IANZ accreditation is no longer considered appropriate.

However, some NDT techniques require the use of potentially lethal equipment and any unsafe practices within the laboratory generally reflect an unsatisfactory approach to the supply of consistent and reliable test results. Unsafe practices may have an adverse effect on an IANZ assessment and could result in the assessment being terminated, accreditation being suspended or withheld, or other appropriate action on the part of the assessment team (commensurate with the unsafe practices observed).

It is the responsibility of the organisation to ensure that all relevant staff and technicians (including contractors) are familiar with the safe use of equipment and with all regulatory requirements applicable to their work (administered by authorities such as the National Radiation Laboratory).

Should the assessment team observe a safety issue, it will be brought to the attention of the organisation's management as required by the H & SE Act. Unless considered as significant, the issue may not affect accreditation and will not in itself be a condition of accreditation. If considered appropriate, the assessment team will comment on the observation and pass on a recommendation in the assessment report.

6 4.81 Radiography

6.1 Staff

6.1.1 General

Staff carrying out any part of the radiographic process need to be adequately qualified or be directly supervised by an appropriately qualified technician. For technicians operating without supervision or acting as supervisors, this qualification level shall be a minimum of CBIP (AINDT) RT Level 2 (or equivalent).

Note: As it is necessary for the radiographic interpreter to have a comprehensive knowledge of all the aspects which can affect the quality of the radiographic film, and be able to eliminate any such effects from the interpretation, the CBIP LIMSPEC qualification in Radiographic Interpretation is not acceptable for IANZ endorsement of radiographic interpretation reports unless the film has been check viewed by a CBIP (AINDT) RT level 2 or 3 (or equivalent) and the report signed by them.

The taking and processing of radiographic films may be undertaken by CBIP (AINDT) RT Level 1 qualified technicians without direct on-the-job supervision. However, the qualified supervisor must direct the work, be aware of the exact nature of the job and take full responsibility for it. The ratio of unqualified staff to qualified staff needs to be such that adequate control is maintained. This aspect will be subject to review on a job-by-job basis by the assessment team with regard to (but not limited to) the following factors:

(a) Experience of the technicians involved

(b) Complexity of the work being undertaken

(c) Materials of construction.

Note: For IANZ endorsed work, it is not acceptable for radiographs to be taken and processed by one organisation and interpreted by another, unless a second interpretation of the radiographs is required from other qualified technicians.

6.1.2 IANZ endorsed reports

All radiographic films for which IANZ endorsement is to apply need to have been interpreted (viewed) by a CBIP level 2 (or equivalent) qualified technician and, preferably, by a technician familiar with the job.

All IANZ endorsed reports shall be signed by an IANZ Approved Signatory. A minimum personal qualification of CBIP (AINDT) RT Level 2 (or equivalent) is a prerequisite for Approved Signatories in Class of Test 4.81 - Radiography.

The Approved Signatory endorsing the radiographic report need not have been personally involved in the work. It is the Approved Signatory's responsibility to ensure that all of the requirements for endorsement have been met, including appropriate supervision.

6.2 Radiographic exposure requirements

The x-ray exposure or gamma source energy shall be selected to ensure that the sensitivity requirements of the code, standard, specification, procedure or customer's requirements are met. They should cover the required thickness range and the shape, nature and location of items likely to be submitted for examination.

To facilitate the standardisation or the selection of appropriate radiographic exposures and procedures, exposure charts need to be prepared for each x-ray machine and each film type used. Decay charts shall be maintained for gamma sources. These charts shall be available to operators whenever the equipment is in use.

Radiographic film shall be stored and maintained in suitable storage areas in accordance with the manufacturer's instructions and used on a rotational basis.

Lead screens used in conjunction with radiographic films shall be maintained free from scratches, chemical splashes and any defects likely to cause spurious indications/artefacts on the processed radiographs. Films should be checked from time to time for such artefacts. One way to ensure defective screens can be traced easily is to uniquely identify them.

The radiographic sensitivity of a radiograph shall be established by means of an Image Quality Indicator (IQI) appropriate to the material and thickness. The type and location of the IQI being used shall be in accordance with the standard or code being used. When a length of weld is radiographed, the IQI shall be placed at the ends of the weld that is to be interpreted. A letter, (e.g. 'F' for film side), or other lead indicator is to be included with the IQI to indicate which side of the item under test the IQI was located on (i.e. source side or film side). The Film Focus Distance (FFD) or Source Film Distance (SFD) shall be such that the geometric unsharpness (Ug) requirement of the code, standard, specification, procedure or customer's instructions are met.

Note: When determining the sensitivity of the radiograph, the position of the IQI can influence the number of detectable wires and the interpreter should be aware of the location.

Radiographs shall be traceable to the report and site of the test. Sufficient quantities of lead identification letters and numbers will need to be available to technicians.

6.3 Developing radiographic films

The developing of radiographs should be carried out in accordance with the film manufacturer's recommendations.

Darkroom facilities for processing radiographs at a consistently high level of quality shall be available and shall be adequate for the number of radiographs being processed. The darkroom shall be fitted with a suitable warning system that prominently indicates that the darkroom is in use (e.g. warning lights). Records shall be maintained of the developer replenisher used and when the processing chemicals are changed. The film loading bench/table shall be easy to clean and maintained in a clean condition. The processing room should be equipped with an extraction fan.

Background working red or red orange lights (safe lights) shall be checked for potential film fogging. The exposure of a bare film (to the safe lights) with an object (e.g. a key) placed on the film is generally considered adequate. Should an outline of the object appear on the film, the safe lights may need to be replaced (or it may indicate that there is external light leakage into the darkroom).

Note: Red or red orange safe lights are often classified as "safe" either as a direct source or an indirect source, and responsible staff should be aware of the type fitted to the darkroom.

A thermometer should be available for the measurement of developer temperature. Unless the film processing is thermostatically controlled at a fixed temperature, a graph or chart relating processing time to developer temperature should be available in the darkroom.

Quality control needs to be exercised over film processing, either by the use of standard test films and/or by recording the amount of film processed.

Automatic film processors shall be maintained in a good condition to the manufacturer's requirements.

6.4 Interpretation of Radiographic Films

The viewing of radiographs shall be carried out in a suitable area using a viewer capable of resolving observed weld defects in films of the contrast and density normally encountered. The light output of the viewer would normally be checked in accordance with Appendix 2.

The radiographic sensitivity of a radiograph shall be determined and recorded at the time of interpretation.

The radiographic density shall be determined and recorded at the time of interpretation by use of a densitometer or calibrated film density strips.

Note: The use of film density strips is not recommended unless technicians are experienced and competent in their use. Working film density strips used for this purpose shall be maintained in good condition and be in service in accordance with dates shown on the manufacturer's certificate.

It is considered good practice for a second appropriately qualified technician to check all radiographs and the subsequent report. Accredited organisations should implement a check viewing system on radiographs and reports.

6.5 Equipment Management & Calibration

As stated in paragraphs 6.2 – 6.4, all equipment must be suitable for the use to which it is being put, be commissioned appropriately, be regularly checked/calibrated and have the appropriate records generated and maintained.

It is not appropriate to prescribe check/calibration intervals in this document as this will depend entirely upon the nature of the equipment, its environment and degree of usage (e.g. an item used entirely within the laboratory may suffer less deterioration than an item constantly used in the field).

Where guidance is required, it is included in Appendix 2 of this document.

Radioactive sources shall be stored, maintained, transported, checked, and used in accordance with the specific requirements of the New Zealand National Radiation Laboratory (NRL). All required NRL licences shall be maintained up-to-date.

The condition of all IQI's shall be monitored and damaged devices withdrawn from use. For laboratories employing a number of staff, this monitoring should be formalised by the scheduling of regular checks. A list of IQI's held by each staff member would be considered a useful aid to this check along with a record of the check.

6.6 Mobile Facilities

All mobile radiography facilities shall comply with the requirements of this document. However, owing to the greater potential for damage and/or general wear and tear, the laboratory will need to develop specific documented procedures for the operation and maintenance of all mobile facilities.

The procedures may be comprehensive, but need only encompass the additional requirements associated with the storage, transport and establishment (at each new site) of the mobile facility. It is anticipated that once established on-site, the actual test procedures will be the same as those used in fixed facilities.

Aspects to be considered (but not limited to):

(a) Equipment management - routine

(b) Equipment preparation for transport

(c) Equipment set-up at each new site

(d) Equipment quality control checks before operation

(e) Equipment spares

(f) Staffing

(g) Supervision

(h) Job acceptance procedures

(i) Job/Test records

(j) Test reporting

(k) Test report issue – including checking, signing, endorsement, etc.

The procedures may be generic in nature or specific to each contract (using the mobile facilities). Where the procedures are generic, it would be appropriate to include any specific individual contract aspects, such as staffing, supervision, reporting, etc, in a document such as a "Technical Directive" or similar.

6.7 Records and Reports

6.7.1 Job Records

At the time of taking the radiograph the following would normally be recorded:

(a) A unique job or contract identification (e.g. job number)

(b) The date the radiograph is taken

(c) The procedure being used

(d) All appropriate machine settings and job parameters

(e) The film size and type being used

(f) The IQI or Penetrameter being used

(g) Each radiograph site is uniquely identified and recorded

(h) The name(s) of the technician(s) carrying out the radiography

(i) Any other relevant information or limitations that may aid the interpretation

(j) Any information that is required to enable a repeat of the radiography using the same conditions.

6.7.2 Interpretation Records

The above job record shall be available to the interpreter at the time of viewing.

At the time of interpretation, the following would normally be recorded:

(a) If the record is not a continuation of the previous record it shall contain the unique job or contract identification

(b) Radiographic film unique identification or test site

(c) The date of interpretation

(d) The radiographic density and sensitivity

(e) **All** imperfections/indications should be recorded (this is most commonly done by the use of standard abbreviations, which would be referenced and consistently used by all technicians)

(f) Name of the technician carrying out the interpretation

(g) The technician's personal qualification (e.g. RT2)

(h) Name of the technician carrying out any check viewing.

An interpretation record may be a continuation of the job record or it may be a separate document.

6.7.3 Reports

Where a formal report, either handwritten or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with AS/NZS ISO/IEC 17020 or NZS ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site.

(c) The code for compliance, (e.g. PD5500)

(d) **All** imperfections/indications (this is most commonly by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Identification of the technician(s) carrying out the interpretation, including their personal qualifications (normally by typed name and signature)

(g) Identification of the staff when check viewing is performed

(h) Is signed by an appropriate Approved Signatory, including their name and function (if endorsed).

Note: Where the Approved Signatory is the job supervisor and interpreter, the radiographic film should be check viewed by another appropriate staff member. Alternatively, if the Approved Signatory is not the interpreter, he may check view the radiographs.

A report may be a continuation of any of the preceding records or it may be a separate document.

6.7.4 Retention of Radiographs

As with all other forms of testing, all test **records** should remain the property of the testing facility. The customer should receive only the test report issued for the work undertaken. This protocol allows the facility to subsequently review all information which had an input into the final test result (that which is reported on a test report).

Radiographic films are “test data” that allow the laboratory to interpret the information and provide a meaningful test result to the client (it is, after all, the interpretation that the customer is paying for). Radiographic films are, in themselves, of little use without the necessary expertise required to interpret them accurately and reliably. Additionally, these records, if not stored and handled appropriately, can deteriorate very quickly. For these reasons the laboratory should retain and maintain the storage of all radiographic films.

However, it has become standard industry practice for engineers to request custody of the radiographs along with the test report. For all jobs where the radiographs are released to the customer, the job records should include a chain of custody statement i.e. name of the person/organisation who received the radiographs.

This statement should include specific instruction on the handling and storage of the radiographs and that they remain the property of the laboratory.

7 4.82 Ultrasonics

7.1 Staff

7.1.1 General

The reliability of ultrasonic examination results depends on the knowledge, training, and experience of the person performing the work. For IANZ endorsed work, the following minimum prerequisite personal qualifications shall apply for technicians carrying out ultrasonic inspections:

CBIP (AINDT) UT Level 1 (or equivalent)

Ultrasonic inspection of butt welded joints in plate, pipe and tube without backing rings

Ultrasonic examination of wall thickness.

CBIP (AINDT) UT Level 2 (or equivalent)

Ultrasonic inspection of welded tees, nozzles and other connections.

7.1.2 IANZ endorsed reports

An IANZ Approved Signatory shall sign all IANZ endorsed reports. A minimum personal qualification of CBIP (AINDT) UT Level 2 (or equivalent) is a prerequisite for Approved Signatories in Class of Test 4.82 - Ultrasonics.

The Approved Signatory need not have been personally involved in the work. It is the Approved Signatories responsibility to ensure that all of the criteria for IANZ endorsement have been met, including appropriate supervision.

7.2 Equipment

All equipment shall be maintained in a calibrated condition and in good working order. Records of all maintenance are required.

The correct functioning of testing units, probes and connecting cables shall be checked and documented at regular intervals (a notebook kept with each set may be an efficient means for recording this information).

Reference blocks shall be uniquely identified and a record that confirms its suitability shall be generated prior to first use. Each record shall include traceable measurements for each of the critical dimensions and include a compliance statement against the relevant standard. The blocks shall be subject to appropriate recalibration dependant on usage. Calibration blocks shall be maintained in good condition, free from any mechanical damage and corrosion that may impair their use.

UT probes shall be uniquely identified and the equipment register shall include a list of all probes in service. Maintenance records shall be maintained. Beam spread charts shall be generated for each probe and copies of those charts are to be available to the technician during each use. The charts need to be updated regularly when necessary, (e.g. when wear is apparent and following any re-shoeing or other refurbishment).

Facilities that are accredited for weld inspection shall maintain a full set of shear wave probes (e.g. 45º, 60º and 70º).

7.2.1 Equipment Management and Calibration

Some guidance is provided in Appendix 2.

7.3 Records and Reports

7.3.1 Job Records

At the time of carrying out the inspection the following would normally be recorded:

(a) A unique job or contract identification (e.g. job number)

(b) The date of inspection

(c) The procedure being used

(d) The ultrasonic equipment, calibration blocks and probes used

(e) Traceability identifies each test site

(f) All observed imperfections/indications

(g) The name(s) of the technician(s) carrying out the job

(h) Any other relevant information or limitations that may affect the test result.

7.3.2 Reports

Where a formal report, either handwritten or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with AS/NZS ISO/IEC 17020 or NZS ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site.

(c) The code for compliance, (e.g. PD5500)

(d) **All** imperfections/indications (this is most commonly by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Identification of the technician(s) carrying out the interpretation, including their personal qualifications (normally by typed name and signature)

(g) Signature of appropriate Approved Signatory, including their name and function (if endorsed)

(h) Any information that is required to enable a repeat of the ultrasonic inspection using the same conditions.

A report may be a continuation of the job record or it may be a separate record.

8 4.83 Visual Examination

Accreditation is available for non-destructive tests by visual inspection of welds in ferrous components. Inspection of welds in non-ferrous components may be considered if inspection technicians hold qualifications that include non-ferrous metals. This includes both direct and remote visual inspection using such equipment as mirrors, telescopes, boroscopes, fibre-optics, camera systems, etc.

This class of test is available in the Laboratory Accreditation Programme (see following note) only as an adjunct to an NDT facility holding or seeking accreditation in radiography, ultrasonics or surface methods. Prerequisite personal qualifications are required and are as discussed below.

Note: Facilities seeking accreditation for visual inspection of welds only (i.e. no other NDT class or discipline), may apply for accreditation in the IANZ Inspection Body Programme.

8.1 Staff

8.1.1 General

The outcome of a visual inspection relies completely on the knowledge and experience of the technician carrying out the work. For IANZ endorsed work, any one of the following prerequisite personal qualifications shall apply for technicians carrying out visual inspection:

CBIP (AINDT) RT	Level 2 or 3	(or equivalent)
CBIP (AINDT) UT	Level 2 or 3	(or equivalent)
CBIP (AINDT) PT	Level 2 or 3	(or equivalent)
CBIP (AINDT) MT	Level 2 or 3	(or equivalent)
CBIP WI or SWI		(or equivalent)

8.1.2 IANZ endorsed reports

All IANZ endorsed reports shall be signed by an IANZ Approved Signatory. A minimum personal qualification of one of the qualifications listed in 8.1.1 is a prerequisite for Approved Signatories in Class of Test 4.83 - Visual Inspection.

The Approved Signatory need not have been personally involved in the work. It is the Approved Signatory's responsibility to ensure that all of the criteria for IANZ endorsement have been met, including appropriate supervision.

8.2 Equipment

Visual aids shall be adequate and suitable for the purpose for which they are being used and must meet any requirements of the applicable test procedure.

8.3 Records and Reports

8.3.1 Job Records

At the time the inspection is carried out the following would normally be recorded:

(a) A unique job or contract identification (e.g. job number)

(b) The date of inspection

(c) The procedure being used

(d) Traceability identifies each inspection test site

(e) The surface condition (e.g. surface preparation)

(f) Any aids which have been used

(g) All observed imperfections/indications

(h) The name(s) of the technician(s) carrying out the job

(i) Any other relevant information or limitations that may affect the test result.

8.3.2 Reports

Where a formal report, either handwritten or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with ISO/IEC 17020 or ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site.

(c) The code for compliance, (e.g. PD5500)

(d) **All** imperfections/indications (this is most commonly by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Identification of the technician(s) carrying out the interpretation, including their personal qualifications (normally by typed name and signature)

(g) Signature of appropriate Approved Signatory, including their name and function (if endorsed)

(h) Any information that is required to enable a repeat of the visual inspection using the same conditions.

Note: For IANZ endorsement, the inspection will need to have been carried out against a specified code (e.g. code, standard or specification). Reporting is to be limited to stating the presence or absence of specified visible imperfections as stated in the code. A compliance statement is acceptable. General reporting of fitness for purpose is not permissible.

A report may be a continuation of the job record or it may be a separate record.

9 4.84 and 4.85 Surface Methods (Dye Penetrant and Magnetic Particle)

9.1 Staff

9.1.1 General

For IANZ endorsed work in the specified areas, the following minimum personal qualifications are required for technicians carrying out surface methods techniques:

CBIP (AINDT) PT	Level 2 (or equivalent)
CBIP (AINDT) MT	Level 2 (or equivalent)

9.1.2 IANZ endorsed reports

All IANZ endorsed reports shall be signed by an IANZ Approved Signatory. A minimum personal qualification of CBIP (AINDT) PT or MT Level 2 (or equivalent) is a prerequisite for Approved Signatories in Class of Test 4.84 Dye Penetrant and 4.85 Magnetic Particle.

The Approved Signatory need not have been personally involved in the work. It is the Approved Signatory's responsibility to ensure that all of the criteria for IANZ endorsement have been met, including appropriate supervision.

9.2 Equipment

All equipment needs to be maintained in good working order and records of all maintenance are required.

9.2.1 Fixed Bench MPI

MPI fixed bench equipment require regular checks that the current level set or indicated is being achieved in the coil or the current flow.

A method for measuring the adequacy of the magnetic field strength on the test pieces should be used during testing (e.g. Castrol strips).

During use, a build-up of background fluorescence will occur from the bench surface and its accessories. The bench should be subject to sufficient cleaning to avoid an unacceptably high level of background fluorescence.

9.2.2 Portable MPI

Electromagnetic and permanent magnet yokes shall be checked regularly in accordance with an appropriate standard (e.g. ASME -T-752.3).

Some method for measuring the adequacy of the magnetic field strength on the test pieces shall be used during testing (e.g. Castrol strips).

9.2.3 UV lights

Where UV light enhancement is used, the UV light source should be regularly checked against a calibrated UV light meter.

9.2.4 MPI Consumables

Magnetic particle solutions are commonly available to technicians in a bulk form made up by the laboratory or in ready to use proprietary aerosols (normally used with hand held MPI yokes). The concentrations of these solutions should be checked against a relevant standard using a centrifuge tube. The particle concentration shall meet the requirements of the code, standard or specification being used in the inspection. Records shall be maintained of these checks.

9.2.5 Proprietary aerosol consumables

Where proprietary aerosols are used, for either MPI or Penetrant methods, records should be maintained of each batch. These records should include:

(a) Batch number

(b) Date of purchase

(c) Identity of supplier

(d) Quality control check (e.g. concentration check - see Note 1)

(e) Date batch put in service

(f) Date batch fully consumed (see Note 2).

Note 1: Laboratories should not automatically accept the suitability of proprietary aerosol consumables. While a degree of confidence can be assumed, sufficient checks should be carried out to confirm that confidence.

Note 2: If the laboratory implements a strict policy of using one batch at a time, the date of final consumption of one batch may be taken as the date of first use of the next batch.

9.3 Records and Reports

9.3.1 Job Records

(a) At the time the inspection is carried out, the following would normally be recorded:

(b) A unique job or contract identification (e.g. job number)

(c) The date of inspection

(d) The procedure being used

(e) The identity of each test site

(f) All observed imperfections/indications

(g) The name(s) of the technician(s) carrying out the job

(h) Any other relevant information or limitations that may affect the test result.

9.3.2 Reports

Where a formal report, either handwritten or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with ISO/IEC 17020 or ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site

(c) The code for compliance, (e.g. BS5500)

(d) **All** imperfections/indications (this may be done by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Name(s) of the staff carrying out the interpretation including their personal qualifications (normally by typed name and signature)

(g) Signature of an appropriate Approved Signatory, including their name and function (if endorsed)

(h) Any information that is required to enable a repeat of the inspection using the same conditions

(i) Comment on whether the item has been de-magnetized.

The report may be a continuation of the job record or it may be a separate document.

10 4.86 Eddy Current

10.1 Staff

10.1.1 General

For IANZ endorsed work, the following minimum prerequisite personal qualifications shall apply for technicians carrying out eddy current techniques:

CBIP (AINDT) ET Level 2 (or equivalent)

10.1.2 IANZ endorsed reports.

All IANZ endorsed reports shall be signed by an IANZ Approved Signatory. A minimum personal qualification of CBIP (AINDT) ET level 2 (or equivalent) is a prerequisite for Approved Signatories in Class of Test 4.86 - Eddy Current.

The Approved Signatory need not have been personally involved in the work. It is the Approved Signatory's responsibility to ensure that all of the criteria for IANZ endorsement have been met, including appropriate supervision.

10.2 Equipment

All equipment shall be maintained in a calibrated condition and in good working order, and records of all maintenance are required.

Eddy current sets shall be set-up (calibrated) prior to each job using appropriate reference items with known imperfections, specifically manufactured and retained for this purpose.

All reference items containing known imperfections should be uniquely identified. Each item will have been manufactured with imperfections that have been physically measured using traceable measuring equipment. A record that clearly identifies the imperfection and its critical dimensions shall be generated prior to first use. The reference items shall be subject to appropriate checks or re-calibration.

Eddy current probes should be uniquely identified and the equipment register should include a list of all probes in service. Maintenance records should be maintained.

10.3 Records and Reports

10.3.1 Job Records

At the time of testing, the following would normally be recorded:

(a) A unique job or contract identification (e.g. job number)

(b) The date of inspection

(c) The procedure being used

(d) The eddy current equipment being used (including probes)

(e) Identity of each test site

(f) All observed imperfections/indications

(g) The name(s) of the technician(s) carrying out the job

(h) Any other relevant information or limitations that may affect the test result.

10.3.2 Reports

Where a formal report, either hand written or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with ISO/IEC 17020 or ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site

(c) The code for compliance, (e.g. PD5500)

(d) **All** imperfections/indications (this may be done by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Name(s) of the technician(s) carrying out the interpretation, including their personal qualifications (normally by typed name and signature)

(g) Signature of an appropriate Approved Signatory, including their name and function (if endorsed)

(h) Any information that is required to enable a repeat of the inspection using the same conditions.

A report may be a continuation of the job record or it may be a separate record.

11 4.87 Specialised Techniques

11.1 Staff

11.1.1 General

This class of test is available for NDT techniques not discussed in the above sections, such as ACFM and TOFD, and accepted for accreditation by IANZ from time to time.

For test results from specialised techniques, to be IANZ endorsed the technician must have successfully completed an approved training course. A training course offered by the equipment manufacturer is acceptable.

11.1.2 IANZ endorsed reports.

An IANZ Approved Signatory in the relevant class of test shall sign all IANZ endorsed reports.

The Approved Signatory must have been personally involved in the work and ensure that all of the criteria for IANZ endorsement have been met.

11.2 Equipment

All equipment shall be maintained in a calibrated condition and in good working order and records of all maintenance are required.

ACFM and TOFD equipment need to be set-up (calibrated) prior to each job using appropriate reference items with known imperfections, specifically manufactured and retained for this purpose.

All reference items containing known imperfections should be uniquely identified. Each item will have been manufactured with imperfections that have been physically measured using traceable measuring equipment. A record, which clearly identifies the imperfection and its critical dimensions, shall be generated prior to first use. The reference items shall be subject to appropriate checks or re-calibration.

All probes used with ACFM or TOFD equipment should be uniquely identified and the equipment register should include a list of all probes in service. Maintenance records should be maintained.

11.3 Records and Reports

11.3.1 Job Records

At the time of the test, the following would normally be recorded:

(a) A unique job or contract identification (e.g. job number)

(b) The date of inspection

(c) The procedure being used

(d) The equipment being used (including probes)

(e) Identity of each test site

(f) All observed imperfections/indications

(g) The name(s) of the technician(s) carrying out the job

(h) Any other relevant information or limitations that may affect the test result.

11.3.2 Reports

Where a formal report, either hand written or typed, is issued to a client, the following would normally be included:

(a) Contents shall comply with ISO/IEC 17020 or ISO/IEC 17025 (as applicable), (e.g. traceability information, dates, etc)

(b) Identification of each test site

(c) The code for compliance, (e.g. PD 5500)

(d) **All** imperfections/indications (this may be done by the use of standard abbreviations, which should be included either as a legend or a reference to the standard abbreviation code)

(e) May include a compliance statement

(f) Identification of the technician(s) carrying out the interpretation, including their personal qualifications (normally by typed name and signature)

(g) Signature of an appropriate Approved Signatory, including their name and function (if endorsed)

(h) Any information that is required to enable a repeat of the inspection using the same conditions

(i) Data analysis procedure.

A report may be a continuation of the job record or it may be a separate record.

Appendix 1: Personnel Certification Bodies

IANZ will accept personal certification issued by personnel certification bodies that are accredited to ISO/IEC 17024 with a scope that includes NDT qualifications.

At the time of publication of this document, the following independent national personnel certification bodies are understood by IANZ as being compliant with this standard, and may be considered by IANZ as being equivalent to the CBIP. The relevant level and scope of personnel certification from these bodies is acceptable prerequisite personal qualification for assessment of IANZ Approved Signatory status.

This list may change from time to time.

(a) AINDT (Australia)

(b) ASNT (USA)

(c) APC (Czech Republic)

(d) BANT (Belgium)

(e) Belorussian Association on NDT & TD (Republic of Belorussia)

(f) British Institute of NDT (PCN scheme)

(g) CERTIAEND (Spain)

(h) CICPND (Italy)

(i) COFREND (France)

(j) DPZ (Germany)

(k) FORCE-Dantest Cert (Denmark)

(l) Inspecta OY (Finland)

(m) ISRACERT (Israel)

(n) NDT Training Center AB (Sweden)

(o) OGfZP (Austria)

(p) SERTINK (Russia)

(q) SKO (Netherlands)

(r) SSNT (Switzerland)

(s) Testing and Diagnostics (Russia)

(t) UKREXPERT (Ukraine)

Appendix 2: Equipment Calibration

The following are provided for guidance and are considered the maximum periods that should occur between successive calibrations or checks.

Item	Calibration/check interval	Comment
Radiography		
Darkroom safe lights	Annual	Check that lights are not fogging film
Densitometers	At least annually	Densitometers should be calibrated against a reference film density strip and records stating the results maintained. Acceptance criteria: +/- 0.2 units.
Density Strip	Five yearly or in accordance with the manufacturer's certificate	Store away from light. Store as a reference item. The manufacturer's certificate issued with the strip is generally considered as adequate traceability of the stated densities.
Lead Screens	At least annually	Lead screens should be regularly checked for damage, which could show on the radiograph. Evidence of the checks should be maintained.
Processor (auto or manual)	Dependent on use	Using either quality control films or by monitoring throughput.
Viewer	Annual	Measure the amount of light coming through a calibrated density strip (density three or above) with a light meter. The luminance measurement shall be not less than 30cd/m^2.
X-Ray machines	Where evidence of damage or inaccuracy is noted	X-Ray machines should be stored, maintained, transported, checked and used in accordance with the specific manufacturer's instructions. Focal characteristics should be monitored for any significant changes.
Ultrasonic Testing		
Digital thickness gauges	At least annually	Using calibrated thicknesses.
Probes	At least once per day or before use	Probe index Probe beam angle Probe beam alignment (squint).
	Initially, then at least once per month	Sensitivity and signal to noise ratio Probe beam profile Overall system gain.
Reference blocks	Prior to first use	Traceable calibration on commissioning, and on-going checks at appropriate periods (depending on usage and condition).
UT Sets	Daily or each time the equipment is used	Including: • Visual checks for damage • Linearity of time base • Calibration of time base • Linearity of equipment gain.

Item	Calibration/check interval	Comment
Magnetic Particle Testing		
AC Electromagnet (Yoke)	Six months	AS 1171, ASME V or BS 6072 requirements as applicable (e.g. lifting power of at least 4.5kg at pole spacing between 75mm and 300mm).
DC Electromagnet	Six months	As for permanent magnets.
Permanent magnets	One month or when used.	AS 1171, ASME V or BS 6072 requirements as applicable (e.g. lifting power of at least 18kg at maximum pole spacing).
Bench Equipment	At least annually	To AS 1171, ASME V or BS 6072 requirements, as applicable
Black Light Meter	Dependent on use	Traceably calibrated externally or by comparison with a calibrated reference.
Black Light	Three monthly or when used if less often.	Using a calibrated Black Light Meter to confirm output of at least 10 W/m^2. UV light output decays in a predictable manner and this can be used to determine appropriate intervals.
Penetrant Testing		
See Magnetic Particle Testing		
Visual Inspection		
Pit and welding gauges and templates	Initial check for errors and periodic checks for damage and wear	
Steel tapes and rulers	Five yearly calibration	See IANZ Technical Guide AS TG 1 *Simple Linear Measurement Instruments – their use, care and calibration*.
Light Meter	Dependant on use	May be calibrated in-house against a traceably calibrated reference.

Appendix 3: Classes of Tests

4.81 Non Destructive Tests by Radiography

(a) Radiographic examination of metals

(i) Single wall or rolled product
- thickness measurements ‡
- corrosion pitting ‡

(ii) Welded Joints ‡

(iii) Castings ‡

(iv) Forgings ‡

(v) Other specified metallic products
- aircraft components and assemblies

(b) Radiographic examination of bonded metals

(i) Soldered and brazed joints

(ii) Hard faced components

(c) Radiographic examination of metal inserts in non-metals

(i) Concrete

(ii) Reinforcing in conveyor belts, hoses, etc.

(d) Radiographic examination of non-metals

(i) Rubber and plastics

(ii) Timber

(iii) Bonded non-metallic components

(iv) Other specified materials

(e) Digital Radiography

4.82 Non Destructive Tests by Ultrasonics

(a) Ultrasonic examination of metals

(i) Single wall or rolled product
- thickness measurements ‡
- corrosion pitting ‡

(ii) Welded Joints ‡

(iii) Castings ‡

(iv) Forgings ‡

(v) Extruded products ‡

(vi) Other specified metallic products
- aircraft components and assemblies
- machined components

(vii) Nozzle and node welds

(b) Ultrasonic examination of bonded metals

(i) Soldered and brazed joints

(ii) Hard faced components

(iii) Machine bearings

(iv) Friction welded components

(v) Other specified components

(c) Ultrasonic examination of components and assemblies

(i) Aircraft structures

(ii) Bonded assemblies

(iii) Components and assemblies

(iv) Thickness measurement

(d) Ultrasonic examination of non-metals

(i) Rubber and plastics

(ii) Timber and plywood

(iii) Bonded non-metallic components

(iv) Ceramics and refractories

(v) Other specified non-metals

(e) Manual Phased Array

(i) Single wall or rolled product
- thickness measurements ‡
- corrosion pitting ‡

(ii) Welded Joints ‡

(iii) Castings ‡

(iv) Forgings ‡

(v) Extruded products ‡

(vi) Other specified metallic products
- aircraft components and assemblies
- machined components

4.83 Non Destructive Test by Visual Inspection

(a) Visual inspection of metals

(i) Flat or rolled products ‡

(ii) Welded joints ‡

(iii) Castings ‡

(iv) Forgings ‡

(v) Metallic coatings ‡

4.84 Non Destructive Test by Dye Penetrant Methods

(a) Visible dye

(i) Water washable method ‡
(ii) Solvent removable method ‡
(iii) Post emulsifiable method ‡

(b) Fluorescent dye

(i) Water washable method ‡
(ii) Solvent removable method ‡
(iii) Post emulsifiable method ‡

4.85 Non Destructive Test by Magnetic Particle Methods

(a) Magnetic flow method

(i) Welded joints
(ii) Forgings
(iii) Castings
(iv) Machined parts

(b) Current flow method †

(i) Welded joints
(ii) Forgings
(iii) Castings
(iv) Machined parts

(c) Coil method †

(i) Welded joints
(ii) Forgings
(iii) Castings
(iv) Machined parts

4.86 Non Destructive Tests by Eddy Current

(a) Surface flaw detection ‡
(b) Metallic coating thickness measurement ‡
(c) Sorting of materials and components ‡
(d) Sub-surface flaw detection ‡
(e) Weld testing ‡

4.87 Non Destructive Tests by Specialised Techniques

(a) Ultrasonic examination by Time of Flight Diffraction ‡
(b) Acoustic emission testing ‡
(c) Flaw detection in coatings by electrical continuity
(d) Automatic Phased Array
(e) IRIS (Internal Rotation Inspection System) - UT method
(f) Alternating Current Field Measurement (ACFM)
(g) Magnetic Flux Leakage

Legend:

† Specify power capability in Amps AC or DC

‡ Specify Materials classification –

Fe	Plain Carbon and Low Alloy Steels
Al	Aluminium alloys
Mg	Magnesium alloys
Cu	Copper alloys
Zn	Zinc alloys
Ni	Nickel, Chromium or Cobalt alloys
Ti	Titanium

Other specified products (including High Alloy and Stainless Steels)

Appendix 4: Non–Destructive Testing Report Concerns

The following extract is reprinted with permission from the Department of Labour, Engineering Safety newsletter, "Safety Lines No. 69", March 2006.

NDT REPORT CONCERNS

An inspection body has drawn our attention to an apparent lack of attention to quality and reporting from NDT providers. Some of the problems include incorrect identification of line/drawing numbers on reports and incorrect identifications on radiographs. In some cases this may be as a result of inaccurate requests by the fabricator in the first place, so this area also needs to be addressed by the individual fabricators. Some of the concerns/comments are as follows:

- Reporting should be as complete as possible, including the use of sketches if necessary, e.g. to show the location or orientation of a weld defect; to show how a weld has been ultrasonically scanned, etc.
- Radiographic reports that cover multiple pipe sizes and/or wall thicknesses and state 'various' for exposure conditions are unacceptable. Exposure conditions, including focus to film distance/source to film distance, for each pipe size and/or thickness need to be stated, clearly and in full, on the report. The reason for this is that if the test has to be repeated at some date in the future, then the same conditions can be applied to the repeat test as were applied to the original test. This applies to all inspection methods. Repeatability of a test is fundamental to good inspection practice.
- Radiographic sensitivity and density also need to be reported accurately. In this case the inspector needs to know the material thickness in order to measure the sensitivity accurately. If the material thickness is not clearly recorded on the report then sensitivity cannot be readily calculated.
- Consumables for liquid penetrant and magnetic particle inspections should be compatible and of the same manufacturer, for example in the past there have been instances of one manufacturer's penetrant used together with another manufacturer's cleaner/remover and developer. This is not acceptable as the materials are from different manufacturers and therefore generally not compatible. The only likely exception would be if there is written agreement from both manufacturers that the consumables are compatible.
- Poor radiographic definition and radiographic densities, which are either inconsistent or fall outside the limits of the specifications. In some cases this may be a result of poor back scatter control.
- Size of film used is inappropriate for the size of the weld. Usually in this case the film is too small to adequately fit the weld, identification and location markers comfortably.
- Lack of care during the radiographic set-up which leads to identification numbers and/or location markers either encroaching on the weld image or being missed off the film altogether.
- Where radiographs are obviously not satisfactory for any reason, the NDT provider should seek to address this situation before the films and reports are submitted to the Inspection Body for review. Failure to do so may result in additional delays, rework and ultimately, costs to the project.
- NDT must comply with the requirements of the appropriate standard and failure to do so means failing to comply with the PECPR Regulations. Any concession request to deviate from the standard must be addressed to the inspection body in writing and must have a sound technical reason. Concession requests based purely on commercial grounds are unlikely to be considered favourably by the Inspection body.
- Any NDT reports that relate to work being done under the PECPR Regulations must bear the IANZ logo/statement. If elements of a report could become separated they should be individually identifiable with the body of the report.
- The inspection body may rely on the NDT results to support its recommendation for the statutory certification of an item of equipment. If the NDT reporting is deemed to be inadequate or otherwise at fault, this may result in the statutory certification either being delayed or in some cases declined, until the situation has been addressed.

It is worth remembering that IANZ, as part of its annual audit of the inspection body, reviews the NDT reports upon which certifications are based. What the NDT service provider supplies to the Inspection Body may be the subject of that scrutiny.