ACCREDITATION UNIT

POLICY **O**N ACCREDITATION **F**OR **N**ON **D**ESTRUCTIVE **T**ESTING

Purpose
By following this guidance, organizations should be able to demonstrate at assessment for accreditation that they meet the requirements of the assessment standard. Alternative methods may be used, provided they are shown to give an equivalent outcome and satisfy client and/or the controlling standards.

Scope
This publication provides detailed guidance for organizations carrying out non-destructive testing as an accredited activity or seeking accreditation, for testing and inspection purposes.

Authorship
This publication is based on the adopted policy EA - 4/15 (Accreditation for Non-Destructive Testing) of the European Organization for Accreditation (EA) and is revised by JAS Technical Committee.

Official language
The text may be translated into other languages as required. The English language version remains the definitive version.

Further information
This policy is mandatory for laboratories, and shall be implemented within two months from its issuance date.
For further information about this publication, kindly contact AU.
This document is also available at our web site where you can check updates directly.

Contact us
Accreditation Unit (AU)
P.O. box 941287 Amman - 11194 Jordan
Tel: +962 6 5658036
Fax: +962 6 5681099
e-mail: accreditationunit@jism.gov.jo

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1 Introduction

Non - Destructive Testing (NDT) activities may be accredited against the requirements of ISO / IEC 17025, General requirements for the competence of testing and calibration Laboratories or EN 45004 - General criteria for the operation of various types of bodies performing inspections.

Whichever route is chosen the accreditation is carried out against the same technical criteria. An organization accredited for performing NDT under ISO/IEC 17025 may perform and report on the following activities:

Testing to appropriately defined standards and procedures, interpretation of test results against the agreed acceptance standards and determination of conformity.

An Inspection Body accredited for performing NDT under EN 45004, may perform and report on the following activities:

Testing to appropriately defined standards and procedures, interpretation of test results against the agreed acceptance standards, determination of conformity and determination of significance of defects found, based on test results.

This publication provides detailed guidance for organizations carrying out non-destructive testing as an accredited activity or seeking accreditation, for testing and inspection purposes using:

- Eddy current,
- Liquid penetrant,
- Magnetic particle,
- Radiographic and
- Ultrasonic methods.

By following this guidance, organizations should be able to demonstrate at assessment that they meet the requirements of the assessment standard. Alternative methods may be used, provided they are shown to give an equivalent outcome and satisfy client and/or the controlling standards.

In some specific situations specialized expertise may be required to ensure testing/inspection to the level of precision demanded by individual test/inspection, e.g. remote access eddy current and ultrasonic inspection. It is not intended to indicate all such points in this publication, but they will be taken into account during the assessment.

Throughout this document the words testing and inspection are used interchangeably and should not be taken to apply to the accreditation standard

2 Scope of Accreditation

The scope of accreditation is the formal statement of the range of activities for which the organization has been accredited; the scope is recorded on an accreditation schedule which is issued together with the accreditation certificate. The scope should be defined as precisely as possible so that all parties concerned know accurately and unambiguously the range of test methods and type of products covered by the organization's accreditation.

Accreditation bodies will only accredit organizations for tests which have been fully documented and validated. These may include national and international standard methods, client and in-house methods. The validation of methods should not be taken for granted and the organization shall satisfy itself that the degree of validation of a particular technique is adequate for its purpose.

Where non-routine testing or testing to client supplied procedures is carried out, it is recognized that a more flexible approach to the scope may be necessary, but the scope must be as specific as is feasible and the quality system maintained by the organization must ensure that the quality of the results is fully controlled.

The accreditation schedule reflects the scope of activity for which the organization is accredited. The content of this accreditation schedule should be included in the Quality Manual so that the accredited scope can be clearly distinguishable from other activities that are outside the scope of the organization's accreditation.

3 Quality System

The quality system should describe the general and specific arrangements for the conduct of all accredited activities including non-destructive testing and should specifically incorporate:

- The arrangements for managing NDT work including the organizational interface and controls between the permanent facilities and remote or site locations.
- The control and authorization of NDT specific procedures and techniques.
- The need to ensure that inspection procedures and techniques are available at the point of inspection, whether in the laboratory or on site.
- The need for audit and review to include remote locations and the interface controls.

4 Organization and Management

The company procedures should ensure the integrity of staff involved in NDT inspection work and that staff are free from all pressures which might affect their impartiality and affect their judgment. Due to the nature of NDT the company should consider the impact on the company of errors and omissions in testing when considering liability insurance.

The person responsible for NDT should hold appropriate qualifications. A person holding level 3 certification issued by a recognized certification scheme in the methods routinely used by the company satisfies these requirements. Where the company supervision is not in the full-time employment of the organization or the in-house level 3 certification does not cover all methods this supervision must be formally documented in a contract of employment.

5 Staff

Appropriate. Irrespective of the base qualification chosen the organization is required to demonstrate that NDT personnel used for inspection and testing have the knowledge, training, education and experience in the type of defects, which may occur during manufacture, and /or use of the plant examined.

In the absence of suitable certification arrangements it may be necessary to establish qualification schemes (in-house or externally) e.g. UT testing for highly attenuative materials.

Where additionally personnel are responsible for the determination of significance of defects found, based on test results they should, in addition to the appropriate qualifications, experience, training and satisfactory knowledge of the examinations carried out, also have:

- Relevant knowledge of the technology used for the manufacturing of the items tested (materials, products etc,) or the way they are used or intended to be used and of the defects or degradations which may occur during use.
- Knowledge of the general requirements expressed in the legislation and standards and An understanding of the significance of defects found with regard to the normal use of the items, material, product, etc concerned.

Organizations should have formal documented arrangements for maintaining up-to-date records of all staff qualifications, training and competencies including eyesight checks as specified by the relevant personnel certification scheme. Records should clearly identify whether staff can interpret the results in addition to carrying out examinations.

Where staff are contracted the organization shall ensure that such personnel are competent, carry appropriate personnel certification, are effectively supervised and that they work in accordance with the organizations quality system using company equipment and procedures.

The organization shall check that the qualification and certification of NDT personnel is appropriate to the inspection to be carried out. This should include checking any limitations in the scope of competence certified and the resulting need for job specific training and authorization.
Organizations are responsible for ensuring that staff have all the other relevant competencies, e.g. safety training, necessary for the performance of their duties.

6 Equipment and Calibration

As part of its quality system, an organization is required to operate a programme for the maintenance and calibration of equipment used in the organization. The organization shall normally use only equipment that is owned by, or on long term lease or loan to the organization. Where, exceptionally, other equipment has to be used, the organization shall have the necessary evidence to show that the requirements of the accreditation standard and this document are met in respect of such equipment.
Equipment shall be protected as far as possible from deterioration and abuse. Equipment that is moved from one location to another should, where relevant, be checked before use.
Precautions shall be taken to ensure that, after transportation to a site, testing equipment remains in a serviceable state and that the calibration remains valid. Appropriate checks shall be performed on site to confirm calibration status before testing commences.
Equipment records shall be maintained up-to-date and include a list of all reference blocks, probes etc held by the organization.
Where battery-operated equipment is used, measures should be taken to ensure the proper maintenance of the batteries.
The calibration of reference measuring equipment used for in-house calibration/verification shall be traceable to national standards and, wherever possible, shall be evidenced by certificates issued by an accredited organization.
Where in-house calibration/verification methods are adopted, the organization shall have the necessary resources consistent with the accuracy required, and with any standard specifications relevant to the calibration/verification concerned.

Procedures for in-house calibrations and verifications shall be adequately documented and describe how to perform the calibration/verification. Equipment records shall clearly define calibration/verification intervals and the action to be taken if calibration/verification falls outside pre-determined limits.

Specific requirements on equipment calibration/verification and equipment calibration/verification intervals for various test disciplines are given in Appendices A to E.

These requirements should be complied with unless overridden by the testing specification. Records of all calibrations/verifications shall be documented and retained and shall include certificates providing evidence of traceability to national standards where required.

7 Measurement Uncertainty

Measurement uncertainty is determined by the equipment and procedures used but may also be affected by parameters such as the material, shape, and surface finish of the object under test together with the shape and acuity of the defect.

Non-destructive testing methods involve an element of subjective judgment and it is not, therefore, possible to give guidance on measurement uncertainty for the different test methods covered in this document.

8 Test Procedures and Written Instructions

Organizations are required to have documented procedures supplemented, where necessary, with detailed written instructions or techniques. Wherever possible the organization shall use standardized procedures and techniques. The control and authorization levels of these documents should be covered in the company document control procedures.

Approval of procedures, i.e. in-house company procedures, shall only be undertaken by qualified personnel authorized by the company. A person holding level 3 certification issued by a recognized certification scheme satisfies this requirement. In certain circumstances, e.g. for UT testing of austenitic steels or Inconel the person approving the procedures may need to have specific knowledge of the type of inspection.

The organization shall maintain a list of all those considered competent to approve procedures or test instructions. Approval of techniques, i.e. in-house company written instructions, shall only be undertaken by qualified personnel authorized by the company. A person holding level 2 issued under a recognized certification scheme satisfies this requirement.

Where the client provides NDT procedures these shall be checked for completeness, accuracy and formally approved by the company carrying out the testing. Any comments or limitations relating to the procedure should be reported to the client prior to the commencement of testing. Where the organization finds it necessary to produce written instructions or to describe nonstandard test methods, the guidance given in Appendix F should be followed.

For specific applications procedures may be developed which incorporate non standard inspection methods. Procedures developed in-house shall be validated and authorized before use. The organization shall be able to provide objective evidence of the qualification/validation of the process. Design of the test should be such as to maximize the likelihood of detecting the defects of specific interest. When no defect description is available, it may be difficult to be confident that an inspection detects all potentially significant defects.

Developments in methodology and techniques may require procedures and techniques to be changed from time to time. Obsolete procedures and techniques shall be withdrawn but must be retained for archive purposes and clearly labeled as obsolete. Procedures and techniques must indicate the organization's representative who authorized its use and from what date.

The organization should be aware of any limitations of general procedures based on national standards and should declare and / or report such limitations to the customer if the specified procedures have not been demonstrated to be able to achieve the required level of reliability expected by the customer.

9 Records

The retention period for all procedures, techniques and records shall be determined and documented to ensure that customer and any regulatory requirements are met.

The records retained shall include sufficient information to enable the test to be repeated, if necessary using the same equipment.

Where operators use notebooks these must be controlled and retained as company records by the organization.

Documented records shall be maintained of all actions and decisions made during the course of the inspection process. These should typically include:

- Contract review,
- Change decisions,
- Equipment records including servicing and repair,

- Details of equipment used, process checks,
- Calculations,
- Location and detail of observed defects,
- Copy of test report.

10 Contract Review

Determining client requirements can be a long and tedious process. The process is assisted when the client provides a clear description of the range and type of inspection must detect including any test or acceptance criteria to be met. Those requiring the inspection should be encouraged to describe the defects to be detected specify the particular defect characteristics which must be measured and identify the acceptance criteria. The contract review should include as applicable:

- That the company has the necessary resources, equipment, qualified personnel to undertake the NDT work.
- Identification of the test method
- Identification of any acceptance criteria
- Any specific qualification requirements e.g. for non-standard test methods or high integrity testing
- Any client approval requirements (particularly for non-standard methods)
- That the qualification and certification of NDT personnel is appropriate to the inspection to
- be carried out (This should include checking any limitations in the scope of competence certified and the resulting need for job specific training and authorization)
- Any specific handling instructions for highly machined components
- Any specific marking instructions, e.g. use of halogen free markers
- Any specific reporting requirements including documentation requirements
- Availability of drawings, inspection plans/ programmes
- Any specific quality control/monitoring arrangements
- Client acceptance of any necessary sub-contracting where activities on site are involved the review should also include issues such as:
- Responsibility for removal of any cladding or coatings and preparation of the surface for testing
- Access arrangements, working conditions and provision of stable working platforms
- Hazards

On completion of the review process the contractual responsibilities of both purchaser and supplier should be clear when contracts are placed.

11 Audits and Review

Audits shall include the observation of personnel actually carrying out testing both at any permanent facility and in a remote facility. This assists the organization in establishing whether the inspectors' knowledge of the plant or component that they are examining and the environment in which they are working is sufficient to enable the operator to perform their activities effectively and safely. It also enables the organization to establish that personnel are working to procedures and agreed client's requirements.

An example check list, detailing particular aspects applicable to NDT which should be examined during a quality audit is listed in Appendix G of this Guide. Management reviews should include NDT specific items such as suitability of personnel certification schemes, and arrangements for managing site activities.

12 Handling of Items and Components

Items to be tested shall be identified such that traceability is maintained throughout the examination process. Identification shall be such that the areas specifically examined, e.g. welded seams can be precisely identified against test results. The method of identification shall not damage the item in question, e.g. halogen free markers may be needed for some components.

Methods for the identification and location of reportable defects and, where appropriate, for the segregation of defective components should be clearly defined and understood. The status of the test item, (e.g. accepted, rejected, tested, not tested) shall be clearly indicated at all times.

13 Reporting

Clear and accurate reporting is essential. Where results from sub contracted tests are included these must be clearly identified.

Sampling is often involved as part of the inspection. Reports must indicate the sampling basis and identify when sampling has been carried out by anyone other than the accredited body. Reports shall identify any factors which have prevented the inspection from being carried out as intended, e.g. restricted access, inadequate surface finish, surface temperature etc.

Interpretation of test results against agreed acceptance standards and determination of conformity is normal practice and is routinely reported in the final report. This use of the word 'interpretation'

is not to be confused with the concept of 'opinions and interpretations' used in some accreditation standards.

14 Sub-Contracting Of Tests

The organization itself should normally perform all the tests that it contracts to undertake and for which it holds accreditation.

Note: Hiring personnel is not regarded as sub-contracting (see section dealing with staff). In an emergency, or exceptional circumstances, the organization may sub-contract part of any tests for which it holds accreditation to:

(a) An accredited organization or

(b) A sub-contractor who has satisfied the organization of their capability to perform the tests to the requirements of the accreditation standard and this document.

Where for other reasons, such as a large contract, the organization finds it necessary to subcontract tests for which it holds accreditation; it should perform the major portion of the test work.

Where by reason of a large contract several testing companies co-operate, the tasks of each organization and their reporting hierarchy shall be clearly laid down and documented. Whenever work is subcontracted the organization shall:

(a) Obtain the agreement of the client and

(b) Provide all necessary information, materials etc, to the sub-contractor

The organization shall maintain a record of its approved sub-contractors and details of the work carried out.

15 Bibliography

- Magnetic Particle
  - EN ISO 3059 - Non-destructive testing – Penetrant and magnetic particle testing - Viewing conditions.
- Penetrant
  - EN ISO 3059 - Non-destructive testing – Penetrant and magnetic particle testing – Viewing conditions.
  - EN ISO 3452 (Parts 2 to 4) - Penetrant inspection.

- Radiography
  - EN 462 (Parts 1 to 5) - Image Quality of Radiographs.
  - EN 584 (Parts 1 to 2) - Classification of film systems for industrial radiography.
  - EN 12543 (Parts 1 to 5) - Characteristics of focal spots in industrial X-ray systems for use in non-destructive testing.
  - EN 12544 (Parts 1 to 3) - Measurement and evaluation of the x-ray tube voltage.
  - EN 12679 - Determination of the size of industrial radiographic sources – radiographic method.
  - EN 25580 - Minimum requirements for industrial radiographic illuminators for non-destructive testing.
- Ultrasonic
  - EN 27963 - Calibration block No. 2 for ultrasonic examination of welds.
  - EN 12223 - Specification for calibration block No. 1.
  - EN 12668 (Parts 1 to 3) - Characterization and verification of ultrasonic examination of ultrasonic examination equipment.
- General
  - ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
  - EN 45004 - General criteria for the operation of various types of bodies performing inspections.
  - ISO 9712 - Non-destructive testing - Qualification and certification of personnel.
  - EN 4179 - Qualification and approval of personnel for non-destructive testing.
  - ASNT SNT-TC-1A - Recommended Practice, personnel qualification and certification in non-destructive testing.
  - NAS 410 NAS - Certification and qualification of non-destructive test personnel.
  - EA - 4/15 - Accreditation for Non-Destructive Testing

16 Appendices

The appendices A to E contain specific guidance on equipment calibration /verification and equipment calibration/verification intervals for each of the test methods covered by this document. These appendices assume that testing is to be carried out to a specified EN standard.

Where an EN standard has not yet been published, other specifications may be used until the relevant EN standard is published. If clients require testing to be carried out to other specifications, then the requirements of those specifications should be met in full. In the absence of specific guidance, the requirements of this Appendix should be adopted.

The responsibility for determining these calibration intervals lies with the body carrying out the tests who shall ensure that they satisfy the requirement of the test specification and any specific client requirements. Inevitably different standards have slightly differing requirements. It is the responsibility of the body responsible for performing the inspection to ensure that the detailed requirements of those standards are met in full.

It is the responsibility of the body carrying out the inspection to ensure that the calibrations or verifications are carried out against the latest version of the appropriate standard unless specifically requested otherwise by the client.

The number and title only of relevant published EN standards at the time of publication of this document are given in the bibliography.

Appendix A

Radiographic Equipment - calibration and calibration intervals

Focal characteristics shall be monitored for any significant changes.

The sensitivity of a radiograph shall be established by means of Image Quality Indicators (IQI) or pentameters appropriate to the material and thickness. It may be necessary to hold manufacturer's certificates of conformity for these IQIs. The condition of IQIs and pentameters should be monitored and damaged devices withdrawn from use.

The type and location of the IQI or pentameter shall be strictly in accordance with the requirements of the agreed standard or code.

Radiographic film processors should be maintained in accordance with the manufacturer's recommendations. Regular monitoring of the processor using pre-exposed film should take place to ensure the correct operation of the processor and to verify that any film classification system requirements are met.

The density of radiographs shall be ascertained using densitometers. The accuracy required determines whether analogue or digital readouts are needed.

Densitometers shall be calibrated at defined intervals against a reference density strip.

Hand-held densitometers should be zeroed each time they are used, against the level of background illumination on which they are to be used.

Regular checks to establish that the densitometer is still operating correctly and is in calibration shall be carried out between calibrations.

Reference film density strips shall be uniquely identified and traceable by certificate to a national standard of measurement and should carry a manufacturer's certificate which is less than five years old unless otherwise specified.

Working density strips should have the density of each step ascertained using a calibrated and certificated densitometer, and recorded either directly into the film or onto a card strip permanently attached to the film. The date of first calibration should be recorded on the strip.

All working density strips which are more than three years old, or which have been subject to undue wear, should be taken out of use and destroyed.

Film density strips are subject to discoloring or fading and should be carefully maintained and stored.

Radiographic viewers and illuminators shall be periodically checked for intensity and evenness of illumination.

Appendix B

Ultrasonic Equipment - calibration and calibration intervals Ultrasonic calibration blocks shall be used to set up the assembly of probe and sensory electronics, each time the equipment is used. The blocks shall be manufactured in accordance with the appropriate specification.

All blocks shall be verified at specified intervals as follows:

• Visual examination for deterioration such as corrosion or mechanical damage

• Radius and other dimensional checks using equipment traceable to national or

International standards Where calibration blocks made from the material of the product under test are used for setting up, the final test report should indicate the calibration status of the test blocks. In all such cases the transmission velocity of the pulse through the block material should be measured and recorded, unless the organization has alternative methods to demonstrate the traceability of the block.

The correct functioning of testing units, probes and connecting cables shall be checked at regular intervals; the results shall be documented. Verification shall be against the controlling specifications.

Ultrasonic test sets shall be verified 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

The performance characteristics of ultrasonic probes and the systems should be checked as follows: at least once per day or before use

• Probe index

• Probe beam angle initially, then at least once per week

• Sensitivity and signal to noise ratio

• Pulse duration

Ultrasonic flaw detectors shall be verified at intervals not exceeding twelve months in accordance with the controlling specification, including:

• Linearity of time base

• Linearity of amplifier

• Accuracy of calibrated attenuator

The calibration of reference measuring equipment used for in-house calibration shall be traceable to national standards and shall be evidenced by a certificate, issued by an accredited organization.

Testing units, probes and connecting cables should be carefully stored. Reference blocks, control specimens and calibration blocks should be stored in such a way as to prevent corrosion occurring.

Where automated test equipment is used, special attention shall be paid to the qualifications and training of operators, the system for the identification of defects, and data storage.

Checks should be made to ensure the correct geometric position of the probe in relation to the output signal.

Appendix C

Magnetic Particle equipment - calibration and calibration intervals the solids content of bulk magnetic inks should be checked by a method specified in the controlling standard. In the case of aerosols, certificates of conformity should be obtained from the manufacturer for each batch.

When using fluorescent inks and powders:

(a) The intensity of UV(A) light at the test surface shall be checked as frequently as necessary to monitor possible deterioration of the illumination. (Where grimy, dusty or other contaminating environments are involved, checking shall be carried out each time the equipment is used.) These checks require the use of a UV (A) light meter.

(b) the ambient white light level shall be checked at least once every three months where illumination is controlled on a long term basis, and should be checked each time the equipment is used in situations where illumination may vary from test to test (e.g. in daylight conditions). These checks require the use of a white light meter.

When using non-fluorescent inks and powders, the level of illumination at the inspection surface should be checked at regular intervals where illumination is by artificial means, and should be checked each time the equipment is used where daylight illumination is employed.

These checks require the use of a white light meter.

UV(A) light meters shall be calibrated at defined intervals.

White light meters shall be calibrated at defined intervals.

The apparatus and ancillary equipment shall be checked at regular intervals.

The strength of permanent magnets and magnetic yokes shall be checked at regular intervals.

Flux indicators should be used to demonstrate the direction of flux. Traceability is not required.

Tests to check the sensitivity of the indications looked for should be carried out using suitable test pieces.

Appendix D

Liquid Penetrant Equipment - calibration and calibration intervals

The penetrant shall be suitable for the intended application and meet the requirements of EN ISO 3452-2. A specific statement by the manufacturer is required, but this may be in the form of a letter, certificate, technical leaflet, or may be included in the labeling of the product.

When undertaking fluorescent penetrant examination, the intensity of UV(A) light illumination at the inspection surface shall be checked as frequently as necessary to monitor possible deterioration of the illumination. (Where grimy, dusty or other contaminating environments are involved, checking should be carried out each time the equipment is used). These checks require the use of a UV(A) light meter. When non-fluorescent (i.e. color contrast) penetrant examination is carried out, the intensity of illumination at the inspection surface shall be checked at least once every three months where illumination is controlled on a long term basis, and should be checked each time the equipment is used in situations where illumination may be variable from test to test (eg in daylight conditions). These checks require the use of a white light meter.

White light meters shall be calibrated at defined intervals.

UV(A) light meters shall be calibrated at defined intervals.

Standard flaw test pieces should be used to check the process. The use of test pieces is not normally specified for portable test kits.

The temperatures of baths and water washes should be monitored. Where the temperature of the test item is close to specification limits then the temperature of that item should be measured.

The pressure of water washes and compressed air blow-offs should be measured where values are specified in testing standards or procedures.

Appendix E

Eddy Current Equipment - calibration and calibration intervals.

A list of all reference blocks, control specimens, reference pieces and calibration blocks should be kept with details of the main characteristics: (e.g. material, conductivity, manufacture, heat treatment).

For portable equipment, a reference 'sensitivity block', dimensionally certified by the manufacturer, should normally be used for checking the response of the equipment to known flaws. For specialized applications, such as tube testing, reference standards should be prepared from material of the same alloy and nominal dimensions as the product to be tested. The dimensions of holes or notches and the thickness of the calibration piece shall be certified by the manufacturer or established in-house by means which are traceable to national standards. Wear on the testing face may reduce the thickness of the sensitivity block or calibration piece and hence the slot depth.

For automatic eddy current testing of tubes, reference standards should be prepared from material of the same alloy and nominal dimensions as the tube to be tested. The dimensions of holes or notches and the thickness of the calibration piece shall be certified by the manufacturer or established in-house by means which are traceable to national standards.

Wear on the testing face may reduce the thickness of the sensitivity block or calibration piece and hence the slot depth.

Where eddy current examination is used for sorting of materials or products, reference test standards should be prepared from the same material, heat treatment and nominal dimensions as the materials or products to be tested.

Reference test standards shall be carefully maintained and shall not be used as working standards.

The calibration of reference measuring equipment used for in-house dimensional verification shall be evidenced by certificates from an accredited organization.

Testing units, probes and connecting cables should be carefully stored. Reference blocks, control specimens and calibration blocks should be stored to prevent corrosion occurring.

Where automated test equipment is used, special attention shall be paid to the qualifications and training of operators, the system for the identification of defects, and data storage.

Checks should be made to ensure the correct geometric position of the probe in relation to the output signal.

Appendix F

Test procedures

As a minimum, test procedures should contain, or refer to, other documents containing the following, and supplemented by any further information necessary to fully specify the test:

(a) Title, unique reference number, issue or revision status and date of issue;

(b) Unique identification of organization producing the procedure;

(c) On each page, the page number, the total number of pages in the procedure and the unique reference number;

(d) Preparation and approval signature, such that the author and the approval authority can be readily identified;

(e) Scope of the procedure, giving precise description of the range of applicability (eg range of diameters and thickness);

(f) Reference test procedure (contractual) and/or European or national standard specifications on which the procedure is based and its issue/revision status; work instructions should reference the controlling procedure;

(g) Terms and definitions used within the procedure and/or reference to a document defining such terms;

(h) Equipment to be utilized, including consumables, complying with relevant specification requirements;

(i) Calibration/verification and maintenance requirements, or reference to procedures controlling these activities;

(j) Personnel qualifications or certification needed for performance of test work/evaluation of results, complying with any specification requirements;

(k) Surface condition required prior to commencing test;

(l) Environmental conditions required, where applicable;

(m) Requirements for identification of test items (by reference to a general test procedure if applicable);

(n) Test method, defining precisely how the test is to be performed, including method of establishment of appropriate datum levels;

(o) Criteria for recording and reporting the results;

(p) Acceptance standards, where specified;

(q) Requirements for segregation or identification of samples according to status (by reference to general test procedure if applicable);

(r) Reporting methods, detailing all aspects that are required to be included in the Test Report (whether specified in the accreditation standard or the test standard) with provision for the operator to report any limitation of access or sampling encountered during the test.

Appendix G

Quality audit

Areas of particular importance to organizations carrying out NDT staff

- Appropriateness of staff certification.
- Relevant certification and eyesight checks are current.
- Training records and competencies are being maintained up to date.
- Tests are only carried out by authorized personnel.
- Observation of staff carrying out NDT is made, on site if necessary.

Contract Review

- Effectively carried out.
- Includes all relevant factors.
- Client is involved where necessary.
- Specific responsibilities particularly relating to site work, such as access, surface preparation, are fully dealt with.

Equipment

- The equipment in use is suited to its purpose.
- Equipment is correctly maintained and records of this maintenance are kept.
- Traceable equipment, e.g. UT sets and blocks, densitometers, etc are calibrated, and the appropriate calibration certificates demonstrating traceability to national standards are available.
- Calibrated equipment is appropriately labeled or otherwise identified.
- Only company controlled equipment is being used.
- Instrument calibration procedures are documented and records of calibration are satisfactorily maintained.
- Appropriate instructions for use of equipment are available.
- Instrument performance checks show that performance is within specification. Procedures and techniques
- Procedures and techniques are adequately documented and appropriately validated if necessary.
- Alterations to procedures and techniques are appropriately authorized.
- Current versions of the procedure/technique are available and being used by the operator.

Quality Control

• Where control checks are used, data has been recorded and performance has been maintained within acceptable criteria.

Goods Handling

• Samples are adequately identified and housed.

• Reject and/or defective areas are adequately marked.

• The method of marking does not damage the item in question.

Records

• Notebooks/worksheets include the date of test, operator, test procedure, test item details, test observations, all rough calculations and other relevant data.

• Notebooks/worksheets are adequately completed, mistakes are crossed out and not erased.

• Control and verification checks are documented.

• Where a mistake is corrected the alteration is signed by the person making the correction.

• The organization's procedures for checking data transfers and calculations are being complied with.

• Records are readily retrievable.

Test reports

• The report meets the requirements of accreditation standard, the method and any additional requirements specified by the client or national/international standard.

• The test location is clearly identified and component identification is unambiguously defined.

• Test specifications and acceptance criteria are fully specified.

• Where sampling is involved this is clearly identified.

Miscellaneous

• There are documented procedures in operation for handling queries and complaints and system failures.

• The Quality Manual is up-to-date and is accessible to all relevant staff.

• Copies of up to date national international standards are accessible.

• There are documented procedures for sub-contracting work.