ICNDT

The World Organisation for NDT

ICNDT Guide to Qualification and Certification

of Personnel for Inspection, Testing and Condition Monitoring

1 April 2012

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Contents

Foreword by Chairman of ICNDT

The competence of those carrying out non-destructive testing is an essential pre-requisite for the achievement of quality and reliability. Qualification and certification of NDT personnel in accordance with international standards such as the unified EN ISO 9712 (Non-destructive testing – Qualification and certification of personnel) helps to assure the competence of NDT personnel and thereby assists global business and safety standards.

The ICNDT, with a track record exceeding 50 years in international cooperation in NDT, is dedicated to supporting best practice in the implementation of standards through this Guide. As Chairman, I express thanks to my colleagues in ICNDT, ISO and CEN for their assistance in preparing this document.

Mike Farley
Chairman, ICNDT

Foreword by Chairmen of ISO TC135 and CEN TC138

Since the effectiveness of any application of non-destructive testing depends upon the capabilities of the persons who perform or who are responsible for the test, a procedure was developed to provide a means for evaluating and documenting the competence of personnel whose duties require the appropriate theoretical and practical knowledge of the non-destructive tests that they perform, specify, supervise, monitor or evaluate. An added incentive stems from the worldwide comparability of a wide range of industrial applications requiring common non-destructive testing approaches.

It is recognised that the efforts of ICNDT have made a valuable contribution to the implementation of the numerous schemes for qualification and certification of NDT personnel. An extensive application of this Guide within industry will improve reliability of industrial products and safety of the worldwide community.

Hajime Hatano
ISO TC135 Chairman

Patrick Fallouey
CEN TC138 Chairman

Foreword by Chairman of the PGP and Editorial Committee

The original Guide, 'ICNDT Recommended Guidelines for Qualification and Certification of NDT Personnel according to ISO 9712', was published in June 2004 at the 16th WCNDT in Montreal, based on a first draft produced by Mr G Nardoni. The first update was approved for publication at the 17th WCNDT in Shanghai. This version is published to coincide with the 18th WCNDT in Durban and the agreements in ISO and CEN to unify ISO 9712 and EN 473 in a new standard EN ISO 9712, to be published in 2012, and the developments underway in ICNDT to create an international Multilateral Recognition Agreement.

ICNDT will update this document periodically and will provide the latest version online via its website (www.icndt.org). Users are strongly advised to check that they have the latest version of this document and the referenced standards. Comments and suggestions are welcome and should be sent to the ICNDT secretariat.

Douglas Marshall
Chairman PGP and Editorial Committee

1. Background

The prime purpose of this Guide, which has been prepared under the auspices of the International Committee for Non-Destructive Testing (ICNDT), is to promote best practice in the qualification and certification of NDT personnel according to the international standard EN ISO 9712.

The competence of NDT personnel is a key element in achieving reliability in non-destructive testing (NDT) and is vital to ensure the quality and safety of products and installations. The ICNDT Guide is of importance to all tiers in the management of NDT operations: regulators, inspection bodies, certification bodies, industry, NDT service companies and supervisors of NDT personnel.

The ICNDT has promoted worldwide dissemination of NDT technologies and the harmonisation of personnel certification schemes for more than 45 years. The decision by ICNDT to promote the adoption of EN ISO 9712 as a basic standard for third-party qualification and certification of NDT personnel arises from the need to achieve a more consistent standard of basic knowledge and practical competence. Such standardisation becomes ever more important as the globalisation of trade increases.

Third-party qualification and certification is widely recognised as conferring a number of advantages:

- It complies with an internationally agreed ISO standard that is increasingly being adopted worldwide;
- It utilises an internationally developed training syllabus;
- Examinations (theory and practical) are provided directly by certification bodies or through authorised qualifying bodies and authorised examination centres under the control of certification bodies (many of which are linked to national NDT societies);
- It provides a harmonised standard for training, qualification and certification of NDT personnel and can be used as the base level for more specific employer-based or third-party certification relevant to particular products or installations.

ISO 9712: 2005 (the third edition) gives more detailed requirements for practical examinations (including details of practical examination specimens and their defect content) to determine the practical ability of the candidate, to better harmonise practical examinations and to provide guidance on the definition of industrial and product sectors to aid international harmonisation. Further harmonisation is possible by using the ISO/TR 25107 'Guidelines for Training Syllabuses'.

The central role of EN ISO 9712 among standards for third-party certification, the historical development of NDT personnel certification and ICNDT's role is explained within this Guide.

Correct use of third-party qualification and certification of NDT personnel is dependent on the employers' recognition of responsibility for NDT personnel. This is important in terms of good quality management practices (outlined in ISO 9001: 2008 at clause 6.2 – Human Resources), product liability, meeting the requirements for accreditation and meeting the requirements of product standards and codes, such as the ASME Boiler and Pressure Vessel Code and the European Pressure Equipment Directive (97/23/EC). An explanation of the employer's responsibilities is provided.

In each of the regions where ICNDT has members (Africa, the Americas, Europe, the Middle East and the Asia-Pacific region), ISO 9712 has been adopted as a basis for third-party certification schemes. For example, Brazil and Argentina have accredited certification schemes which comply with ISO 9712 and Canada also has a certification scheme based on the standard. In the USA, the American Society for Nondestructive Testing (ASNT) has introduced ANSI/ASNT standard CP 106, which is closely aligned with ISO 9712. Many other countries in Latin America: Uruguay, Peru, Bolivia, Colombia and Venezuela, are developing national schemes based on ISO 9712. In the Asia-Pacific region, Australia, Japan and China, among many other countries, have introduced schemes based on ISO 9712. In Europe, a large number of countries have schemes which comply with EN ISO 9712. A listing of certification schemes and their current status is provided.

The ICNDT is endeavouring to promote international recognition of third-party certification schemes through a global Multilateral Recognition Agreement (MRA) and details are given. In many countries around the world, certification bodies that provide EN ISO 9712 certification have gained accreditation or approval by government agencies or accreditation bodies in both voluntary and regulatory sectors. This is discussed later in the Guide.

Details of other approaches to NDT personnel certification can be referenced at www.efndt.org (for aerospace certification to EN 4179) and www.asnt.org (for in-company certification to SNT-TC-1A).

2. Recommendations on qualification and certification

Recommendations to users of central third-party certification

When central third-party certification is appropriate, it is recommended that regulators and industry define the levels of competency of NDT personnel who are certified in accordance with EN ISO 9712 by a certification body accredited to ISO IEC 17024.

Regulators, users and auditors of NDT operations should recognise the importance of employers of NDT personnel properly fulfilling their responsibilities to authorise personnel to work after first confirming that their employees are adequately trained, experienced and qualified.

Recommendations to certification bodies

Certification bodies are urged to provide certification to EN ISO 9712 in order to maximise the value of their certification. In anticipation of future harmonisation, their training syllabuses should encompass the requirements of ISO/TR 25107.

Recommendations to national standards bodies

In adopting the international standard EN ISO 9712, the ISO member body is strongly urged to apply it without deviation from the original text in order to ensure that it acts as a harmonising influence. Failure to do so could result in a refusal to recognise or accept NDT personnel certification issued by certification bodies operating to national standards with deviations created under ISO guide 21.

3. Responsibilities of the employer

An employer of NDT personnel carries important responsibilities for the overall quality of NDT operations. These should be reflected in the employer's quality procedure for NDT (which may be known as the written practice[1]). The employer retains these responsibilities whether he uses in-company certification, third-party certification or a combination of both.

This section of the ICNDT Guide clarifies the employer's responsibilities within the framework of using personnel qualified to EN ISO 9712 and gives guidance on how the employer should fulfil these responsibilities. In this context, the employer (or responsible agency) is defined as 'the organisation for which the candidate works on a regular basis'. If the individual is self-employed, he shall assume all responsibilities specified for the employer or responsible agency.

It is a central tenet of the standard that the employer has overall responsibility for the results of NDT operations and is fully responsible for the authorisation of his staff to work. In practice, this must include checking that the NDT tasks to be carried out are within the scope of the individual's certification (sector, method and level) and, if they are not, organising additional job-specific training and/or examinations (see Figure 1).

The employer is responsible for introducing candidates to the certification body and for documenting the candidate's education and prior experience. (If the candidate is unemployed or self-employed, the declaration of education, training and experience shall be attested to by at least one independent party.)

The employer must ensure annually that employees meet the visual acuity requirements of the certification body and must keep records of work experience that will be needed to demonstrate continuity of satisfactory work activity without significant interruption. This is important both for his own quality assurance and to support renewal/recertification.

To fulfil these responsibilities the employer should prepare and implement a quality procedure (or written practice) covering at least the above responsibilities and maintain adequate records.

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[1] See, for example, SNT-TC-1A published by ASNT.

The quality procedure, which shall additionally cover the correct administration and control of NDT personnel in order to meet the quality requirements of the company, its customers and relevant international or national regulations, will include reference to:

- Applicable codes and standards;
- General responsibilities of Levels 1, 2 and 3;
- Certification required (sector, method, level);
- Persons designated by the employer to be responsible for issuing the authorisation to operate;
- Control of in-house training and examination supplementary to that carried out during the ISO 9712 qualification and certification process. This will include job-specific training for tasks outside the scope of the individual's certification and updating with respect to new equipment or techniques;
- Responsibility for maintenance of records. The employer must maintain records for each of his NDT personnel including:
  - training;
  - education;
  - work experience;
  - vision test results;
  - certification examination results.

If these are complete and acceptable, then the employer issues the necessary authorisation to discharge the duties of Level 1, 2 or 3 in a defined area of competence.

The best way for this to be done is through an employer's Certificate of Authority to Work and this should be signed by an appropriately designated person on behalf of the employer (see Figures 1 and 2).

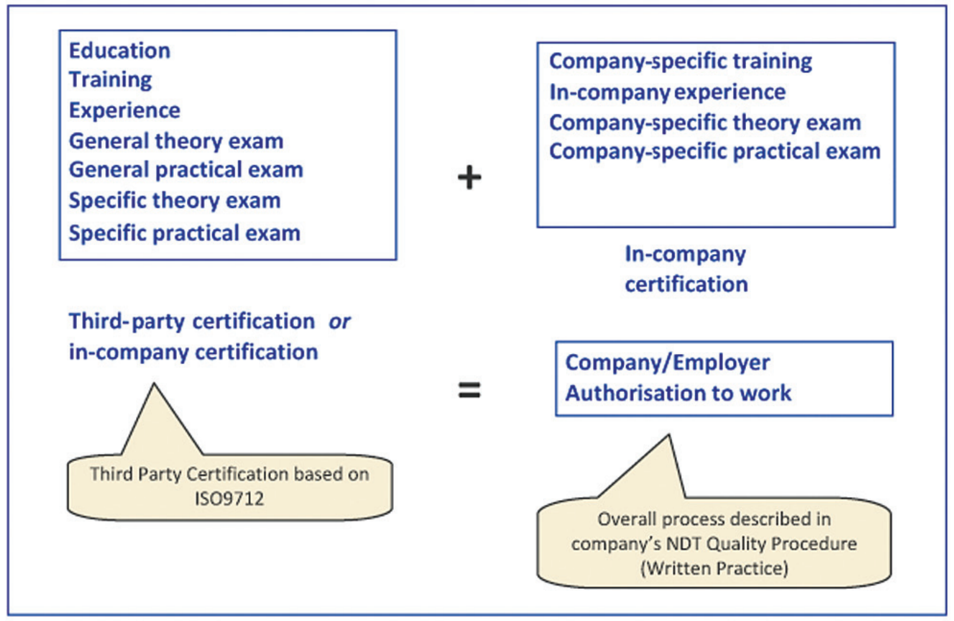

Figure 1. Elements of personnel certification

COMPANY NAME:			
OPERATOR'S NAME:			
SCOPE OF CERTIFICATION (sector, method, level):			
Requirement	**Evidence**	**In File**	**Accepted**
Valid test certificate for near vision acuity:			
Valid certificate of unimpaired colour vision:			
Work experience (in months according to level):			
Training hours (in hours according to level):			
Successful completion of qualification examination:			
Issued ISO 9712 certification:			
Job-specific training:			
Product/materials			
NDT equipment/systems			
NDT instructions/procedures			
Safety			
Responsible Level 3 Acceptance			
Signature:			
Name:			
Position:			
Date:			

Figure 2. Employer checklist leading to authorisation to work

If all of the above are acceptable, and the employer is satisfied that the above named employee can be authorised to carry out work for this company in respect of the method and level indicated, the authorisation to work is signed for the employer by the Company Authorised Person.

COMPANY NAME:						
This authorisation is issued to:						
who has demonstrated having successfully met the requirements of the Company Quality Procedure (COMPANY X – DOCUMENT REF) in respect of education, training, work experience and examination and is authorised to perform NDT as follows:						
Method	Technique	Level	Date of ISO 9712 certification	Due date of renewal or recertification	Signature of authorised company representative	Date

Figure 3. Authorisation to perform non-destructive testing

4. Requirements for NDT personnel certification bodies

Specific requirements for NDT personnel certification bodies (NDT PCB)

EN ISO 9712[1] is the latest internationally recognised and widely accepted standard for qualification and third-party certification of NDT personnel, replacing ISO 9712 and EN 473.

General requirements for personnel certification bodies (PCB)

EN ISO 9712 requires that the certification system shall be controlled and administered by a certification body that conforms to the requirements of the standard EN ISO/IEC 17024[3]. A PCB in compliance with EN ISO/IEC 17024 will be impartial in its decisions on certification and will ensure that assessments leading to certification are fair, valid and reliable.

Quality management system (QMS)

EN ISO/IEC 17024 requires a QMS that is capable of supporting and demonstrating the consistent fulfilment of the requirements of 'this international standard' (clause 11.2 in DIS 17024: 2011). The standard states that an ISO 9001 compliant management system would fulfil the requirement.

Accreditation

Accreditation is third-party attestation, by an authoritative body, conveyed in a formal document of the competence of PCBs to carry out specific conformity assessment tasks and to give confidence in their activities and their outcomes. The accreditation process is intended to increase the confidence of users in the status of a certification body. Accreditation reduces the risk for users of certification by ensuring that accredited certification bodies are competent to carry out the work they undertake within their scope of accreditation. Requirements for accreditation bodies are detailed in EN ISO/IEC 17011[2].

There is an international grouping of accreditation bodies known as the International Accreditation Forum (IAF), and there is also a European equivalent known as the European Accreditation of Certification (EAC). Accreditation bodies that are members of the IAF and EAC are required to operate at the highest standard and to require the conformity assessment bodies (CAB) that they accredit to comply with appropriate international standards, such as EN ISO 9712, which in turn requires conformance to EN ISO/IEC 17024.

The Certification Executive Committee of the European Federation for NDT (EFNDT) has prepared specific guidance to accreditation bodies assessing personnel certification bodies for compliance with EN ISO/IEC 17024: 2003. At the time of writing, the EFNDT guidance is published as a CEN Technical Report (CEN/TR 16332). This document will need to be withdrawn or updated with the publication of EN ISO/IEC 17024: 2012.

The EAC has a Multilateral Agreement (MLA), which is operated in compliance with EN ISO/IEC 17040[4], covering recognition of accreditations of personnel certification bodies. At the time of writing, the IAF does not have an MLA covering the operations of its members offering accreditation to ISO IEC 17024, though it is expected to implement such an MLA in the future.

Accreditations granted by signatories to the EAC MLA facilitate the development of Multilateral Recognition Agreements (MRA) amongst groups of PCBs operating certification of persons for specific activities such as NDT, which in turn should allow accredited conformity assessment certificates, for example for EN ISO 9712, gained in one part of the world to be recognised elsewhere in the world.

Currently, it is not viable to establish a globally accepted benchmark for ICNDT member countries operating certification of NDT personnel through accreditation bodies that are members of the International Accreditation Forum (IAF). The reasons for this are:

- There is no MLA between IAF ISO/IEC 17024 accreditation bodies.
- Many prospective and ICNDT member countries do not have accreditation bodies that are members of IAF.
- Lack of uniformity since considerable variation exists in the conformity assessment process used by the accreditation bodies for NDT personnel certification.
- Accreditation assessments undertaken by bodies that do not use supporting experts during assessments lack credibility.

APPENDICES

Appendix 1: The role of ICNDT and its regional groups in the harmonisation of qualification and certification

Introduction

This section highlights the role of the ICNDT members and the regional groups of ICNDT with respect to qualification and certification of NDT personnel, and summarises the 50 years of dedication by ICNDT to this field. It also references the documents produced on qualification and certification of NDT personnel, the very effective liaison with ISO TC135 on the harmonisation of standards, and provides some details concerning on-going work.

Foundation of ICNDT

The first World Conference on NDT was held in 1955 by a group of European countries, USA, Japan, China, India and the USSR. Its main objective was to gather scientists and technologists from all over the world in order that they could pool together their common experiences in promoting the development of the application of NDT.

ICNDT, as an international organisation, was formed on 15 March 1960, just prior to the 3rd World Conference on Non-Destructive Testing, which was held in Tokyo, Japan, from 16-21 March 1960.

ICNDT is a non-profit association devoted to the development of the science and practice of non-destructive testing in conjunction with existing NDT societies and recognised regional groupings of NDT societies.

ICNDT has recently broadened its horizons and has set itself a number of important objectives:

- To be the international organisation that acts as the prime focus on non-destructive testing for the benefit of the involved community and the public in general
- To promote international collaboration in all matters relating to NDT
- To encourage the foundation, growth, development and cooperation of national and regional societies
- To assign the place and organisation of the World NDT Conference to an appropriate NDT society or group of societies, at intervals of four years
- To establish with continental groupings of NDT societies initiatives for implementing ICNDT policy
- To encourage the formulation of international standards on non-destructive testing in collaboration with the International Organization for Standardization (ISO) and other standards bodies
- To establish an ICNDT Multilateral Recognition Agreement (MRA) of NDT personnel certification and the development of a process for the ICNDT assessment and approval of NDT personnel certification bodies.

World Conferences on NDT (WCNDT)

The NDT World Conference organised by ICNDT was the first concrete expression of the desire to cooperate in the dissemination of NDT. The 1st World Conference was held in Brussels in 1955 as a tribute to Gevaert, the producer of X-ray film, which sponsored international meetings in Antwerp.

Subsequent world conferences are listed below. Forthcoming conferences will be in Durban, South Africa (April 2012) and in Munich, Germany (2016).

Besides the need to establish, improve and disseminate NDT techniques, the need for harmonisation of qualification and certification of NDT personnel has grown through the years, with this topic becoming the focus of many ICNDT meetings and an important topic of discussion during the world conferences. Those world conferences that resulted in signification advances in the field of qualification and certification of NDT personnel were:

- **Montreal, 1967 – Qualification and certification of NDT personnel**

  In 1967, during the 5th World Conference on NDT held in Montreal, ICNDT adopted the following resolutions:

  "The Committee agrees that the appropriate time has arrived for the establishment of an 'International Recommendation on the Qualification of NDT Personnel' prepared by a task group of ICNDT."

  "All delegates are requested to promote, through their national standardisation organisations, the importance of establishing an ISO Technical Committee to deal with NDT."

- **Hanover 1970 – Discussions at World Conference**

  The 1967 discussions had a strong impact on ICNDT. Three years later, at the 6th World Conference in Hanover in 1970, the first contributions on the qualification and certification of NDT personnel were given by France, Germany, Japan, the United Kingdom and the USA. At that meeting the following statement on personnel certification was made:

  "Representatives of each country will submit statements on the qualification system prevailing in their country. These topics should form a topic for discussion at a specific session. In the meantime, statements of the present position will be communicated to ICNDT members."

- **Warsaw 1973 – Formation of Task Group**

  In Warsaw in 1973, ICNDT, during its 10th meeting, appointed a Task Group for the preparation of guidelines dealing with the qualification and certification of NDT personnel.

- **Cannes 1976 – ICNDT WH 76 – Liaison with ISO**

  The first document of the ICNDT Task Group on qualification and certification of NDT personnel was presented at the round table discussion in Cannes in 1976, during the 8th World Conference. The document was a comparison of all the existing schemes among the members of ICNDT. This was the first step towards a more complete series of guidelines on the qualification and certification of NDT personnel. Recommendations were made to make ISO knowledgeable on the importance of a working group on NDT. It was agreed at this ICNDT meeting to forward the document to ISO TC135.

- **Melbourne 1979 – Initiation of ICNDT document on minimum technical requirements for qualification and certification of NDT personnel**

  In 1979 in Melbourne, during the 9th World Conference on NDT, a further step forward on the topic of the qualification and certification of NDT personnel was made. Based on the Cannes document and the information available the following statements were made:

  "Two types of certification schemes are present in the world: independent body certification and employer-based certification. Mutual recognition of NDT certificates may be possible and the working group shall try to facilitate this."

  "Three levels of qualification are generally applied by the majority of the country members."

  In the same meeting it was decided to prepare a document on the minimum technical requirements for each level of qualification relative to the different methods of NDT (RT, UT, PT, MT, ET and LT).

- **Moscow 1982 – Review of draft document WH-85**

  After extensive work, in which all the main countries of the world were involved, the minimum technical requirements for qualification and certification of NDT personnel were presented in Moscow at the 15th ICNDT meeting. It received general consensus with minor changes made in order to give more completeness in the document.

- **Las Vegas 1985 – Final approval of WH-85**

  In 1985 in Las Vegas, during the 11th World Conference, the document received final approval for publication as an ICNDT document:

  ICNDT WH-85, 'The Complete Recommendations on International Harmonisation of Training, Qualification and Certification of NDT Personnel' (November 1985).

  The document was sent to ISO TC135 and was used as a reference in the preparation of the ISO 9712 standard on the qualification and certification of NDT personnel, which was published in 1992.

- **New Delhi 1996 – ISO 9712 standard**

  The 24th ICNDT meeting highlighted the work carried out by ISO TC135 in editing the ISO 9712 standard and its extensive application in the member countries. It was noted that the implementation of ISO 9000 would encourage certification in accordance with ISO 9712.

- **Copenhagen 1998 – ICNDT seminar on ISO 9712**

  In 1998 in Copenhagen, during the 25th ICNDT meeting, it was decided to create a common framework, which would comply with ISO 9712. In addition, it was proposed to prepare a guidance document for the application of ISO 9712. Following these proposals it was decided at the ICNDT PGP meeting in China (Shantou) to organise the first ICNDT seminar on ISO 9712 certification during the world conference in Rome.

- **Rome 2000 – Updating ICNDT WH-85**

  During the 27th ICNDT meeting in Rome, a complete revision of the document ICNDT WH-85 relative to minimum technical requirements was handed directly to the ISO TC135 chairman. Many interesting items relative to global mutual recognition of NDT schemes emerged from the ISO 9712 seminar.

- **Brisbane 2001 – ICNDT Recommended Guidelines for Qualification and Certification of NDT Personnel according to ISO 9712**

  During the PGP meeting held in Brisbane, recognising that an increasing number of schemes are aligned to ISO 9712 (including EN 473, ACCP, etc), it was proposed to draft ICNDT Guidelines for Qualification and Certification of NDT Personnel based on ISO 9712.

- **Montreal 2004 – ICNDT Recommended Guidelines for Qualification and Certification of NDT Personnel according to ISO 9712**

  The first edition approved by the ICNDT Editorial Committee was published and circulated to delegates at the 16th WCNDT.

- **Shanghai 2008 – Update of Guide including ICNDT recommendations and ICNDT workshop on harmonisation of EN 473 and ISO 9712**

  A new edition of the Guide incorporating important recommendations from ICNDT was approved for publication. A workshop was held with participation from ISO TC135 and CEN TC138 to explore the differences between the standards EN 473 and ISO 9712. It was concluded that the differences were not significant and it was announced that the two committees would work together to achieve a single harmonised standard. ICNDT was invited to become a formal liaison member of TC135.

The role of NDT societies

In most countries, the major catalyst for establishing a certification scheme is the national NDT society. The society provides a focus for information on NDT technologies, training and certification and, through the ICNDT, a link to the international NDT community. More than 62 countries have established NDT societies (see www.icndt.org) and ICNDT continues to assist the formation of new societies.

The role of ICNDT regional groups

The regional groups within ICNDT have a primary role in the promotion of NDT and in providing information on how to set up an NDT society. Regional groups also have a strong focus on the recognition and harmonisation of NDT personnel certification schemes within that region and alignment of these certification schemes to ISO 17024.

Four regional groups are active:

- Asia-Pacific Committee;
- Pan American Committee;
- European Federation for NDT – www.efndt.org;
- African Federation of NDT – www.afndt2008.com.tn.

Each regional group has their own constitution which, in terms of both strategy and policy, is complementary to that of ICNDT. Regional conferences play an important role in the development and promotion of NDT.

IAEA/ICNDT cooperation

In the promotion of NDT in developing countries, the International Atomic Energy Agency (IAEA) and ICNDT have forged a strong relationship based on mutual cooperation. In particular, ICNDT experts participate in many IAEA projects that involve the training, qualification and certification of NDT personnel.

ICNDT achieves legal status in 2008

ICNDT was formally registered as a legal non-profit international association in Vienna in 2008, in accordance with the Austrian Corporations Act. An up-to-date list and contact addresses are given on the ICNDT website at www.icndt.org

ICNDT website

Information on all ICNDT activities is provided on the ICNDT website (www.icndt.org). This site serves to improve and strengthen links between NDT societies and regional groups. ICNDT also publishes a regular journal.

World Conferences on NDT (promoted by ICNDT)

Conference No	*Year*	*City*	*Country*
1st WCNDT	1955	Brussels	Belgium
2nd WCNDT	1957	Chicago	USA
3rd WCNDT	1960	Tokyo	Japan
4th WCNDT	1963	London	Great Britain
5th WCNDT	1967	Montreal	Canada
6th WCNDT	1970	Hanover	Germany
7th WCNDT	1973	Warsaw	Poland
8th WCNDT	1976	Cannes	France
9th WCNDT	1979	Melbourne	Australia
10th WCNDT	1982	Moscow	Russia
11th WCNDT	1985	Las Vegas	USA
12th WCNDT	1989	Amsterdam	The Netherlands
13th WCNDT	1992	San Paulo	Brazil
14th WCNDT	1996	New Delhi	India
15th WCNDT	2000	Rome	Italy
16th WCNDT	2004	Montreal	Canada
17th WCNDT	2008	Shanghai	China
18th WCNDT	2012	Durban	South Africa

Appendix 2: Bibliography

This section provides a list of the latest editions of standards dealing with or impacting upon the qualification and certification of personnel engaged in testing, inspection and condition monitoring.

1. EN ISO 9712: 2012 Non-destructive testing – Qualification and certification of NDT personnel (not yet at FDIS)

2. EN ISO/IEC 17011: 2012 Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies

3. EN ISO/IEC 17024: 2012 Conformity assessment – General requirements for bodies operating certification of persons (not yet at FDIS)

4. EN ISO/IEC 17040: 2005 Conformity assessment – General requirements for peer assessment of conformity assessment bodies and accreditation bodies

5. EN ISO 20807 (2004) Non-destructive testing – Qualification of personnel for limited applications of non-destructive testing

6. ISO TS 11774 (2011) Non-destructive testing – Performance-based qualification

It should be noted that the above list is not exhaustive, and the status of the referenced standards should be ascertained by reference to ISO before use.

Appendix 3: Qualification and certification of NDT personnel in accordance with EN ISO 9712: 2012

Two 'major' third-party certification systems have coexisted for several years: EN 473 and ISO 9712. Following several initiatives from industry and ICNDT, the two certification committees in charge of these standards (ISO TC135 and CEN TC138) decided in 2009 to launch a harmonisation process intending to produce a unique EN ISO standard. This process has involved more than 20 countries and has succeeded in producing EN ISO 9712, which will be published in the third quarter of 2012.

The standard covers the qualification and certification of NDT personnel in one or more of ten NDT methods: acoustic emission testing, eddy current testing, infrared thermographic testing, leak testing (hydraulic pressure tests excluded), magnetic testing, penetrant testing, radiographic testing, strain testing, ultrasonic testing and visual testing (direct unaided visual tests and visual tests carried out during the application of another NDT method are excluded).

The responsibilities of the certification body, its authorised qualifying bodies (where used) and examination centres are defined, and the role of the employer is clarified. Three levels of qualification are defined (Levels 1, 2 and 3). Qualification is 'specific' to a defined industrial or product sector(s).

Eligibility for certification is specified covering vision requirements for all levels, minimum training requirements and the required duration of industrial experience.

Qualification examinations are defined – comprising both written and practical parts – for each level, with minimum numbers of questions and, for Levels 1 and 2, test specimens specified.

Rules are specified governing administration of certification, including the conditions for renewal and recertification.

The main changes from the previous EN and ISO standards are:

- clarification of the roles of the certification body, the authorised qualifying bodies (where used) and examination centre;
- modification of the required training hours (with a rewrite of the relevant clause);
- ISO/TR 25107 Training Guidelines referenced as a basis for certification bodies to define their training syllabuses (other documents demonstrated as equivalent may be used);
- a rewrite of the clause about required experience (for more clarity);
- introduction of 'digital certificates/e-assessment'; and
- for Level 3 recertification, deletion (compared to ISO 9712) of a precise requirement for demonstration of practical skill (practical test), replaced by demonstrated evidence of this skill (to be accepted by the certification body).

Appendix 4: Qualification of NDT personnel in accordance with EN ISO 20807 and ISO TS 11774

Introduction

EN ISO 9712 establishes the general requirements for the qualification and certification of personnel for a wide range of competencies defined by the application of NDT methods to products, such as castings, forgings and welded constructions used in specified industry sectors.

In certain circumstances it may be necessary or desirable for economic or safety reasons to qualify NDT personnel for specified limited applications, and the two documents referred to in this Appendix provide a framework for such qualification activities.

ISO 20807 (Non-destructive testing – Qualification of personnel for limited applications of non-destructive testing)

International standard ISO 20807 establishes a system for the qualification of personnel who perform NDT applications of a limited, repetitive or automated nature, such as:

- eddy current and electromagnetic sorting of materials;
- eddy current and electromagnetic testing of tubular products during manufacture;
- normal beam ultrasonic testing of plate materials during manufacture;
- ultrasonic thickness testing.

As a provision outside the scope of ISO 9712 requirements, limited NDT is the practice of a test method for a particular application requiring specific training and experience, *ie* an application which is limited, repetitive or automated. Annex A to ISO 20807 serves to provide examples of syllabuses for the training and examination of personnel seeking qualification to this international standard.

The methodology set out in ISO 20807 may be applied to the qualification of personnel for any limited application of NDT. However, it is not intended that qualification for limited applications be substituted for qualification and certification under ISO 9712, which includes provision for a reduction in the duration of training and experience required for eligibility in limited applications.

ISO TS 11774 (Non-destructive testing – Performance-based qualification)

The technical specification 'ISO TS 11774 Non-destructive testing – Performance based qualification' has the scope to provide a method for qualification of non-destructive testing personnel, procedures and equipment for specific NDT conducted in accordance with documented procedures to achieve a required level of performance.

Implementation will require cooperation between applicable industry sector committees (ISCs) and qualification bodies to assure that specific performance expectations are addressed.

The qualification methodology described is based upon the candidate's ability to demonstrate capability in detecting and sizing critical discontinuities equivalent to those to be detected and sized in the performance-based qualification programme as established by the ISC.

Second-party (employer-based) qualification and approval (for example in accordance with ANSI/ASNT CP-189), or qualification and third-party certification (for example in accordance with ISO 9712 or EN 473), followed by on-the-job training, may not provide the required degree of confidence for safety critical inspections and this technical specification provides criteria to assist in preparing an individual for performance-based qualification examinations.

Qualification to this ISO TS is limited to specific applications, using the specific documented procedure in the performance-based qualification programme.

Process

The NDT procedure shall first be qualified and the personnel qualification is valid only when the essential parameters are applied and controlled as defined within the procedure. The procedure qualification shall demonstrate the capability to resolve mandatory detectable discontinuities under representative conditions.

The candidates shall provide evidence of current valid NDT Level 2 or 3 certification in the method for which he or she is to be qualified. For NDT Level 2 personnel, the certification may be from a nationally recognised employer-based programme or a certification body accepted by the ICS. For NDT Level 3 personnel, the certification shall be from a certification body.

Candidates for qualification shall have sufficient training and specific practical experience to ensure they are capable of performing non-destructive tests using the qualified NDT procedure. The experience may be obtained with the use of virtual training systems, or by examining representative specimens, with relevant and non-relevant discontinuities that may be located in a laboratory, or analysing recorded data from automatic, digital or analogue systems.

The discontinuities in the specimens that the candidates shall report may be actual or simulated and shall range in size from the minimum detectable using a qualified procedure to not more than the maximum size specified.

The qualification body shall be responsible for the administration and grading of examinations and shall appoint the NDT qualification examiner.

Periodic performance demonstration. The frequency and content of periodic performance demonstration shall be determined by the ISC.

The ISO TS 11774 process is represented in flowchart form in Figure 4.

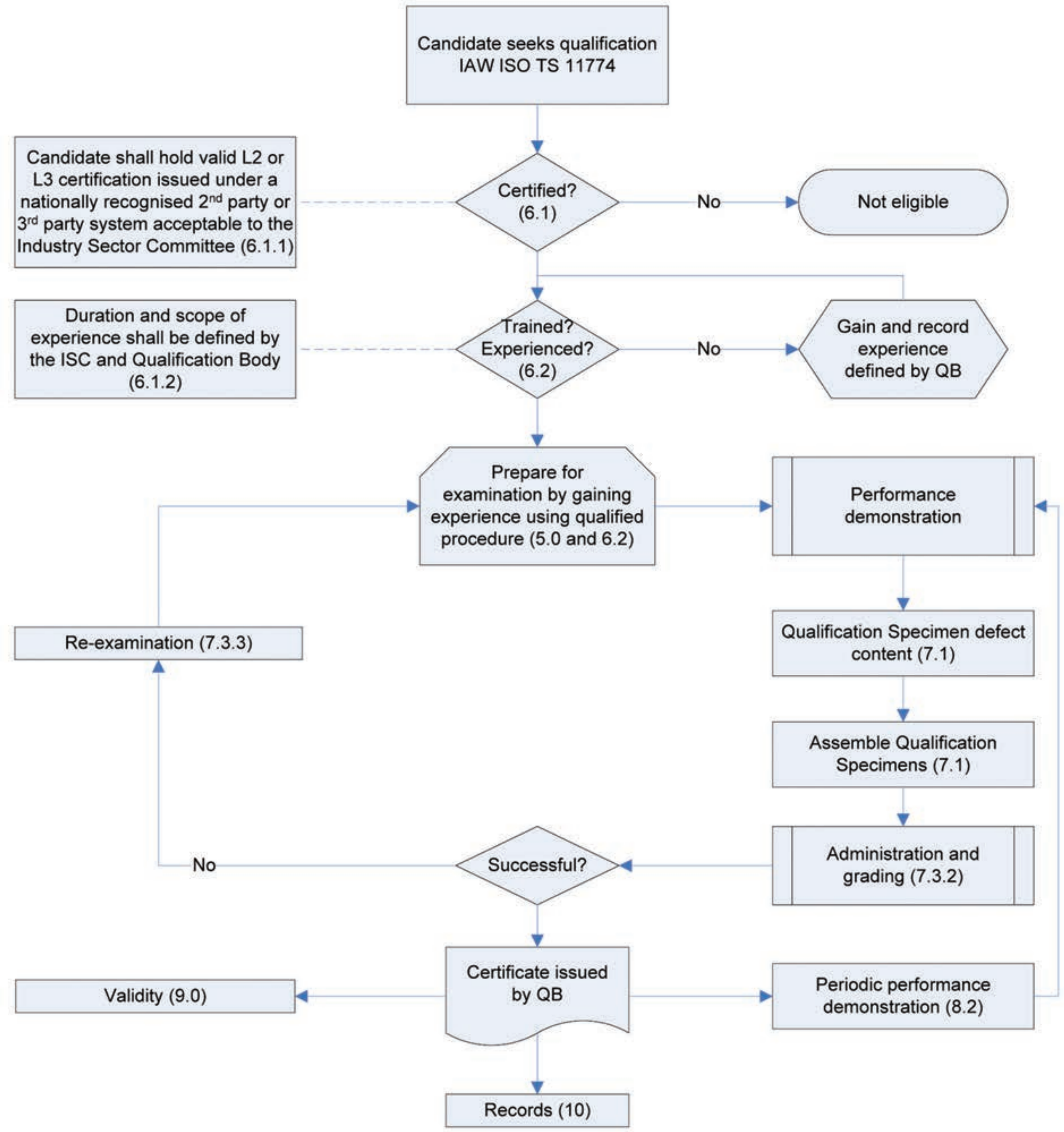

Figure 4. The ISO TS 11774 process

Appendix 5: ASME position on recognition and acceptance of central certification programmes

The ASME Boiler and Pressure Vessel Code includes specific requirements for NDT and for the qualification or certification of NDT personnel in appropriate sections. This code is used all around the world, including in regions such as Europe, where compliance with other regulations, for example the Pressure Equipment Directive, is facilitated by the use of third-party certification and in countries where third-party certification is mandatory.

In 2003, following presentations from EFNDT and the European Boilermakers' Association, each seeking to avoid unnecessary double certification, to take advantage of the benefits of third-party certification and to facilitate meeting the requirements of the PED, ASME advised a revision to the ASME Boiler and Pressure Vessel Code Section V, Article 1. An amended paragraph T120 was approved and published in the 2003 Addenda – see Figure 5. The option is also included in Code Sections I and VIII, Divisions 1, 2 and 3. Although there is no reference to specific central certification programmes other than ACCP, these amendments allow the use of national or international central certification programmes, such as those complying with EN ISO 9712, to fulfil the examination requirements of the employer's written practice, which must be in accordance with SNT-TC-1A or ANSI/ASNT CP189.

It is notable that ICNDT's recommendations in this Guide are consistent with the key principles of ASME code requirements:

- an employer's written practice is required
- NDT personnel shall be qualified by examination
- the employer retains responsibility.

Employers working to ASME codes who choose to follow this option now prepare a written practice (based on the recommendations of SNT-TC-1A/CP189), which references certification in accordance with third-party/central schemes that comply with ISO 9712 and/or EN 473. A reference to CP106 would also meet the specified requirement.

Employers must specify the additional training and examinations that are necessary to provide a bridge between the scheme's training and examinations and the specific ASME NDT procedures and/or specific employer's needs (for example for the application of TOFD or phased arrays).

In Code Case N-788 'Third-Party NDE Certification Organizations, Section XI, Division 1', approved 9 April 2010, Section XI has defined the requirements for third-party certification organisations, which may be used *in lieu* of employer-based certification of Level 2 and 3 NDE personnel. Specific requirements (on QA to USA standards and training) are defined over and above those implicit in EN ISO 9712 certification.

Codes and Standards

ASME International

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July 7, 2003

To: Mr. Guiseppe Nardoni, I & T International
Mr. R. Roche, President, EFNDT
Mr. Bjarne Larsen, Vice President, EFNDT
Mr. John Thompson, Manager, Certification Services Division, BINDT
Dr. Reinhard Maab, European Boilermaker's Association
Mr. Helmut Salomon, European Boilermaker's Association

Subject: Revision to BPVC Section SC V Regarding NDE Personnel Qualifications

Gentlemen,

This letter is to advise that, in response to international interest in NDE requirements for qualification of personnel, the attached revision to ASME BPVC Section V, Article 1, paragraph T-120 was approved and published in the 2003 Addenda. In particular, I direct your attention to T-120(e) and (f), which provide for alternatives to be used by the manufacturer to fulfill the examination requirements of the documents listed in T-120(e).

Yours truly,

Ed Maradiaga
Secretary
SC V Subcommittee on Nondestructive Examination
Phone: 1-212-591-8056
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Att: BPVC Section V, Article 1, Paragraph T-120

Cc (w/att): Jon Batey, Chair, SC V
Bruce Kovacs, Vice-Chair, SC V
Richard McGuire, Chair, SG Personnel Qualifications, SC V

The American Society o Mechanical Engineers

ARTICLE 1 - GENERAL REQUIREMENTS

T-120 GENERAL

(a) Subsection A describes the methods of nondestructive examination to be used if referenced by other Code Sections or referencing documents.

(b) Subsection B lists Standards covering nondestructive examination methods which have been accepted as standards. These standards are nonmandatory unless specifically referenced in whole or in part in Subsection A or as indicated in other Code Sections or referencing document.

(c) Any reference to a paragraph of any Article in Subsection A of this Section includes all of the applicable rules in the paragraph.[1] In every case, reference to a paragraph includes all the subparagraphs and subdivisions under that paragraph.

(d) Reference to a standard contained in Subsection B is mandatory only to the extent specified.[2]

(e) For those documents that directly reference this Article for the qualification of NDE personnel, the qualification shall be in accordance with their employer's written practice which must be in accordance with one of the following documents:

(1) SNT-TC-1A[3], Personnel Qualification and Certification in Nondestructive Testing; or

(2) ANSI/ASNT CP-189[3], ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

(f) National or international central certification programs, such as the ASNT Central Certification Program (ACCP), may be alternatively used to fulfill the examination requirements of the documents listed in T-120(e) as specified in the employer's written practice.

[1] For example, reference to T-270 includes all the rules contained in T-271 through T-277.3.

[2] For example, T-233 requires that Image Quality Indicators be manufactured and identified in accordance with the requirements or alternatives allowed in SE-747 or SE-1025, and Appendices, as appropriate for the style of IQI to be used. These are the only parts of either SE-747 or SE-1025 that are mandatory in Article 2.

[3] SNT-TC-1A (2001 Edition), "Personnel Qualification and Certification in Nondestructive Testing;" and ANSI/ASNT CP-189 (2001 Edition), "ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel;" published by the American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, Ohio 43228-0518.

[4] In this Code Section, "Code User" is any organization conducting nondestructive examinations to the requirements of this Section. A03

Figure 5. ASME letter and amended paragraph T120

Appendix 6: Non-destructive testing under the European Pressure Equipment Directive (97/23/EC)

Introduction

The Pressure Equipment Directive – 97/23/EC – was formally adopted by the European Parliament and Council on 29 May 1997 and was published in the Official Journal of the European Communities, No L181, on 9 July (ISBN 011 916 0927). It came into force on 29 November 1999 and compliance with its requirements has been mandatory since 29 May 2002.

The purpose of the directive is to harmonise national laws regarding the design, manufacture and conformity assessment of pressure equipment and assemblies (vessels, storage containers, heat exchangers, shell and water tube boilers, industrial pipework, safety devices and pressure accessories), subject to an internal pressure greater than 0.5 bar above atmospheric.

Equipment is categorised within four levels (I to IV) according to the degree of hazard: category III and IV equipment will require conformity assessment by 'notified bodies' and 'recognised third-party organisations'.

Non-destructive testing

For pressure equipment, non-destructive tests of permanent joints must be carried out by 'suitably qualified personnel'. For pressure equipment in categories III and IV, NDT personnel must be approved by a 'third-party organisation' (RTPO) recognised by a member state pursuant to Article 13.

Certificates of competence in compliance with EN ISO 9712: 2012[2] issued by a recognised third-party organisation (RTPO) and covering the testing of permanent joints (in effect, welds) are presumed to satisfy the requirements of the directive because EN 473 is a harmonised standard. But, there are alternative acceptable methods of fulfilling the requirements of the directive, as detailed in CEN/TR 15589: 2006 (Non-destructive testing – Code of Practice for the approval of NDT personnel by recognised third-party organisations under the provisions of Directive 97/23/EC).

Further information is available at www.efndt.org under the section 'Pressure Equipment'.

[2] An informative Annex ZA will be included in EN ISO 9712, which will state: "This European standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to essential requirements of the new approach directive (97/23/EC) (PED).

Once this European standard is cited in the Official Journal of the European Communities under that directive and has been implemented as a national standard in at least one member state, compliance with the clauses of this standard given in Table ZA.1[3] confers, within the limits of the scope of this European standard, a presumption of conformity with the corresponding essential requirements of that directive and associated EFTA regulations.

[3] Table ZA.1 will show the relationship between EN ISO 9712 and Directive 97/23/EC by reference to specific clauses of the standard.

Appendix 7: Basic principles of NDT

NDT methods covered by ISO 9712

Acoustic emission testing (AT)

The principle of the method is based on the detection of acoustic waves emitted by a material due to its local stress/strain excitation, crack initiation and/or crack propagation.

Eddy current testing (ET)

A magnetic field, generated by a coil fed with alternating current, produces induced currents (eddy currents) in the test-piece. Such currents affect the impedance of the coil that generates them. The presence of any discontinuity in the eddy current causes variations in their intensity and flow and, in turn, the impedance of the coil. The corresponding signal fluctuation is represented on a meter or oscilloscope and may indicate the presence of a defect.

Infrared thermographic testing (TT)

Infrared thermography (thermal imaging) is a method of observing the appearance of an object in terms of its surface temperature. It is a non-contact as well as non-destructive method of instantaneously determining minute variations of surface temperature that can be indicative of discontinuities at or below the surface scanned. The TT method is particularly useful for plant and machinery condition monitoring, electrical systems condition monitoring and monitoring of buildings for insulation failure. It can be applied as a 'passive' or 'active' technique, the latter requiring the application of heat to the object under test and the monitoring of the dissipation of that heat on the surface, which is influenced by sub-surface properties.

Leak testing (LT)

When a penetrating flaw is present through a wall separating two environments at different pressures, the fluid at a higher pressure passes to the lower-pressure environment at a flow rate which is proportional to its velocity. In some cases the turbulence caused at the point of flow generates wideband noise, which can be detected by a transducer tuned to specific frequencies or, if a gas (typically helium) is injected, by a mass spectrometer.

Magnetic testing (MT)

The method is based on magnetic flux leakage at a discontinuity when a high-intensity magnetic field is introduced into the test object, which must be ferromagnetic.

Penetrant testing (PT)

The method is based on the phenomenon of capillary action, that is the tendency for a liquid to rise within a capillary tube, and on the physical properties of the liquid, viscosity and surface tension.

Radiographic testing (RT)

The method is based on the change of attenuation of electromagnetic radiation (X- and gamma rays) caused by the presence of a discontinuity or changes in material density when passing through the test material.

Strain gauge testing (ST)

Strain testing covered by ISO 9712 is strain measurement using electric resistance strain gauges. When a test object is subjected to a strain, a strain gauge adhered to the test object is subjected to the same strain. This causes a change in the electrical resistance of the strain gauge. The change in resistance is detected as the change in the output voltage of the bridge circuit to which the strain gauge is connected.

Ultrasonic testing (UT)

Ultrasonic testing is based on the phenomenon of acoustic wave reflection or diffraction upon encountering obstacles to propagation within a material. If the obstacle lies normal to the incident ultrasonic beam, the wave is reflected back to its generating source. In the case of time-of-flight diffraction (TOFD), waves are diffracted from the tips of cracks.

ICNDT GUIDE TO QUALIFICATION AND CERTIFICATION OF PERSONNEL FOR INSPECTION, TESTING AND CONDITION MONITORING 23

Visual testing (VT)

Visual testing is a non-destructive testing method applied using specialised equipment such as mirrors, magnifiers, borescopes, fibrescopes, gauges, closed-circuit television (CCTV) using light sources and special lighting, as well as computer-enhanced systems, imaging systems and special optical systems.

Advanced NDT methods or techniques

Foreword

Whilst these methods or techniques are not explicitly covered by ISO 9712, several certification bodies offer (or are developing) certification complying with the standard, and others offer certification which requires an ISO 9712 certificate in ultrasonics or radiography as a precursor.

Phased (ultrasonic) arrays

A conventional UT probe consists of a single piezoelectric element, while that for phased array UT has multiple piezoelectric elements contained within the probe. Each piezoelectric element is independently controlled through the electronic timing of the pulses to synthesise these individual wavelets, which can then be directed and steered to control the resultant ultrasonic beam.

Whereas a conventional probe has one focal length and one orientation, a single phased array probe allows the user to change the shape and focal point of the ultrasonic beam to optimise each inspection. The acoustic energy can be focused and delay laws can be applied to steer the acoustic beam.

Dynamic depth focusing allows measurements to be made at several depths in the same amount of time as it takes to carry out a single depth measurement using a conventional probe and with similar accuracy because of the focusing of the beam.

Additionally, because the angle can be swept over a wide range, it is possible to inspect areas to which conventional ultrasonic methods are not applicable.

Phased arrays can reduce inspection times by eliminating, or at least reducing, the need for mechanical scanning, *ie* probe movement, because of the ability to move the beam by electronic means. When piezoelectric elements in a phased array UT probe are divided into groups, the speed of inspection can be increased by electronic manipulation instead of scanning with a probe.

This elimination or reduction of mechanical scanning also increases the reliability of flaw sizing and measurement by eliminating changes in (or loss of) coupling, which is a risk each time the probe is moved.

Ultrasonic time-of-flight diffraction (TOFD)

In conventional pulse-echo systems, it is the specular reflections that are interrogated. This may be from the flat surface of a lack of side-wall fusion or from a small facet of an irregular slag inclusion. Where time-of-flight diffraction (TOFD) differs is in that it detects reflectors by the signals diffracted from the extremities of those reflectors, such as the ‘corners’ and ‘ends’ of cracks.

Two angled compression wave probes are used in tandem mode, one each side of the weld to be inspected. Because of the beam width (divergence) in moderate plate thicknesses, the majority of the thickness of the weld area is intercepted.

Time-of-flight diffraction inspection actually produces three useful signals because of the transducer arrangement and operation in a pitch-catch mode.

The first is the lateral wave, caused by propagation of the sound between the transmitter and receiver in a direct path just under the examination surface.

The second signal, LL, is the primary backwall signal, caused by the direct reflection of the L wave from the back wall.

A third signal is another backwall signal created by mode conversions on this surface (longitudinal wave to shear wave).

During a normal scan, the three signals appear consistently. However, when a flaw is present, signals will appear in the ‘time window’ between the lateral wave and the back wall. The depth of the flaw can be calculated from the arrival time of the flaw signals to the arrival time of the backwall signal and the probe separation distance.

Depending on which direction the probes are moved over the component surface, it is possible to construct ‘end-view’ (B-scan TOFD) or ‘side-view’ (D-scan TOFD) cross-sectional slices. TOFD can also utilise synthetic aperture focusing or beam modelling software to minimise the effects of beam divergence, thereby providing more accurate location and sizing information.

TOFD is generally recognised as the most accurate ultrasonic technique for measuring the through-wall height of planar flaws that lie perpendicular to the surface and as a method for detecting and quantifying crevice corrosion at the weld root. It is widely used in the petrochemical and nuclear industries for the inspection of butt welds in pressure vessels and pipework and is often used to provide critical flaw sizing data for input to engineering critical assessments (ECA).

The TOFD technique is suited for the detection and sizing of all types of internal discontinuities, especially planar discontinuities. However, the detection of small near-surface flaws can be more difficult due to the presence of the lateral wave response, which often occupies several millimetres of the surface layer.

The technique is less reliable where there are large numbers of reflectors, such as cluster porosity or multiple slag inclusions, and in coarse-grained materials such as some stainless steels.

Ultrasonic guided waves (or long-range UT)

Guided wave ultrasonic testing is a relatively new technology. It uses ultrasound, that is to say sound at frequencies beyond the range of human hearing, and so it is useful to introduce the principles of guided wave ultrasonics by referring to conventional ultrasonic NDT.

Guided waves use frequencies in the KHz range and wave modes that penetrate the whole wall thickness of the test object. Therefore, in a plate for example, the plate must be thin enough and the wavelength of the ultrasound long enough for waves on the opposite surfaces to interact. These are known as plate or Lamb waves.

A unique characteristic of plate waves is that they change velocity with frequency. They are described as being ‘dispersive’, because a pulse of plate waves, containing as it does a spectrum of frequencies, will broaden as it propagates. The lower frequency components travel more slowly than those of a higher frequency.

In the case of pipe, they are known as guided waves. A symmetrical circular wave is transmitted from a ring of piezoelectric or EMAT transducers clamped around the pipe. The particle displacements are similar but, because the pipe acts as a wave guide, the pulses can be propagated over even longer distances.

Long-range ultrasonic testing uses guided waves to test rods, cables and rails, but almost exclusively to test pipes, mainly in the oil, gas and chemical industries. It has the advantage of full volume coverage and the ability to test long lengths of structure from one point. Inaccessible regions can also be inspected from an accessible location.

Real-time and digital radiography

Real-time radiography provides an image which can be viewed on a screen and enhanced by the use of digital imaging software.

Conventional RT ‘revelation’ is by means of exposing a film to ionising radiations, and the film is viewed using transmitted light after developing. Conventional film is often replaced today by specific transducers converting the electromagnetic rays of ionising radiations directly into electrical signals displayed on a computer screen.

Fluoroscopy is an RT technique where the image is directly produced and viewed on a screen coated with salts that emit light based on the radiation they receive and, once amplified by an intensifier, it is possible to see them in real-time on a TV monitor.

Radioscopy produces an image of the intensity of ionising radiations generated on a luminescent screen. Radiation is absorbed by the screen and directly converted into visible light. Mostly zinc sulphide (ZnS) has been applied as a converting material.

Computed radiography (CR) has been applied for about 20 years in medicine and biology, but CR systems have only recently been developed for NDT applications. However, up to the present these systems cannot fully replace classical radiography in NDT. On the other hand, new areas of NDT application can be accessed since the high sensitivity of imaging plates allows significantly smaller exposure periods, and the resulting images can be digitally enhanced.

Digital radiography (DR) employs the same techniques as conventional RT, only changing the medium where the image is displayed. In DR, electronic receivers are excited by ionising radiations and the resulting image is stored in digital form and can be enhanced by means of suitable software, and can be transmitted by electronic means, which makes evaluation possible at a distance. Once cleared of the electronic image, the electronic receivers can be reused multiple times.

Neutron radiography

Neutron radiography can be used to detect hydrogenous material inside metal assemblies. Applications lie in the field of corrosion monitoring, examination of complex castings and explosive fillings. The neutrons pass through the object to be tested and an image (similar to an X-ray) is generated. Neutrons are generated from radio-isotopes, atomic reactors and particle accelerators. Extensive safety precautions must be taken.

Advice on choice of NDT method

For further information on NDT techniques and a link to a useful method selector chart, visit:

http://www.icndt.org/Home/WhatisNDT.aspx

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Appendix 11: Code of practice for personnel certification bodies

NDT personnel certification bodies (PCB) seeking ICNDT approval and/or registration under the ICNDT Multilateral Agreement on Recognition of Certification are obliged to sign an undertaking to comply with this Code of Practice and, *inter alia*, they shall:

1. Maintain compliance with the standard(s) and specification(s) detailed on their certificate of accreditation or the ICNDT certificate of approval, notifying the ICNDT Certification Executive Committee (CEC) of any change in status, or in the standards with which the certification scheme that they operate to complies;
2. Promote recognition and acceptance in their own country of the certificates of conformance issued by other NDT PCBs registered under the ICNDT Multilateral Recognition Agreement (MRA);
3. Keep confidential all examination material, including examination questions and specimens, in secure conditions with strictly controlled access only to authorised individuals;
4. Conduct their business in a responsible manner and utilise fair and equitable practices in dealing with clients and candidates;
5. Perform their professional duties with proper regard for the physical environment and the safety, health and well-being of certificate holders and candidates for certification;
6. Protect to the fullest extent possible, consistent with the wellbeing of the public and the provisions of this Code of Practice, any information given to them in confidence by an employer of certificated NDT personnel, candidates and certificate holders, or members of the public;
7. Avoid conflicts of interest with employers of certificated NDT personnel or candidates, but when unavoidable forthwith disclose the circumstances to the employer or candidate;
8. Not falsify nor permit misrepresentation of their accreditation, ICNDT approval or registration under the ICNDT MRA;
9. Refrain from making unjustified statements or from performing unethical acts which would discredit the NDT profession or the ICNDT;
10. Immediately report to the ICNDT CEC any perceived violation(s) of this Code of Practice by any party.
11. Accept the right of the ICNDT, and provide unhindered access to a nominated representative of the ICNDT, to investigate any alleged infringements of this Code of Practice.

Appendix 12: ICNDT membership directory

For an up-to-date list of ICNDT member societies and contact details, go to: http://www.icndt.org/Directory.aspx

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