



The World Organisation for NDT

ICNDT Guide to Qualification and Certification

of Personnel
for NDT

1 February 2024



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Forewords

Foreword by Chair of ICNDT

Personnel competence of those carrying out non-destructive testing (NDT) is an essential prerequisite for the achievement of quality and reliability. Qualification and certification of NDT personnel in accordance with international standards, such as the unified 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. ICNDT, with a track record of over six decades in international cooperation in NDT, is dedicated to supporting the best practice in the implementation of standards through this guide. As Chair, I express sincere thanks to my ICNDT colleagues and to members of ICNDT WG1 and ISO/TC 135 SC 7 for their assistance in preparing this document.

S K Babu
Chair, ICNDT

Foreword by Chairs of ISO/TC 135

ISO 9712 (Non-destructive testing – Qualification and certification of NDT personnel) has been harmonised internationally as a third-party certification standard and revised in 2012.

When applying this revised and unified ISO 9712 for maintaining the integrity of materials, components, structures, facilities, etc, the ICNDT Guide to Qualification and Certification of Personnel for NDT is indispensable for the implementation of a qualification and certification scheme.

Moreover, this ICNDT Guide, which is based on long-term historical experience in supporting the implementation of ISO 9712, will provide more possibility of mutual recognition among the ICNDT member societies in the certification of NDT personnel in order to accelerate international harmonisation.

ISO/TC 135 expect that this ICNDT guide will be valuable both for NDT personnel requiring certification and for the NDT industry worldwide in order to maintain safety and reliability in a wide range of industrial fields.

Norikazu Ooka
ISO/TC 135 Immediate Past Chair

Takamasa Ogata
ISO/TC 135 Chair

Darcy Corcoran
ISO/TC 135/SC 7 Chair

Foreword by Chair of the IAC and Editorial Committee

The original guide was published in June 2004 at the 16th World Conference on Non-Destructive Testing (16th WCNDT) in Montreal, Canada, based on a first draft produced by Mr G Nardoni. The first update was approved for publication at the 17th WCNDT in Shanghai, China. The next version was published to coincide with the 18th WCNDT in Durban, South Africa, and the agreements within ISO and CEN to unify ISO 9712 and EN 473 in a new standard, ISO 9712, published in 2012. The 2014 version reflected updates in ISO 17024 and the developments in ICNDT to create an international multilateral recognition agreement and to document how different certification bodies are implementing ISO 9712:2012. The 2016 version reflected developments in the relationship with the American Society of Mechanical Engineers (ASME), further information on the implementation of ISO 9712 and a reference to a code of ethics for certificated personnel. The 2023 version reflects the publication of ISO 9712:2021 and the much more widespread use of the standard around the world.

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.

Mike Farley
Chair, IAC 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 non-destructive testing (NDT) personnel according to the international standard ISO 9712^{[1]*}.

The competence of NDT personnel is a key element in achieving reliability in 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 (CBs), industry, NDT service companies and supervisors of NDT personnel.

ICNDT has promoted worldwide dissemination of NDT technologies and the harmonisation of personnel certification schemes for more than 60 years. The decision by ICNDT to promote the adoption of 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.

The central role of ISO 9712 among standards for third-party certification, the historical development of NDT personnel certification and ICNDT's role are explained within this guide in Appendices 1 and 2. A list of ICNDT members, at the time of writing, is given in Appendix 3.

The 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^[2] in 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 (see Appendix 4) and the European Pressure Equipment Directive^[3] (2014/68/EU – see Appendix 5). An explanation of the employer's responsibilities is provided in Chapter 3.

In each of the regions where ICNDT has members (Africa, Europe, Asia-Pacific and Pan-America), ISO 9712 has been adopted as a basis for third-party certification schemes. A list of certification schemes and their current status is provided in Appendix 6. The schemes recognised by ICNDT are listed in Appendix 7. In summary:

- In Africa, South Africa has an accredited ISO 9712 certification system and Tunisia is introducing a similar system.
- In Europe, a large number of countries (more than 14) have accredited schemes that comply with ISO 9712.
- In the Asia-Pacific region, Australia, India, Malaysia, Singapore, South Korea and Sri Lanka have certification bodies accredited to ISO/IEC 17024 and delivering ISO 9712 certifications. The Singapore scheme is delivered to the latest ISO 9712:2021 standard. China provides certification to ISO 9712:2012. Japan was an early adopter of ISO 9712 according to ISO 17024.
- In the Pan-America region, Brazil, Argentina, Canada, Colombia and Mexico have accredited certification schemes that comply with ISO 9712. In the USA, the American Society for Nondestructive Testing (ASNT) will be transitioning away from ANSI/ASNT standard CP 106^[4], which is closely aligned with ISO 9712:2012, and has now rolled out ASNT 9712, which complies with the ISO 9712:2012 edition and provides for psychometrics-based robust practical examinations. Many other countries in Latin America, including Uruguay, Peru, Bolivia and Venezuela, are developing national schemes based on ISO 9712.

*The reference numbers given in square brackets refer to the documents listed in Chapter 5, Bibliography.

- Other countries have foreign CBs providing certification to ISO 9712 or operating a scheme with compliance to ISO 9712, but which is unaccredited.
- Most of the accredited CBs are registered by ICNDT under the multilateral recognition agreement (MRA) (see Appendices 6 and 7).

The widespread adoption of an international standard has brought significant harmonisation, but not complete uniformity. Within the terms of the standard, a certification body has options to choose the sectors in which it offers certification and to set its own questions and practical examinations. It also chooses the languages in which it provides examinations. Additionally, it has the responsibility to decide when to accept certification by other personnel certification bodies (PCBs) as equivalent to or as a stepping-stone towards its own.

ICNDT Working Group 1 'Qualification and Certification' seeks to further protect and improve harmonisation by publishing reports and guidance. These include:

- Advice on the interpretation of ISO 9712:2012 and informed discussion during the revision of the standard. This report is available on the ICNDT website at: <https://bit.ly/3NXYUV7>
- 'ICNDT Recommendations for the operations of Certification Bodies during the COVID-19 pandemic in compliance with ISO/IEC 17024:2012 and ISO 9712:2012'. See: www.icndt.org/ICNDT%20Recommendations.pdf
- 'ICNDT Guide to Good Practice – Fraudulent Management by Personnel Certification Bodies' to reduce the risk for certification bodies in delivering the ISO 9712 personnel certification and to prevent any violations from ISO/IEC 17024:2012 (in progress).
- Tasks dealing with practical examinations and the functions and responsibilities of certification bodies, authorised qualification bodies and examination centres (in progress).
- A report on the interpretation of ISO 9712:2021, which will be available on the ICNDT website (in progress).

ICNDT promotes international recognition of third-party certification schemes through a global MRA and details are given in Appendix 7. In many countries around the world, certification bodies that provide ISO 9712 certification have gained accreditation or approval by government agencies or accreditation bodies to ISO 17024^[5] in both voluntary and regulatory sectors. This is discussed in Chapter 4.

Other approaches to NDT personnel certification are covered by EN 4179^[6] (for aerospace certification) and SNT-TC-1A^[7] (for in-company certification). In certain circumstances it may be necessary or desirable, for economic or safety reasons, to qualify NDT personnel for specified limited applications and standards covering this are described in Appendix 8.certification.

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 ISO 9712^[1] by a certification body accredited to ISO/IEC 17024^[5]. Certification bodies registered under the ICNDT MRA will meet this requirement. Such bodies will have demonstrated independent evidence of accreditation to ISO/IEC 17024 and compliance with ISO 9712, either through a national or international accreditation body or by a conformity assessment carried out by ICNDT (see Appendix 7).

Regulators, users and auditors of NDT operations should insist that employers of NDT personnel properly fulfil 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 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^[8].

National NDT societies seeking to establish their own national certification schemes are recommended to consider seeking cooperation with an existing personnel certification body as an alternative or complementary approach. This does not preclude setting up a local PCB.

NDT societies or PCBs that are operating outside of their own home country are encouraged to cooperate closely with the national NDT society where they wish to operate. In practice, this should be achieved by means of a signed agreement between the parties. When there is a disagreement, the matter should be referred to ICNDT for mediation.

Guidance for developing countries seeking to establish national certification schemes is provided in Appendix 9.

Recommendations to national standards bodies

In adopting the international standard 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. Significant deviations, although permitted under ISO Guide 21^[9], could result in a refusal to recognise or accept NDT personnel certification.

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*). The employer retains these responsibilities whether they use third-party certification, in-company certification or a combination of both.

This section of the ICNDT Guide clarifies the employer's responsibilities and gives guidance on how the employer should fulfil them. In this context, the employer (or responsible agency) is defined as "The legal entity by whom the candidate is employed". If the individual is self-employed, they 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 their staff to work. In practice, this should include checking that the NDT tasks to be carried out are within the scope of the individual's certification (sector, method, level and their recent experience) and, if they are not, organising additional company job-specific training and/or examinations (see Figure 1). In some countries, the central third-party certification may be supplemented by industry sector-specific training and examinations (sometimes called 'trade tests') to fill this gap. In some industries, specific job task analysis may be carried out to determine exactly what job-specific training and/or examinations are appropriate.

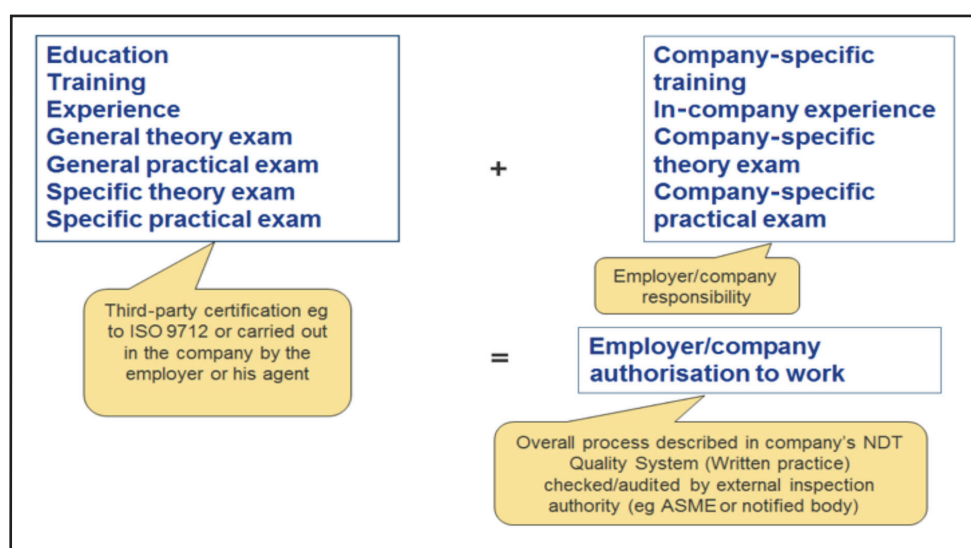


Figure 1. Elements of personnel certification

*See, for example, SNT-TC-1A^[7] published by ASNT.

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 their 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. This is strongly advised, for example, in the World Nuclear Association report 'Certification of NDE Personnel'^[10], which recommends use of ISO 9712 certification in the context of a company's quality procedure for NDT.

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 their NDT personnel, including:
 - training;
 - education;
 - work experience;
 - vision test results;
 - certification examination results.

The results may be recorded using a suitable checklist – see, for example, Figure 2 (page 8).

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 – see, for example, Figure 3.

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

ISO 9712:2021^[1] is the latest internationally-recognised and widely-accepted standard for qualification and third-party certification of NDT personnel, replacing earlier versions and EN 473.

An important clause in ISO 9712:2012 facilitated transition from the earlier standards to the 2012 one. Certification achieved under either EN 473 or ISO 9712:2005 was considered to comply with the 2012 standard, until the next renewal or recertification is due. Certification to the new standard was to be considered compliant with the old standards when these are specified.

A new renewal process is one of the key updates of ISO 9712:2021. It is based on either successful completion of a practical examination element or successfully meeting the requirements of the structured credit system. For details see clause 10 of ISO 9712:2021. Certification achieved under ISO 9712:2012 is considered to comply with ISO 9712:2021 until the next renewal or recertification is due. As soon as a certification body upgrades their accreditation to ISO 9712:2021 the renewal, recertification and extension to scope shall be carried out according to its new provisions of ISO 9712:2021.

General requirements for personnel certification bodies

Clause 5.2.1 of ISO 9712:2021 maintains the requirement that the certification body shall fulfil the requirements of ISO/IEC 17024^[5]. A PCB in compliance with ISO/IEC 17024 should be impartial in its decisions on certification and should ensure that assessments leading to certification are fair, valid and reliable.

Quality management system

ISO/IEC 17024 requires a quality management system (QMS) 'that is capable of supporting and demonstrating the consistent achievement of the requirements of this international standard' (clause 10.1 of ISO/IEC 17024:2012). The standard states that an ISO 9001-compliant management system would fulfil the requirement.

Accreditation

Accreditation is third-party attestation related to a conformity assessment body conveying a formal demonstration of its competence to carry out specific conformity assessment tasks. Accreditation is performed by an accreditation body that is an authoritative body. Requirements for accreditation bodies are detailed in ISO/IEC 17011:2017 (Conformity assessment – Requirements for accreditation bodies accrediting conformity assessment bodies).

The accreditation process is intended to increase the confidence of users of certification in the status of a certification body. Accreditation reduces the risk for users of certification by ensuring that accredited certification bodies and appropriate bodies conducting outsourced work, for example qualification bodies, examination centres, etc, are competent to carry out the work they undertake within the scope of accreditation.

Accreditation of personnel certification bodies is performed against ISO/IEC 17024. The latest edition of ISO/IEC 17024 was published in July 2012 and all accreditations are now against this version. Major changes to the 2012 version were:

- New terms were added;
- The section for personnel became more detailed;
- The section for management of impartiality became more detailed;
- A new section with more information about the structure of the certification body in relation to training was added;
- More detail was added for records and information requirements;
- There was a more detailed description of certification schemes;
- There was more detail provided for the certification process requirements;
- New sections were added for appeals, complaints and management systems requirements;
- A 'principles' section was added in Annex A.

There is an International Accreditation Forum (IAF), which is a worldwide association of accreditation bodies and other bodies interested in conformity assessment including in the field of personnel certification. There are six regional groupings of accreditation bodies, whose aims include the maintenance of regional multilateral recognition agreements, recognising the equivalence of their members' accreditations: the African Accreditation Cooperation (AFRAC), the Inter American Accreditation Cooperation (IAAC), the Asia Pacific Accreditation Cooperation Incorporated (APAC), the Arab Accreditation Cooperation (ARAC), the European co-operation for Accreditation (EA) and the Southern African Development Community Cooperation in Accreditation (SADCA).

There is an IAF multilateral recognition arrangement (MLA) (see: <https://iaf.nu/en/about-iaf-mla>), the purpose of which is to ensure mutual recognition of accredited certification between signatories to the MLA and, subsequently, acceptance of accredited certification in many markets based on one accreditation. Accreditation body and regional accreditation group members of the IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, for example accreditation to ISO/IEC 17024 under the scope of ISO 9712.

ICNDT multilateral recognition agreement

Against the above background, ICNDT has created its own multilateral recognition agreement with criteria and processes that take advantage of and complement accreditation.

At the time of publication, 47 NDT societies have signed up to promote the recognition of 21 PCBs that have gained and maintain registration with ICNDT. More detail is given in Appendix 7.

5. Bibliography

This section lists all of the documents referred to in the main text and the appendices. It provides a list of the latest editions (at the time of writing) of standards dealing with or impacting upon the qualification and certification of personnel engaged in NDT.

1. ISO 9712:2021 Non-destructive testing – Qualification and certification of NDT personnel
2. ISO 9001:2015 Quality management systems – Requirements
3. 2014/68/EU Pressure Equipment Directive (PED) – overview online at: <http://bit.ly/22fcq67>
4. ANSI/ASNT CP-106-2008 Non-destructive testing – Qualification and certification of personnel
5. ISO/IEC 17024:2012 Conformity assessment – General requirements for bodies operating certification of persons
6. EN 4179:2021 Aerospace series – Qualification and approval of personnel for non-destructive testing
7. SNT-TC-1A (2020) ASNT Recommended Practice for Personnel Qualification and Certification in Non-Destructive Testing (due for update in 2024)
8. ISO/TR 25107:2019 Non-destructive testing – Guideline for NDT training syllabuses
9. ISO/IEC Guide 21-1:2005 Regional or national adoption of international standards and other international deliverables – Part 1: adoption of international standards
10. WNA Report 2014/003 Certification of NDE Personnel, World Nuclear Association, CORDEL Codes & Standards Task Force, October 2014
11. ISO 20807:2004 Non-destructive testing – Qualification of personnel for limited application of non-destructive testing
12. ISO/TS 11774:2011 Non-destructive testing – Performance-based qualification
13. ASNT CP-189-2020 ASNT Standard for Qualification and Certification of Non-Destructive Testing Personnel
14. CEN/TR 15589:2014 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

It should be noted that the above list is not exhaustive. The status of the referenced documents should be ascertained by reference to the issuing organisation before use.

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

Introduction

This appendix highlights the role of ICNDT members and regional groups with respect to qualification and certification of NDT personnel and summarises the 60+ 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/TC 135 on the harmonisation of standards and provides some details concerning ongoing work.

Foundation of ICNDT

The first World Conference on Non-Destructive Testing (WCNDT) 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 to 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 to 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 Conference on NDT 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 the 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 (PCBs).

World Conference on NDT

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

A list of all world conferences, including planned venues up to 2028, is given at the end of this appendix.

Besides the need to establish, improve and disseminate NDT techniques, the need for harmonisation of qualification and certification of NDT personnel has grown over 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 significant 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, Canada, 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 the World Conference on NDT**

The 1967 discussions had a strong impact on ICNDT. Three years later, at the 6th World Conference on NDT held in Hanover, Germany, 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**

During its 10th meeting, taking place in Warsaw, Poland, in 1973, ICNDT 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, France, during the 8th World Conference on NDT in 1976.. 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/TC 135.

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

In 1979, during the 9th World Conference on NDT held in Melbourne, Australia, a further step forward was made on the topic of the qualification and certification of NDT personnel. 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, Russia, during 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, during the 11th World Conference on NDT held in Las Vegas, Nevada, USA, the following 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/TC 135 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/TC 135 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**

During the 25th ICNDT meeting, held in Copenhagen, Denmark, in 1998, 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 Policy and General Purposes (PGP) Committee meeting, held in Shantou, China, to organise the first ICNDT seminar on ISO 9712 certification during the world conference in Rome, Italy.

- **Rome 2000 – Update to ICNDT WH-85**

During the 27th ICNDT meeting, held in Rome, Italy, a complete revision of the ICNDT WH-85 document relative to minimum technical requirements was handed directly to the ISO/TC 135 Chair. 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, Australia, recognising that an increasing number of schemes are aligned to ISO 9712 (including EN 473, ACCP, etc), it was proposed to draft the 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 to 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/TC 135 and CEN/TC 138 to explore the differences between the EN 473 and ISO 9712 standards. 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 TC 135.

- **Durban 2012 – Update to guide in anticipation of ISO 9712:2012**

An updated version of the guide was issued, recognising that the process to combine ISO 9712 and EN 473 into a single global standard was well underway. The ICNDT General Assembly gave conditional approval for the introduction of an ICNDT multilateral recognition agreement and an ICNDT assessment scheme for PCBs (ICNDT PCBA). The first ICNDT Certification Executive Committee (ICEC) was nominated.

- **Munich 2016 – Update to guide taking account of ISO 9712:2012**

An updated version of the guide was issued, incorporating details of the ICNDT MRA and PCBA and appendices relating to the use of ISO 9712 in the context of ASME requirements and the European Pressure Equipment Directive. 18 certification bodies were listed as providing personnel certification to ISO 9712. 11 of these were registered by ICNDT under the ICNDT MRA and 38 members of ICNDT had signed the recognition agreement.

- **2016 to 2021 – Review of ISO 9712:2012 and publication of ISO 9712:2021**

Through its Working Group (WG1) and participation in ISO/TC 135/SC 7 as a liaison member, ICNDT played an important role in the implementation and subsequent revision of the standard. WG1 prepared a report on the implementation of the 2012 version and, during the 8th International Certification Conference in 2017, collected views on the need for revision.

Note: the 20th WCNDT, which was planned to be held in Seoul, South Korea, in 2020, was postponed due to the COVID-19 pandemic.

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 ICNDT, a link to the international NDT community. Around 70 countries have established NDT societies that are members of ICNDT (see Appendix 3) 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:

- African Federation of Non-Destructive Testing (AFNDT)
- Asia-Pacific Federation for Non-Destructive Testing (APFNDT) – www.apfndt.org
- European Federation for NDT Non-Destructive Testing (EFNDT) – www.efndt.org
- Pan-American Federation for Nondestructive Testing (PANNDT) – www.panndt.org

Each regional group has its own constitution that, in terms of both strategy and policy, is complementary to that of ICNDT. In 2016, the ICNDT Constitution and Operating Procedures were modified to integrate the regions more fully into the governance of ICNDT, the promotion of membership and the collection of fees. Regional conferences play an important role in the development and promotion of NDT.

IAEA/ICNDT cooperation

In order to promote 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/ISO cooperation

ICNDT has supported ISO since 1967 and in 2008 was approved as a liaison member of ISO/TC 135 and its subcommittee 7.

ICNDT status

ICNDT was formally registered as a legal non-profit international association in Vienna, Austria, 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 newsletter, known as the *ICNDT Journal*.

World Conferences on NDT (promoted by ICNDT)

<i>Conference Number</i>	<i>Year</i>	<i>City</i>	<i>Country</i>
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	Netherlands
13th WCNDT	1992	São 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
19th WCNDT	2016	Munich	Germany
20th WCNDT	2024	Seoul	South Korea
21st WCNDT	2028	Buenos Aires	Argentina

Appendix 2: Qualification and certification of NDT personnel in accordance with ISO 9712 – historical perspective

Two ‘major’ third-party certification systems, EN 473 and ISO 9712, coexisted for several years. Following several initiatives from industry and ICNDT, in 2009 the two certification committees in charge of these standards (ISO/TC 135 and CEN/TC 138) decided to launch a harmonisation process intending to produce a unique ISO standard. This process involved more than 20 countries and succeeded in producing ISO 9712:2012^[1], which was published in the third quarter of 2012 and replaced EN 473.

2012 version

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 (CB), 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 the administration of certification, including the conditions for renewal and recertification.

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

- 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^[8] 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);
- the introduction of ‘digital certificates/e-assessment’;
- 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).

The new standard was implemented widely (see Appendix 6). ICNDT carried out an exercise to document how different PCBs had implemented the standard where options are allowed. This is now out of date.

2021 version

ISO 9712:2021 is the fifth edition of this standard. It technically cancels and replaces the fourth edition, ISO 9712:2012.

The standard has evolved in terms of recognising the importance of conformity assessment, in particular, impartiality. ISO/CASCO, which is the ISO committee that works on issues relating to conformity assessment, has defined requirements to align ISO 9712 with ISO/IEC 17024 (Conformity assessment - General requirements for bodies operating certification of persons). As a result, there have been a number of refinements to the requirements for the certification body and conditions of certification. The changes are not likely to be significant for CBs already accredited to ISO/IEC 17024. Requirements have been included for certification bodies accepting certificates issued by other certification bodies.

Notable changes are:

- **Clause 3 – Terms and definitions**

Terms and definitions have been expanded and new terminology included to cover new requirements.

- **Clause 5.5 – Employer**

Users of this standard should be aware of the employer requirements and understand the changes that have been introduced. The standard now mandates that the employer's responsibilities are described in a documented procedure (this was only a recommendation in the fourth edition of BS ISO 9712). If the employer does not meet these mandated responsibilities, they should consider whether what they are offering is compliant ISO 9712 certification and that there could be legal/contractual implications if this is not the case.

- **Clause 7.2 – Training**

NDT training is now counted in days, not hours, with some changes in the required durations. The standard now allows the CB to accept alternative methods of theoretical training, including face-to-face instructor-led, distance learning and self-paced. On the other hand, the practical training must still be delivered in a face-to-face instructor-led format. The standard now prescribes a time limit for the validity of training for initial certification, which is a maximum of ten years from the date of completion. This limit has not been applied in previous editions.

- **Clause 7.3 – Industrial experience**

Industrial experience is now counted in days, not months, and the amount required has reduced. The use of a structured experience programme (SEP) has been introduced. This is a programme approved by the certification body to reduce the time required to gain industrial experience. Industrial experience may now be confirmed by a suitable referee or by the employer, as before.

- **Clause 7.4 – Vision requirements**

Vision requirements have been expanded and are now in accordance with BS ISO 18490.

- **Clause 8 – Examinations**

The changes are unlikely to be significant to CBs already accredited to BS ISO 17024. Clause 8.1.1 has been expanded to cover the process for development, preparation, confidentiality and security (this is not an exhaustive list) of examination questions and the overall examination process. The clause now refers to the examination parts as 'elements' and has separated the NDT instruction writing from the practical element. This means that an individual who fails the NDT instruction writing element of the examination need only retest the NDT instruction writing element, rather than the practical and instruction writing.

- **Clause 9.3 – Conditions of certification**

The sub-clauses of this section have been added and/or expanded to give the user of this standard an idea of conformity assessment requirements used and implemented by CBs. Options for validity of an extension to existing certification have been defined in 9.3.3 so that the CB may add the additional scope to an existing certificate with the original period of validity or the certificate could be issued separately with a new period of validity.

- **Clause 10 – Renewal**

There is now a structured credit system for the renewal of Levels 1, 2 and 3 and for Level 3 recertification. The renewal criteria for Levels 1 and 2 include the possibility of a practical exam as an alternative.

- **Annexes**

- Annex A (normative): Product sectors now include composite materials.
- Annex B (normative): Table covering minimum number and type of specimens has been replaced by requirements.
- Annex C (normative): Structured credit system has been expanded to cover Levels 1 and 2. The changes will affect certificate holders (and their employers' procedures) and certification bodies. For the certification bodies these changes may be significant.

- Annex D (normative): Aligned with the introduction of exam 'elements' and NDT instruction writing.
- Annex F (informative): Introduction of training requirements for techniques.
- Annex G (informative): Introduction of psychometric principles.
- Annex ZA (informative): Updated to align with the essential requirements of EU Directive 2014/68/EU (see also Appendix 5A).

Appendix 3: ICNDT membership directory

The following list shows all ICNDT members at the time of writing, with their ICNDT membership status (Full or Associate). For an up-to-date list of ICNDT member societies and contact details, go to: www.icndt.org/ICNDT-Membership/Membership-Directory

Full members

Country	Society	Website
Algeria	Centre de Recherche Scientifique et Technique en Soudage en Controle/Federation (CSC/FALEND)	
Argentina	Asociación Argentina de Ensayos No Destructivos y Estructurales (AAENDE)	www.aaende.org.ar
Australia	Australian Institute for NDT (AINDT)	www.aindt.com.au
Austria	Austrian Society for NDT (ÖGfZP)	www.oegfzp.at
Bangladesh	Bangladesh Society for NDT (BSNDT)	bsndt1990@gmail.com
Belarus	Belarusian Association for NDT and Technical Diagnostics (BANDT)	http://bandt.basnet.by
Belgium	Belgian Association for NDT (BANT)	http://bant.be
Bolivia	Asociación Boliviana de Soldadura, Ensayos No Destructivos, Inspección y Corrosión (ASBOSENDIC)	
Bosnia & Herzegovina	Bosnian and Herzegovinan Society for NDT	
Brazil	Associação Brasileira de Ensaios Não Destrutivos e Inspeção (ABENDI)	www.abendi.org.br
Bulgaria	Bulgarian Association for Non-Destructive Testing (BGSNDT)	www.bg-s-ndt.org
Canada	Canadian Institute for Non-Destructive Evaluation (CINDE)	www.cinde.ca
China, People's Republic of	Chinese Society for Non-Destructive Testing (ChSNDT)	www.chsndt.com
Chinese Taiwan	Non-Destructive Testing Society of China-Taipei (SNTCT)	www.sntct.org.tw
Colombia	Asociación Colombiana de Soldadura y Ensayos No Destructivos (ACOSEND)	www.acosend.org
Croatia	Croatian Society for Non-Destructive Testing (CrSNDT)	www.hdkbr.hr
Czech Republic	Czech Society for Non-Destructive Testing (CNDT)	www.cndt.cz
Denmark	Danish Society for NDT	www.dslsvejs.dk
Egypt	Egyptian Society for Industrial Inspection	www.egyptiansndt.org
Finland	Finnish NDT Society	
France	French NDT Organisation (COFREND)	www.cofrend.com
Germany	German Society for Non-Destructive Testing (DGZfP)	www.dgzfp.de
Greece	Hellenic Society of Non-Destructive Testing (HSNT)	www.hsnt.gr
Hungary	Hungarian Association for Non-Destructive Testing (MAROVISZ)	www.marovisz.hu
India	Indian Society for Non-Destructive Testing (ISNT)	www.isnt.org.in
Indonesia	Asosiasi Uji Tak Rusak Indonesia (AUTRI)	www.autri.org
Iran	Iranian Society for Nondestructive Testing (IRNDT)	en.irndt.org
Israel	Israeli National Society for Non-Destructive Testing (ISRANDT)	www.israndt.org
Italy	Italian Society for NDT (AIPnD)	www.aipnd.it

Japan	Japanese Society for Non-Destructive Inspection (JSNDI)	www.jsndi.jp
Kazakhstan	Kazakhstan Association of Non-Destructive Testing and Technical Diagnostics (KANDTTD)	
Kenya	Non-Destructive Testing Society of Kenya (NDTK)	engjk@ndtk.co.ke
Korea, South	Korean Society for Non-Destructive Testing (KSNT)	www.ksnt.or.kr
Latvia	Latvian NDT Society	
Lebanon	Industrial Research Institute (IRI)	www.iri.org.lb
Lithuania	Lithuanian Society for NDT and Technical Diagnostics (LNBD)	www.lnbd.lt
Malaysia	Malaysian Society of NDT (MSNT)	www.msnt.org.my
Mexico	Instituto Mexicano De Ensayos No Destructivos AC (IMENDE)	www.imende.com
Netherlands	Nederlandse Vereniging voor Kwaliteitstoezicht, Inspectie en Niet-destructieve Techniek (KINT)	www.kint.nl
New Zealand	New Zealand Non-Destructive Testing Association Inc (NZNDTA)	www.ndta.org.nz
Nigeria	Institute of Non-Destructive Testing Nigeria (INDTN)	www.indtn.org
Norway	Norwegian NDT Society (NSNDT)	www.ndt.no
Philippines	Philippine Society for Non-Destructive Testing Inc (PSNDT)	www.psnt-ndt.org
Poland	Polish Society for NDT and Technical Diagnostics (PTBNIDT/SIMP)	www.ptbnidt.pl
Portugal	Associacao de Laboratorios Acreditados de Portugal (RELACRE)	www.relacre.pt
Romania	Romanian Association of NDT (ARoEND)	www.aroend.ro
Russian Federation	Russian Society for NDT and Technical Diagnostics (RSNTTD)	www.ronktd.ru
Serbia	Serbian Society for NDT (SDIBR)	
Singapore	Non-Destructive Testing Society (Singapore) (NDTSS)	www.ndtss.org.sg
Slovakia	Slovak Society for Non-Destructive Testing (SSNDT)	www.ssndt.sk
Slovenia	Slovenian Society for Non-Destructive Testing (SSNDT)	
South Africa	Southern African Institute for NDT (SAINT)	www.saint.org.za
Spain	Spanish Association for NDT (AEND)	www.aend.org
Sudan	Sudanese Society for Non-Destructive Testing (SSNDT)	
Sweden	Föreningen för Oförstörande Provning (FOP)	www.ndtsweden.com
Switzerland	Schweizerische Gesellschaft für Zerstörungsfreie Prüfung (SGZ/SSNT)	www.sgzp.ch
Tunisia	Tunisian Committee for NDT c/o CETIME (COTEND)	www.cetime.ind.tn
Turkey	The Turkish Society for Non-Destructive Testing (TURK NDT)	www.turkndt.org
Ukraine	Ukrainian Society for NDT (USNDT)	www.usndt.com.ua
United Kingdom	The British Institute of Non-Destructive Testing (BINDT)	www.bindt.org
United States of America	The American Society for Nondestructive Testing (ASNT)	www.asnt.org
Uruguay	Asociación Uruguaya de Ensayos No Destructivos (AENDUR)	
Uzbekistan	Uzbekistan Society for Non-Destructive Testing (UzSNDT)	

Associate members

Country	Society	Website
Mexico	Mexican Association of NDT (AMEXENDE)	
South Africa	Southern African Institute of Welding (SAIW)	www.saiw.co.za

Potential members

Country	Society	Website
Chile	ACHISEND	
Costa Rica	National Committee for NDT	
Dominican Republic	CONENCA	
Ecuador	ASENDEC	
Mongolia	Mongolian Society for NDT (MSNDT)	
Pakistan	Pakistan Society for NDT (PASNT)	www.ncndt.org.pk
Sri Lanka	Society for Non-Destructive Testing, Sri Lanka (SNDT)	
Thailand	Thai Society for NDT (TSNT)	
Venezuela	Asociacion Venezolana de Ensayos No Destructivos (ASOVEND)	
Vietnam	Vietnam Association for NDT (VANDT)	

Appendix 4: ASME position on acceptance of central certification programmes – ICNDT perspectives

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code includes specific requirements for non-destructive evaluation (NDE) and for the qualification or certification of NDE personnel in its various sections, including both Section V 'NDE' and the various 'Product' sections. This ASME code is used all around the world, including in regions where compliance with other regulations is facilitated by using third-party certification (for example in Europe for the Pressure Equipment Directive) and in countries where third-party certification is mandatory.

ASME, specifically Section V, has tightened the qualification requirements for NDE personnel over the past few years. ASME Section V, Article 1, para T-120 specifies requirements for the qualification of NDE personnel. The current wording for the 2021 edition is shown below. Article 1 ('Power Boilers') also refers to mandatory appendices for use of ASNT TC-1A and ASNT CP-189, which will be phased out in the 2023 to 2025 editions, adopting those respective documents in whole.

Additionally, ASME Section VIII 'Nuclear', Divisions 1 and 2 refer to Section V, paragraph T-120, as does Section I 'Power Boilers' and other sections of the code. The current wording for ASME Section V-2021, Article 1, para T-120 is reproduced in Figure 4.

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 not mandatory unless specifically referenced in whole or in part in Subsection A or as indicated in other Code Sections or referencing documents. Where there is a conflict between Subsection A and Subsection B, the requirements of Subsection A take precedence.

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

NOTE: For example, a reference to T-270 includes all of the rules contained in T-271 through T-277.3.

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

NOTE: 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. In many cases, Subsection B documents are not mandatory and are intended only for guidance or reference use.

(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 shall be in accordance with one of the following documents:

(1) SNT-TC-1A (2016 Edition),¹ Personnel Qualification and Certification in Nondestructive Testing, as amended by Mandatory Appendix III; or

(2) ANSI/ASNT CP-189 (2020 Edition),¹ ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel, as amended by Mandatory Appendix IV

(f) National or international central certification programs, such as ISO 9712-based programs, may alternatively be used to fulfill the written practice requirements of (e) for training, experience, general examination, basic examination, and method examination, as applicable.

(g) In addition to the requirements described in (e) or (f) above, if the techniques of computed radiography (CR), digital radiography (DR), phased-array ultrasonic (PAUT), ultrasonic time-of-flight diffraction (TOFD), or ultrasonic full matrix capture (FMC) are to be used, the training, experience, and examination requirements found in Article 1, Mandatory Appendix II shall also be included in the employer's written practice for each technique as applicable.

Figure 4. Article 1 Para T-120 ASME Section V, 2015 edition

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 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 NDE procedures and/or specific employer's needs (for example for the application of advanced techniques such as phased array, time-of-flight diffraction (TOFD), computed radiography (CR) and digital radiography (DR)).

Employers who desire to work to ASME codes and use third-party certification are therefore:

- required to prepare a written practice (based on the recommendations of ASNT SNT-TC-1A7 or CP18913), which references certification in accordance with third-party/central schemes that comply with ISO 9712;
- required to administer, as a minimum, a 'specific' and a 'practical' examination to augment any third-party certifications, including re-examination to be 'by examination';
- required to take specific account of ASME Section V-2021, Article 1, para T-120 clause (g) whenever the techniques of CR, DR, phased array ultrasonic testing (PAUT), TOFD or full-matrix capture (FMC) are to be used.

Appendix 5: Non-destructive testing in Europe

Appendix 5A: The European Pressure Equipment Directive (2014/68/EU)

Introduction

The Pressure Equipment Directive (PED), originally designated as 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. The regulations were subject to minor amendment (SI 2003/1267), made on 6 May 2002, and came into force on 30 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'.

The old directive, 97/23/EC, will be replaced by the new directive, 2014-68-EU. The change will implement alignment with the new legislative framework (NLF) 765/2008 and 768/2008, which aims to streamline and simplify the rules for putting pressure equipment on the market in the face of increasing competition from fraudulently certified equipment.

Article 13 of 2014/68/EU was effective 1 June 2015 and now relates to fluid classification, *ie* classification, labelling and packaging (CLP) regulations 1272-2008. The date of application of the remaining articles is from 19 July 2016.

Non-destructive testing

For pressure equipment, non-destructive testing 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 'recognised third-party organisation (RTPO)' recognised by a member state pursuant to Article 24.

ISO 9712 has been adopted without any change in Europe as EN ISO 9712 and the relationship between the Directive and ISO 9712 can only be in the context of the EN version of the standard, *ie* EN ISO 9712. This means that any use of the standard ISO 9712 for assessing compliance to the requirements of the EU Directive shall be done by reference to EN ISO 9712.

An informative Annex ZA is included in EN ISO 9712, which states: 'This European Standard has been prepared under a Commission's standardization request M/071 "Mandate to CEN for standardization in the field of Pressure equipment" to provide one voluntary means of conforming to essential requirements of Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonization of the laws of the Member States relating to the making available on the market pressure equipment'.

'Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations. Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.' Table ZA.1 shows the relationship between EN ISO 9712 and Directive 2014/68/EU by reference to specific clauses of the standard.

Certificates of competence in compliance with EN ISO 9712:2022, issued by an RTPO and covering the testing of permanent joints (in effect, welds) are presumed to satisfy the requirements of the directive because EN ISO 9712 is a harmonised standard. There are alternative acceptable methods of fulfilling the requirements of the Directive, as detailed in CEN/TR 15589^[14] (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 (now 2014/68/EU)).

Note: see Appendix 5B for information on how UK Certificate holders can qualify to work under the Pressure Equipment Directive and for information on how EU certificate holders are now qualified to work under the UK Pressure Equipment (Safety) Regulations (UK PESR).

Appendix 5B: The UK Pressure Equipment (Safety) Regulations (UK PESR)

The withdrawal of the UK from the European Union (EU) (frequently referred to as Brexit) has created issues for UK NDT certificate holders (for example PCN or CSWIP) wishing to work under the EU Pressure Equipment Directive and for holders of other NDT certification wishing to work under the new UK Pressure Equipment (Safety) Regulations. In both cases, an ISO 9712 certificate in a relevant method/sector is an important stepping stone towards approval to work under the regulations.

In 2016, the UK government introduced the UK Pressure Equipment (Safety) Regulations, thereby implementing Directive 2014/68/EU on pressure equipment and assemblies (the EU PED). The British Institute of Non-Destructive Testing (BINDT) became an RTPO accredited by the United Kingdom Accreditation Service (UKAS). The scope of the appointment was for the approval of personnel to carry out non-destructive tests on permanent joints for pressure equipment in categories III and IV in accordance with section 22 of Schedule 2 to the 2016 regulations. These regulations are referenced in the more recent UK (post-Brexit) Pressure Systems Safety Regulations 2000 (PSSR), which cover the safe design and use of pressure systems.

How can NDT personnel with PCN certification work under the UK PESR?

BINDT is an RTPO accredited by UKAS, under the UK Pressure Equipment (Safety) Regulations 2016. The scope of the appointment is for the approval of personnel to carry out non-destructive tests on permanent joints for pressure equipment in categories III and IV in accordance with section 22 of Schedule 2 to the 2016 regulations. All PCN certification valid for the welding and pre-service and in-service inspection sectors satisfies the Pressure Equipment (Safety) Regulations 2016: Guidance (GB).

How can NDT personnel with certificates issued by an EU RTPO work under the UK PESR?

There have been a number of interim arrangements (which BINDT can advise on) but following a UK government announcement in August 2023 (see: <https://www.gov.uk/government/news/uk-government-announces-extension-of-ce-mark-recognition-for-businesses>) and the completion of the parliamentary process, certificates issued by an EU RTPO are valid against the UK PESR and this will remain the case in future (so long as the certificates are valid). Please refer to BINDT for information on this subject as changes are still being made to the requirements.

How can NDT personnel with UK PCN or CSWIP NDT certificates work under the EU PED?

Prior to the UK's withdrawal from the EU, BINDT (PCN) and TWI CL (CSWIP) were RTPOs for the EU Pressure Equipment Directive (2014/68/EU) (PED), which enabled them to offer certification in compliance with the EU PED. These arrangements ended with Brexit, so those who gained PCN or CSWIP certification post 1 January 2021 are not automatically in compliance with the EU PED and any pressure equipment or assemblies are not eligible to be placed on the EU market. This means that individuals who wish to comply with the EU PED and meet EU requirements for placing pressure equipment or assemblies on the EU market must gain the relevant certification from an EU RTPO before they can proceed. In this respect:

- BINDT has received an appointment from CASL (an LRQA company), formerly WQ-iC Ltd, an RTPO and notified body (NoBo No 2893) based in Dublin, Ireland.
- BINDT has implemented a robust certification process with an EU27 RTPO (CASL) for the certification of NDT personnel. This process is fully compliant with CEN/TR 15589 route B requirements and allows BINDT/PCN to issue certification that is acceptable under the European Pressure Equipment Directive 2014/68/EU, Annex 1 § 3.1.3.
- In addition, certificates issued before January 2021, and listed on the PCN verification page, also remain valid under the PED.
- TWI CL is working with multiple EU RTPOs to secure a mutual recognition agreement.

Appendix 6: Directory of certification bodies

The table on the following pages summarises information from NDT societies on personnel certification bodies offering ISO 9712 certification, as known at the time of writing. The table will be updated as further information becomes available and the latest version can be found on the ICNDT website.

The PCBs marked in grey are those registered with ICNDT Schedule 2.

Certification body	Scheme	Management system	Certification standard(s)	Accreditation status	Methods covered	No of certifications		Commencement of certification
						People	Method	
ASNT Certification Services, LLC	ASNT NDT Level III	ISO 17024	Recommended Practice SNT-TC-1A	ANAB (only in MT, PT, RT, UT and ET)	MT, PT, RT, UT, VT, ET, AE, LM, LT, NR, IR	8833	26,876	03/1977
	ASNT NDT Level II	ISO 17024	Recommended Practice SNT-TC-1A	In process by ANAB	MT, PT, RT, UT, VT	113	160	10/2013
	ACCP Level II	ISO 17024	ANSI/ASNT CP-106 (US adoption of ISO 9712)	Pending 2016 revision of CP-105	MT, PT, RT, UT, VT	1933	2202	1997
	ACCP Level III	ISO 17024	ANSI/ASNT CP-106 (US adoption of ISO 9712)	Pending 2016 revision of CP-106	MT, PT, RT, UT, VT	296	833	1997
	IRRSP	ISO 17024	10 CFR 34 Appendix A SSR CR Part E	ANSI	Radiation Safety Certification	2675	2696	1998
	ISQ	ISO 17024	ASNT-9712	Pending	MT, PT, RT, UT, VT	None yet	None yet	06/2023
Australian Institute for NDT	NDT and CM AINDT	ISO/IEC 17024:2012	ISO 9712, ISO 20807:2004, PED, ISO 18436	JAS-ANZ	MT, PT, ET, RT, UT, VT, PAUT, TOFD, CR/DR	2366	6365	ISO 17024 and ISO 9712 through JAS-ANZ in 2002
Argentina	IRAM	ISO/IEC 17024:2012	EN ISO 9712	OAA	ET, LT, MT, PT, RT, UT, VT	1302	2132	2006
Austrian Society for NDT	ÖGfZP	ISO 17024:2012	EN 473, ISO 9712, PED	BEN ISO/IEC 17024:2012 and EN ISO 9712:2022 by BMAW	UT (including PAUT and TOFD), RT-F, RT-FDI, MT, PT, VT, ET, LT, TT, TT, AT	4135	8985 (2022)	02/1996
Brazilian Society for NDT	SNQC	ISO 17024	ISO 9712, ISO 11484	INMETRO	UT, PT, MT, VT, RT, AT, TOFD, PA, ET, TT, LT	11,370	18,076	03/1993
British Institute of NDT	PCN	ISO/IEC 17024:2012	BS EN ISO 9712:2012, ISO 18436, ISO 20807:2004, ISO 10256, ISO 11484, EN 4179	UKAS	ET, MT, PT, UT, RT, TOFD, PAUT, ACFM, VT, CRT, Rail, VA, AE, IRT, LA, US	22,154	50,474	1985
Bulgarian Society for NDT	BG S NDT	ISO/IEC 17024:2012	EN ISO 9712, EN 4179	BAS	No current data	No current data	No current data	04/10/2001

Certification body	Scheme	Management system	Certification standard(s)	Accreditation status	Methods covered	No of certifications		Commencement of certification
						People	Method	
NR Can National NDT Certification Body Canada	Canadian General Standards Board (CGSB)- NRCan	ISO 9001:2015	ISO 9712-CAN/ CGSB 48.9712 (identical adoption)	ISO 17024 for ISO 971- CAN/CGSB 48.9712 [via IAS - IAF member] and ISO 9001 for QMS [via CGSB]	PT, MT, ET, UT, RT	6533	15,568	1960 (Junior/Senior) 1979 (Three levels)
Czech Republic	TUV Nord Czech	ISO 17024	ISO 9712	TUV Nord Valid	AE, ET, LT, RT, UT, MT, PT, VT	2393	7338	2011
The Chinese Society for NDT	ChSNDT	ISO 9712	GB9445 (identical with ISO 9712), ISO 9712	ICNDT PCBA recognition to ISO 9712	UT, RT, MT, PT, VT, ET	77,807	132,804	1978
Chinese Taiwan (SNTCT)	SNTCT- CQ-001	ISO 17024:2012	ISO 9712:2012, CNS 13588, SNTCT-CQ-001	TAFTW	PT, VT, MT, RT, LT, ET and UT (PAUT and TOFD)	1253	2250	2012
France	COFREND	ISO/IEC 17024:2012	EN ISO 9712:2012	COFRAC	AT, ET, LT, MT, PT, RT, UT, VT, TOFD, UT PA	12,082	21,352	1979
FINLAND Inspecta Sertifiointi	Nortest	ISO 17024	ISO 9712	FINAS	MT, PT, ET, RT, UT, VT	891	2353	2005
Germany	DPZ c/o DGZfP	ISO/IEC 17024:2012	EN ISO 9712:2021	DAkS, ZLS	AT, ET, LT, MT, PT, RT (RT CT, RT D, RT F, RT S, RT FI, RT FDI), TT, UT (incl. TOFD, PA), VT	17,017	37,986	TBA
Germany	GSectorCert SMV02 (ISO 9712)	ISO/IEC 17024:2012	EN ISO 9712:2021	DAkS, ZLS	ET, LT, MT, PT, RT, TT, UT, VT	9363	15,833	1993
Hellenic Society of NDT	HSNT	ISO/IEC 17024:2012	EN ISO 9712:2012	ESYD	MT, PT, UT, RT, RI, VT	314	591	2005
India	ICN	ISO/IEC 17024:2012	EN ISO 9712:2012	NABCB	MT, PT, UT, RT and VT (Weld sector)	5	8	2022
Italy	CICPND AIPnD	ISO/IEC 17024:2012	ISO 9712, PED, UNI PdR56, Guidelines ANSFISA	ACCREDIA	MT, MT-FL, PT, VT, UT, RT-FD, RT-CT, RT-S, RT-IDE, TT, AT, ST, ET, LT- P/TG, TOFD, PA	4650	9515	1978
The Japanese Society for NDI	JSNDI	ISO 17024	JIS Z 2305 (ISO 9712 MOD)	No	ET, LT, MT, PT, RT, ST, UT, TT	45,715	86,478	1968, ISO 9712 from 2003

Certification body	Scheme	Management system	Certification standard(s)	Accreditation status	Methods covered	No of certifications		Commencement of certification
						People	Method	
Korean Society for NDT	KPCN	ISO 17024	ISO 9712	KAB	RT, UT, MT, PT, VT, ET, PAUT	274	393	2014
Malaysia	DSD SPKM- (NDT)	ISO 17024	ISO 9712	Standards Malaysia	RT, UT, MT, PT, ET	No current data	No current data	2012
Mexico	IMENDE	ISO 17024	ISO 9712 NMX-B-482	EMA	VT, PT, MT, UT, RT, LT	522	1753	2016
Poland	CERT-3/ PR/01, CERT-3/ PR/03	ISO 17024:2012	ISO 9712:2012	PCA	MT, MTR, PT, RT, RTI, UT, UTT, VT	2325	3965	2002
Portugal	RELACR CERT-3/ PR/03	ISO 17024:2012	ISO 9712:2012	IPAC	PT, MT, RT, UT, VT	613	1232	2001
Romania	PL-01 V, version A	ISO 17024 2012	ISO 9712, PED	RENAR	UT, RT, ET, MT, PT, VT	742	947	1998
Russia	RTC	ISO 17024 2012	ISO 9712:2021	ICNDT	RT, UT, ET, MT, PT, LT, VT, AT	7532	12,328	1994
Singapore; NDT Singapore	SGNDT	ISO 17024	ISO 9712:2021	SAC	ET, MT, PT, UT, RT, PAUT, TOFD, VT, TBT, UTC	149	244	2017
South Africa	SAIW	ISO 17024	ISO 9712:2012	SANAS	No current data	No current data	No current data	2016
Sri Lanka National Certification Body for NDT	NCCNDT	ISO/IEC 17024:2012	ISO 9712:2012	Sri Lanka Accreditation Board	RT, MT, PT, UT, ET, VT	46	124	2011
Ukraine	UKRSRI NDT	ISO/IEC 17024:2012	ISO 9712:2012	No current data	No current data	No current data	No current data	2008
United Kingdom TWI	CSWIP	ISO/IEC 17024:2012	ISO 9712	UKAS	ET, RT, MT, PT, UT PA, TOFD, CRI, VT	3380	4918	1969

Appendix 7: ICNDT multilateral recognition agreement, PCB assessment scheme and examination question bank

Three key initiatives to aid harmonisation and recognition of personnel certification globally launched in 2013 during the NDT week in Croatia and have now been operating for almost ten years. These are:

- The ICNDT multilateral recognition agreement (MRA);
- The ICNDT personnel certification body conformity assessment (PCBA); and
- The ICNDT examination question bank (EQB).

These developments were included in the ICNDT Strategic Plan and are managed by the ICNDT Certification Executive Committee (ICEC) and the ICNDT Executive, with the strong support of the ICEC secretariat.

The ICNDT multilateral recognition agreement

Under the MRA, ICNDT members sign Schedule 1 of the agreement and agree to commit to the pursuance of the objectives of the MRA to:

- promote the recognition and acceptance of the certification issued by PCBs registered under the MRA;
- assist other interested parties by giving a clear overview of the NDT personnel certification activities in their own country;
- provide other parties with non-confidential information on the certification scheme(s) operated by PCB registered under this agreement;
- consult with and seek membership of the scheme and technical committees of NDT PCBs in their own country and indemnify ICNDT against liability for the party's use or misuse of this MRA.

Details can be found in the ICNDT Operating Procedure OP19 (see ICNDT web address below). The ICNDT MRA builds directly on the successful experience of the European Federation for Non-Destructive Testing (EFNDT) with a similar agreement since 1994.

At the time of publication, 47 ICNDT members (Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Chinese Taiwan, Colombia, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Iran, Israel, Italy, Japan, Kazakhstan, Lebanon, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Poland, Portugal, Romania, Russia, Serbia, Singapore, Slovakia, South Africa, South Korea, Spain, Sri Lanka, Switzerland, Turkey, Ukraine, United Kingdom and Uzbekistan) are signatories.

Personnel certification bodies proposed by signatories to Schedule 1 of the agreement may seek registration from ICNDT and are listed in Schedule 2. Such registration will demonstrate that the certification body meets the criteria set out in OP19, including that they have continuity of independent accreditation in conformance with ISO/IEC 17024 and ISO 9712. At the end of 2022, 21 certification bodies were registered in Schedule 2:

- Argentina, the Argentinian Institute for Standards and Certification (IRAM);
- Australia, Australian Institute for Non-Destructive Testing (AINDT);
- Brazil, Associação Brasileira de Ensaios Não Destrutivos e Inspeção (ABENDI);
- Czech Republic, Czech Association for Personnel Certification (APC);
- China, Chinese Society for Non-Destructive Testing (ChSNDT);
- Chinese Taiwan, the Society for Non-Destructive Testing and Certification (SNTCT);
- Finland, Inspecta Sertifiointi Oy;
- Germany, SECTOR Cert, Gesellschaft für Zertifizierung mbH;
- India, National Certification Board of Indian Society for Non-Destructive Testing NCB (ISNDT);
- Korea, Korean Society for Nondestructive Testing KPCN (KSNT);

- Malaysia, Malaysia Department of Skills Development, Ministry of Human Resources;
- Mexico, Mexican Institute for NDT (IMENDE);
- Poland, Urząd Dozoru Technicznego Jednostka Certyfikująca Osoby (UDT-CERT);
- Portugal, National Certification Body for Non-Destructive Testing (RELACRE);
- Russia, Testing and Diagnostics (RTC);
- Singapore, Non-Destructive Testing Society (NDTSS);
- South Africa, South African Institute of Welding Certification (SAIW);
- Sri Lanka, National Certification Body for Non-Destructive Testing (CBNDT);
- UK, British Institute of Non-Destructive Testing (BINDT);
- UK, TWI Certification Ltd (TWI);
- Ukraine, the Ukrainian Scientific Research Institute for NDT (UkrSRINDT).

Updated versions of Schedule 1 and Schedule 2 are published on the ICNDT website: www.icndt.org/ICNDT-Activities/NDT-Qualification-and-Certification

The ICNDT personnel certification body conformity assessment

ICNDT recognises that some certification bodies may find it difficult to gain accreditation, for example in cases where independent accreditation is not available or where the accreditation does not meet all of the criteria in OP19, especially in relation to compliance with ISO 9712. In these cases, the ICNDT PCBA offers a full or partial conformity assessment, carried out by assessors approved by ICNDT. Details are given in ICNDT Operating Procedure OP20 (see bit.ly/42Xf05b).

The ICNDT examination question bank

The ICNDT examination question bank will be an important platform for harmonisation. It is available in English and Spanish with improved management software. There are 7000+ selected questions at three levels (Level 1, Level 2 and Level 3) in seven methods complying with ISO/TR 25107^[8] (plus radiation safety and TOFD). The questions are classified by industrial sector and can be combined for multi-sector examinations.

What are the benefits?

- Enabling national bodies to share effort in generating suitable questions and therefore reducing the burden on each body;
- Helping harmonise standards by ensuring national bodies around the world are using a similar quality of questions;
- Enabling the generation of a higher quality of examination paper by increasing the number of questions from which those used on a particular paper can be selected;
- Helping to make examinations more rigorous by enabling participating bodies to ensure that their papers more evenly cover the required bodies of knowledge for a particular subject;
- Satisfying the EN ISO IEC requirement for fairness, validity and reliability in qualification examinations.

Who has access to the question bank?

Personnel certification bodies nominated by an ICNDT member, who have signed or committed to sign the ICNDT multilateral recognition agreement and have agreed to meet the requirement for security of the data in the examination question bank.

What methods and sectors are covered?

- Radiation safety: general;
- Materials science: multi-sector;
- Time-of-flight diffraction: welds;

- Visual testing: in-service inspection, general;
- Magnetic particle testing: in-service inspection, general;
- Penetrant testing: in-service inspection, general;
- Eddy current testing: aerospace, general, in-service inspection, tubes, welds, wrought products;
- Radiographic testing: aerospace, castings, general, in-service inspection, welds; and
- Ultrasonic testing: aerospace, castings, general, in-service inspection, welds, wrought products.

What is the application capable of?

- Generating question papers manually or automatically;
- Selection options for sector, method, level and difficulty;
- Each paper has a unique reference and is permanently archived;
- Input form for adding further questions;
- Data outputs for statistical analysis.

Other related initiatives on certification

ICNDT is continuing with other complementary actions to further strengthen the proper use of third-party certification and ISO 9712:

- Update of this ICNDT Guide – which explains how third-party certification to ISO 9712 can be properly embedded in a company system/written practice;
- Actions led by WG1 – see section 1.

Appendix 8: Qualification of NDT personnel in accordance with ISO 20807:2004 and ISO/TS 11774:2011

Introduction

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.

Two other standards address how, for limited application or safety reasons, to qualify NDT personnel for specified limited applications. These are described below.

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

International standard ISO 20807:2004^[11] 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 measurement.

Annex A to ISO 20807:2004 provides examples of syllabuses for the training and examination of personnel seeking qualification to this international standard. The methodology set out in ISO 20807:2004 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. It should be noted that ISO 9712 also provides a route for limited applications by reducing training, experience and examination requirements (see clauses 7.2b, 7.3.3.4, A.1, B.(h), C2.2 and F3.2) while complying with ISO 9712.

ISO/TS 11774:2011 (Non-destructive testing – Performance-based qualification)

The technical specification ISO/TS 11774:2011^[12] provides a method for qualification of NDT personnel, procedures and equipment for specific NDT conducted in accordance with documented procedures to achieve a required level of performance, usually in a safety-critical application.

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 on 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^[13]), or qualification and third-party certification (for example in accordance with ISO 9712), 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:

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 they are 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, 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.

Appendix 9: Guidance for developing countries seeking to establish national certification schemes

Background

This guidance has been developed by ICNDT in response to Action Plan 3, Action A5: “Provide guidance for developing countries seeking to establish national certification schemes – listing merits of cooperation with established CBs”.

Preamble

1. It is clearly not practical for every single PCB to offer every category of certification (method, sector, etc).
2. NDT societies in developing countries considering setting up their own certification schemes face a major task and a long period of time before they can offer a full range of certification and further major hurdles in achieving recognition.
3. On the other hand, management of a national PCB is often a route to some authority and influence for an NDT society in its own country.
4. Some qualification and certification organisations offer training and examinations outside their home countries, using several different models:
 - ASNT offers examinations for Level 3 in numerous different countries around the world, through international authorised examination centres (Germany, Egypt, Malaysia and the UK) and national sponsoring organisations, which are mainly NDT societies, including ChSNDT, ISNT and KSNT. There are other special examination sponsors in a further seven countries.
 - PCN (the certification body of BINDT) offers PCN examinations through a number of authorised qualification bodies in the UK and abroad. Some of the UK-based authorised qualifying bodies (AQBs) themselves offer examinations abroad (in Greece, Hong Kong, Kazakhstan, Malaysia, Qatar, the United Arab Emirates (UAE) and the USA) and external AQBs have been set up in Australia, China, India, Netherlands and Singapore.
 - PCN (the certification body of BINDT) offers PCN examinations through a number of authorised qualification bodies in the UK and abroad. Some of the UK-based AQBs themselves offer examinations abroad (in Greece, Hong Kong, Kazakhstan, Malaysia, Qatar, UAE and the USA) and external AQBs have been set up in Australia, China, India, Netherlands and Singapore.
 - RTC Testing and Diagnostics (Moscow), an accredited certification body and ICNDT approved certification body, offers examinations in Russia and in India, Iraq and Singapore through its AQBs there.

Guidance

National NDT societies seeking to establish national certification schemes are recommended to consider seeking cooperation with an existing certification body as an alternative or complementary approach. This does not preclude setting up a local PCB.

NDT societies and/or PCBs that are operating outside their own home country are encouraged to cooperate closely with the national NDT society where they wish to operate. In practice, this should be achieved by means of a signed agreement between the parties. Possible areas of collaboration are:

- External PCBs should seek to accept local certification and training as an entry level to their examinations;
- Agreement on language for examinations;
- Recognition of local meetings and activities in points schemes for renewal/recertification.

When there is a disagreement, the matter should be referred to ICNDT for mediation.

Appendix 10: Codes of practice and ethics for personnel certification bodies and NDT personnel

Code of practice for personnel bodies

NDT personnel certification bodies 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. *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 conformity, notifying the ICNDT Certification Executive Committee (ICEC) 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 MRA;
3. Keep confidential all examination material, including examination questions and specimens, in secure conditions with strictly controlled access to authorised individuals only;
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 wellbeing 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 certificate of conformity or certificate of registration under the ICNDT MRA;
9. Refrain from making unjustified statements or from performing unethical acts that would discredit the NDT profession or ICNDT;
10. Immediately report to the ICEC any perceived violation(s) of this code of practice by any party;
11. Accept the right of ICNDT, and provide unhindered access to a nominated representative of ICNDT, to investigate any alleged infringements of this code of practice;
12. Indemnify ICNDT against liability for the PCB's use or misuse of the ICNDT MRA and/or PCB CA systems, which are administered as a series of signed agreements under the jurisdiction of Austrian law.

Code of ethics for NDT personnel

A PCB shall also produce and enforce a code of ethics for personnel certificated under their scheme. ICNDT cannot impose wording for this because there may be national differences. However, the following points should be considered when drawing up the code of ethics.

Individuals certified, or in the process of being certified, must recognise that personal integrity and professional competence are the fundamental principles on which their testing activities are founded. Accordingly, it is a condition of certification that certificate holders shall undertake to:

1. Comply with the code of ethics for the PCB under which they are certificated;
2. Comply with the relevant provisions of the applicable certification scheme;
3. Undertake only those non-destructive testing assignments for which they are competent by virtue of their training, experience, qualification and certification;
4. Only sign documents which they have personal professional knowledge and/or direct supervisory control;

5. Engage, or advise the engagement of, such specialists as are required to enable testing activities to be properly completed;
6. Conduct themselves in a responsible manner and utilise fair and equitable business practices in dealing with colleagues, clients and associates;
7. At all times, be aware of and comply with the provisions/requirements of codes, regulations or standards under which they are working;
8. Immediately report to the certifying body any perceived violation(s) of codes, regulations or standards;
9. Perform their professional duties with proper regard for the physical environment and the safety, health and wellbeing of the public;
10. Protect, to the fullest extent possible consistent with the wellbeing of the public and the provisions of this code of ethics, any information given to them in confidence by an employer, colleague or member of the public;
11. Avoid conflicts of interest with the employer or client but, when unavoidable, forthwith disclose the circumstances to the employer or client;
12. Maintain their proficiency by updating their technical knowledge as required to properly practice NDT in the certified methods and levels;
13. Indicate to the employer or client any adverse consequences that may result from an overruling of their technical judgement by a non-technical authority;
14. Not falsify, make claims, nor permit misrepresentation of their own or their associates academic or professional qualifications, training, experience or work responsibilities;
15. Refrain from unethical acts that would discredit the certification scheme or bring the certifying body into disrepute and refrain from making statements that the certifying body could consider misleading or unauthorised;
16. Immediately report to the certifying body any perceived violation(s) of this code of ethics;
17. Immediately report to the certifying body any attempt to pressure or force an individual certified to violate this code of ethics;
18. Inform their employer in the event that their certification is suspended, cancelled or withdrawn.

Failure to comply with the above code of ethics will be dealt with under arrangements for handling complaints and appeals and may necessitate corrective measures, such as the termination of the certification process, the suspension or withdrawal of certification, publication of the violation, notification of the employer(s), union(s) and appropriate regulatory authorities and, if appropriate, additional legal action.

To provide further guidance, additional items included in other code(s) of conduct/ethics are:

- Act at all times to uphold the integrity and dignity of the industry;
- Verify the information on their certificates and/or wallet card. If the information is incorrect, it is their responsibility to inform the certifying body as soon as possible so that a new, corrected certificate and/or wallet card can be issued;
- Not attempt to cheat on certification examinations, attempt to bribe or threaten certifying body invigilators or examiners, falsify documents, falsely claim, misrepresent or permit misrepresentation or misuse of their own or their associate's academic or professional qualifications, knowledge, training, experience, work responsibilities or certifications;
- Discontinue all claims to certification upon expiry, suspension or withdrawal of certification and, upon request, return to the certifying body any certificates and/or wallet cards issued by the certifying body;
- Provide professional advice, express opinions or make statements in an objective and truthful manner to the best of their ability and on the basis of adequate knowledge;
- Certificate holders shall undergo an annual test of visual acuity and submit the test results to the employer.

Notes

Notes

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