

CP002 Certification Programme of the Certification Body for NDT Personnel of TÜV UK Limited



Non-destructive testing (NDT) is an integral part of the condition assessment of materials and components. For this reason, different non-destructive test procedures have been developed and are still being further developed today.

In order to be able to ensure that the results of the non-destructive tests are reliable, the NDT specialist personnel must regularly provide proof of their competency. Therefore, provisions governing the certification of NDT personnel have been introduced, which are described in international standards.

The certification programme of the Certification Body for NDT Personnel of TÜV UK Limited complies with the BS EN ISO 9712 as applicable to the Pressure Equipment (Safety) Regulations. The provisions of the programme are applied equally to all individuals concerned. There follows a description of the NDT test procedures and testing techniques and the qualification levels for which certification can be issued for welded products.

A large, faded version of the TÜV NORD logo, consisting of the text 'TUV NORD' in a bold, blue, sans-serif font, with a blue arc above it. This logo is positioned in the lower half of the page.

Definition of the Certification Programme

1.1 Test Procedures and Testing Techniques

The certification programme includes the following test procedures:

- penetration testing;
- magnetic particle testing;
- radiographic testing;
- visual inspection;
- ultrasonic test;

certifications can also be restricted to defined testing techniques of a test procedure.

Furthermore, the programme takes into account the certification of further developments of the test procedures.

Details of the above are described in Annex 1.

1.2 Qualification Levels

The TÜV UK Ltd certification programme applies the qualification levels 1, 2 and 3 as described in BS EN ISO 9712.

1.3 Product and Industrial Sectors

The certification programme is for (w) welded products only.

2 Training and Examination Contents

The qualification examinations include questions relating to basic knowledge, the execution of the tests, device technology, the application of the test procedure to industrial products and test documentation, as well as to environmental protection and occupational safety. The recommendations of ISO/TR 25107 are taken into account here.

Training courses for selected test procedures can be carried out on a face-to-face basis, within the framework of a web seminar or by means of a hybrid learning concept (e-learning) in accordance with ISO/TR 25108.

These contents also represent the basis for the recognition of training courses which are one of the prerequisites for the certification process.

3 Approval of NDT Personnel according to the UK Pressure Equipment (Safety) Regulations 2016

On the basis of certification according to BS EN ISO 9712 in conjunction with the MT, PT, RT, UT and VT test procedures, the certification body issues approvals for the scope of application covered by Pressure Equipment (Safety) Regulations 2016 if they are awarded for the “welded products” sector or for an industrial sector which includes the “welded products” sector.

4 Criteria for the Certification according to BS EN ISO 9712

The certification procedure takes into account the following aspects:

- NDT experience;

- NDT training;
- Vocational training;
- Physical fitness (visual acuity);
- Knowledge and skills (qualification examination);
- Professional ethical conduct.

4.1 NDT Experience, NDT Training, Vocational Training

The training contents are described in detail in Annex 2.

Annex 3 lists the criteria for NDT experience and NDT training periods. They take into account the vocational training of the personnel and any limited scope of application to individual testing techniques and product sectors.

Evidence of at least 10% of the specified NDT practical experience periods must be provided before the examination in order for the candidate to be admitted to the qualification examination. As an alternative, these NDT practical experience periods can be acquired by means of a recognised internship.

4.2 Physical Aptitude

The candidate must provide written evidence of satisfactory visual acuity in accordance with the following requirements:

- a) With respect to near vision, visual acuity 1.0 must be achieved at a distance of not less than 30 cm with at least one eye, with or without a visual aid (e.g. proof with the Jaeger number 1 letters or Landolt rings);
- b) Colour vision must be sufficient to be able to recognise and distinguish contrasts between colours or shades of grey which are used in the NDT methods concerned – as specified by the employer.

The near vision examination must be repeated at least once a year – including after the certification process. Responsibility for this lies with the employer.

4.3 Knowledge and Skills

Proof of the individual's knowledge and skills is to be provided in the qualification examinations. For levels 1 and 2, these consist of:

- (G) the General Section; (multiple-choice questions)
- (S) the Specific Section; (multiple-choice questions)
- (P) the Practical Section; (performance of the test on two or three test pieces, and on Level 2 the preparation of a set of test instructions).

For Level 3, the examination is divided up into:

NDT Basic Knowledge with the following sections:

- (A) Materials science and process technology;
- (B) Certification system;
- (C) General NDT knowledge.

Main procedure with the following sections:

- (D) Knowledge of the procedure;

- (E) Application of the procedure;
- (F) Draft of a procedure description.

Sections (A) to (E) contain multiple-choice questions.

A candidate who has already taken the NDT Basic Knowledge examination does not have to take it again for Level 3 certification in one or more further test procedures. The Basic Knowledge examination remains valid for 5 years, provided that the first examination in the main procedure is taken within this period.

A candidate seeking Level 3 certification without having previously been certified at Level 2 must additionally take the Practical Part of the Level 2 examination; the only exception to this is the preparation of test instructions.

The following processing times are available:

Test Section	Processing Time per Question in Minutes
G, A, C and D	2
S, B, D and E	3

Depending on the procedure (method) and level of difficulty, the candidate has between 45 and 90 minutes available in the Practical Examination (Section P) for each test piece or the creation of the test instructions. The time available for the creation preparation of the procedure description (Level 3, Section F) is between 2 and 4 hours, depending on the procedure.

5 Rules of Professional Ethics

Every person who is in possession of a TÜV UK Ltd. certificate must ensure to the best of their knowledge and belief that personal injury and property damage are avoided during the course of their work. All knowledge and skills that this person possesses are to be used by this person at all times and in all locations in compliance with the recognised rules of technology. The certificate holder may only assume responsibility to the extent that he or she is qualified and certified to do so on the basis of his or her training and experience. He or she must act, evaluate and report objectively at all times.

Any infringements of the rules of professional ethics that become known may result in the certificate being declared invalid.

6 Validity of the Certificate

The validity period of the initial certification is 5 years and begins with the certification decision by the certification body. After that, renewal is possible – and after a further five years recertification as well.

The certificate is valid only on condition that the holder has up-to-date evidence that his or her visual acuity is satisfactory. In the event of an interruption to NDT work lasting more than 12 months or two or more periods with a total time of two years, the certificate will lose its validity.

7 Renewal of the Certificate

After six months at the earliest, but at the latest before the expiry of the validity of an initial certification or recertification, the certificate may be renewed upon application for a further five years if the certificate holder provides proof of his or her physical aptitude and continued work within the scope of application for which the certification was granted.

After the expiry of the renewal, recertification will be required which, in addition to the items of evidence required for the recertification, includes a recertification examination.

It is the responsibility of the certificate holder to submit the completed application for renewal or recertification to the certification body in good time. This must be carried out within the period of validity of the certification, but not earlier than six months before its expiry. The certification body can accept subsequent requests for documentation for a maximum of one year after the date on which the certificate became invalid. After the completion of the certification procedure, the certification will be declared as having been renewed. The applicant will receive a certificate with a maximum validity period of a further five years. The late submission of documents does not extend the validity period of the certification.

8 Monitoring of Certificates

The certificates are monitored by:

- The renewal after five years and the recertification after a further five years.
- “Monitoring on the market”, i.e. reaction to complaints which are brought to the attention of the certification body by the certified person him/herself or by third parties.
- The online verification on the TÜV NORD GROUP website.

9 Revocation of Certifications

Certifications can be revoked by the certification body if

- they are misused or used in a misleading manner.
- the certificate holder infringes the rules of professional ethics.

The certification body reserves the right to publish declarations of invalidity. Certificates which have been declared invalid will neither be renewed nor recertified by the certification body.

10 Publications

In order to counteract misuse, the certification body reserves the right to publish certificate lists.

Annex 1: Test Procedures and Testing Techniques

Test procedure		Testing Technique	
MT	Magnetic particle testing	all testing techniques	
		Y	Yoke magnetisation
		C	Coil magnetisation
		B	Test bench
PT	Penetration testing	all testing techniques	
		WS	Water and solvent-soluble systems
		RW	Dye penetration systems
RT	Radiographic testing	all testing techniques	
		FI	Evaluation of film recordings
RT-DR	Digital radiography	DR	all testing techniques
		DI	Evaluation of digital recordings
		FDI	Evaluation of digital / analogue recordings
UT-PA		PA	Phased Array technique
UT-TOFD		TOFD	Time of Flight Diffraction technique
VT	Visual inspection	all testing techniques	
		D	Direct visual inspection

Annex 2: Training and Examination Contents

Penetration Testing (PT)

**1. Introduction to the History, Development
and Application of the Penetration Testing**

History
Application of NDT
Application of the penetration testing (PT)
Technical terms

2. Physical Principles of the Method

Penetration systems
Properties and features

**3. Product Knowledge and
Application Possibilities of
Different Working Techniques**

4. Equipment

Execution and operation of penetrant testing
systems and devices

5. Information before a Test

Details of the test object
Test conditions and regulations
Execution of the test
Test instructions

6. Testing

Preparation and performance of a
PT test
Parameters

7. Assessment and Reporting

Test protocol
Assessment

8. Assessment

9. Quality Aspects

Qualification of the personnel
Documentation
Knowledge of the application and product
standards

**10. Environmental Protection and
Occupational Safety**

Chemicals
Aids
Human factors

11. Developments

Magnetic Particle Testing (MT)

**1. Introduction to the History, Development
and Application of
Magnetic Particle Testing**

History
Application of NDT
Application of magnetic particle testing (MT)
Technical terms

**2. Physical Principles of the Method
and Associated Knowledge**

Physical principles of the method
Material properties
Characteristics of the magnetic particle
testing

**3. Product Knowledge and
Application Possibilities of
Different Working Techniques**

Performance

4. Equipment

Magnetisation equipment
Measuring instruments and their adjustment
Demagnetisation
Test equipment
Viewing conditions

5. Information before a Test

Details of the test object
Test conditions and application of
regulations
Testing technique and test sequence
Test instructions

6. Testing

Preparation and performance of an MT test
Parameters
Post-treatment
Post-cleaning

7. Assessment and Reporting

Findings classification
Test conditions
Test protocol

8. Assessment

Assessment of indications and
discontinuities

9. Quality Aspects

Qualification of the personnel
Documentation
Knowledge of the application and product
standards

**10. Environmental Protection and
Occupational Safety**

Human factors
Chemicals
Aids

11. Developments

Radiographic Testing (RT + RT-DR)

**1. Introduction to the Terminology and
History of Radiographic Testing**

History
Application of NDT
Purpose of the radiographic testing (RT)
Technical terms
Relevant standards

2. Physical Principles of the Method

General
Weakening of radiation
Beam contrast, noise
Optimisation of the image quality
Geometric imaging conditions
Image quality, test specimen

**3. Product Knowledge and
Application Possibilities of
Different Working Techniques**

General production defects
Influence on recognisability

4. Equipment

Radiation source – X-ray tube
Radiation source – gamma emitter
Film
Film development and darkroom conditions
Radiation sources - Gamma emitters
Computed radiography
Imaging plates (CRs)
Digital area detectors DDAs
Line detectors LDAs
Image intensifier, fluorescent
Film digitisation
Accessories
Data collection, detector adjustment

5. Information before the Start of the Test

Information about the test object
Test conditions and application of
regulations
Procedure and sequence of the test
Instruction

6. Test Performance

Usual procedures and evaluation standards

7. Assessment and Report Preparation

Fundamentals of the assessment
Physical factors
Test report
Digital image processing
Automatic image evaluation

8. Assessment Criteria

Classification of irregularities

9. Quality Aspects

Personnel qualification
Documentation
Knowledge of the applicable NDT methods
and product standards

10. Developments

Special techniques

Visual Testing (VT)

1. Introduction to the History, Development and Application of Visual Testing

History
Application of NDT
Application of visual penetration testing (VT)
Technical terms

2. Physical Principles of the Method

Fundamentals
Structure and function of the eye
Lighting
Types of light sources
Optical aids
Cameras and photographic equipment
Functional principles of fibre bundles and
lenses
Visual perception
Properties of the test object and their
influence on the VT
Direct and indirect visual inspection
Viewing and environmental conditions

3. Product Knowledge and Application Possibilities of Different Working Techniques

Testing of welded joints
Testing of castings
Testing of forged parts
Testing of rolled products
General

4. Equipment

Introduction and applications

5. Information before a Test

Details of the test object
Sequence of the test (general and specific
VT)
Test instructions

6. Test Performance

7. Assessment and Reporting

Test results

8. Assessment Criteria

Classification and assessment of findings

9. Quality Aspects

Qualification of the personnel
Documentation
Knowledge of the application and product
standards

10. Developments

Ultrasonic Testing (UT) – Phased Array (PA)

**1. Introduction to the History and
Terminology of the Group Emitter –
Technology**

Historical overview
Introduction to Phased Array UT testing

2. Physical Principles of the Method

Fundamentals of the sound field
Sound field-related terms
Array-related terms

**3. Product Knowledge and
Application Possibilities of
Different Working Techniques**

Product-specific knowledge and flaws

4. Equipment

Test device and accessories
Test probes
Displacement transducers
Adjustment device

5. Information before a Test

Information on the test object
Test conditions and standards
Testing technique and procedure
Instruction

6. Test Performance

Testing techniques
Range setting
Sensitivity adjustment

7. Evaluation and Documentation

Assessment of findings
Reporting

8. Assessment

9. Quality Aspects

Qualification and certification

Ultrasonic Testing (UT) – Time-of-Flight-Diffraction (TOFD)

**1. Introduction to the History and
Terminology of the Diffraction Time –
Technology**

Historical overview
Introduction to TOFD testing

**2. Underlying Physical and Mathematical
Principles of the Method**

Underlying physical and mathematical
principles

**3. Product Knowledge and
Application Possibilities of
Different Working Techniques**

Product-specific knowledge and flaws
General properties of test objects

4. Equipment

Test device and combined equipment
Displacement transducers
Adjustment device

5. Information before a Test

Information on the test object
Test conditions and standards
Testing technique and procedure
Instruction

6. Test Performance

Testing techniques
Sensitivity settings
Adjustment device
Interpretation and analysis of
UT-TOFD images

7. Evaluation and Documentation

Assessment of findings
Reporting

8. Assessment

9. Quality Aspects

Qualification and certification
Documentation

**Annex 3: Overall Presentation of the Certification Programme with the Requirements
Placed on the Training and Work Experience**

Qualification Levels 1 and 2

Test procedure	Qualification level	Sectors	Testing Technique	NDT Training in Lessons* a) c) j)	Practical experience periods in months a) h)
MT	1	w	all	16	1
	2			24	3
PT	1	w	all	16	1
	2			24	3
RT	2	w	FI	56	6
RT-DR	2	w	FDI	72	9
UT-PA	2	w	-----	40 e) f)	6 e)
UT-TOFD	2	w	-----	40 e) f)	6 e)
VT	1	w	all	16	1
	2			24	3
	2	w	D	20	2

For explanations, see page 14

Qualification Level 3

NDT Basics

The training time for the NDT basics is 80 lessons.i)

Main Procedure

Test procedure	Sectors	NDT training times in lessons* b) c)	Practical experience periods in months b) d) h)
MT	A	32	12
PT	A	24	12
RT	A	40	18
UT	A	40	18
VT	A	24	12

Explanations for Qualification Levels 1, 2 and 3:

- a) Direct access to level 2 requires the total number of training lessons and practical experience periods from level 1 and level 2.
 - b) Direct access to level 3 requires proof of the training lessons from levels 1, 2, and 3, as well as the practical experience periods from level 2 and level 3.
 - c) For candidates who can provide proof of the completion of the following levels of the European Qualifications Framework (EQF) in a relevant subject area, the training time will be reduced by up to 50%:
 - Level 6 (Bachelor, Master, Technician)
 - Level 7 (Master, Graduate Engineer)Relevant subject areas are engineering or natural sciences or metalworking professions.
 - d) These values assume that the candidate has successfully completed training as a technician or a technical or scientific course of study that lasted at least two years. If this is not the case, the length of time will be multiplied by a factor of 2.
 - e) Additional training and practical experience periods for UT2 qualification.
 - f) If UT-PA and UT-TOFD are completed simultaneously, a total training time of 48 h will be sufficient.
 - g) The prerequisite for taking the RT-DR2 qualification examination is a recognised RT1 or RT-DR1 training course or an RT1 certificate. The training time can be reduced to 40 lessons if the participant can provide proof of RT2 certification.
 - h) Proof of at least 10% of the practical experience periods must be submitted before the qualification examination.
 - i) The required training time of 80 lessons for NDT basics can be partially or completely reduced provided that the candidate can provide proof of the contents that are relevant to the examination by participation in training courses to become a welding engineer and level 2 training courses in the RT, UT, MT, PT and VT test procedures.
 - j) Training courses can be taken for selected test procedures in classroom form, within the framework of a web seminar or via a hybrid learning concept (e-learning) in accordance with ISO/TR 25108. Training courses with a practical component for teaching and consolidating skills must comprise 40% - 60% of the required training duration as face-to-face instruction.
- *) one training lesson (teaching unit) corresponds to 45 min.