INTERNATIONAL STANDARD

ISO 11484

Third edition
2019-04

Steel products — Employer's qualification system for non-destructive testing (NDT) personnel

Produits en acier — Système de qualification, par l'employeur, du personnel pour essais non destructifs (END)

Reference number
ISO 11484:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 19, *Technical delivery conditions for steel tubes for pressure purposes*.

This third edition cancels and replaces the second edition (ISO 11484:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

a) update of the candidate's vision requirements in 7.4;

b) Table 1 has been aligned with the provision of ISO 9712;

c) updated minimum required number of questions for three types of examinations;

d) standardized calculation for the composite grade N for Level 1 and Level 2;

e) added 9.3 regarding digital qualification records;

f) added 9.4.2 regarding re-validation.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document concerns the qualification of personnel engaged in the non-destructive testing (NDT) of steel products.

It has been recognized that within the steel industry worldwide there is a predominance of semi-automated/automated NDT equipment in use by NDT personnel to establish product integrity, as opposed to principally manual methods adopted in other industrial sectors. As a result, this document permits the employer qualification, subject to certain restrictions.

In the preparation of this document, the requirements of ISO 9712 have been taken into account or adopted where they apply. However, it should be noted that the primary job-specific nature of the NDT tasks performed by NDT personnel on steel products is outside the scope of ISO 9712 job-specific training performed by the employer (see ISO 9712:2012, 3.13).

Thus, in the context of this document, the requirements of ISO 9712 should not be taken as basic or additional minimum requirements. This does not preclude the right of any individual to apply for and obtain qualification/certification in conformity with ISO 9712 as may be appropriate in another sector.

It is recognized that this document may be applied to steel product sectors and other specific product sectors, as appropriate. For product sectors, refer to ISO 9712:2012, A.2.

Steel products — Employer's qualification system for non-destructive testing (NDT) personnel

1 Scope

This document specifies an employer's qualification system for non-destructive testing (NDT) personnel performing the testing of the following steel products under the employer's responsibility:

a) tubes/pipes (seamless or welded);

b) flat products, long products, rails, bars, sections, rods and wires.

This document specifies qualification requirements for the competence of Level 1 and Level 2 NDT personnel to execute specific tasks in the NDT of steel products. The qualification is issued by the employer for a specific steel product and a specific test method.

This document is applicable to NDT personnel performing predominantly the automated testing of steel products, using any of the following NDT methods:

a) eddy current testing (ET);

b) leak testing (LT);

c) liquid penetrant testing (PT);

d) magnetic testing (MT);

e) radiographic testing (RT);

f) ultrasonic testing (UT);

g) visual testing (VT).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9712:2012, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 18490, *Non-destructive testing — Evaluation of vision acuity of NDT personnel*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9712 and following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
candidate
individual seeking qualification who gains experience under the *supervision* (3.32) of personnel having a qualification acceptable to the certification body

[SOURCE: ISO 9712:2012, 3.3]

3.2
capability
ability and/or skill to execute a specific NDT task

3.3
competence
product knowledge and *capability* (3.2) to carry out a specific NDT task

3.4
employer
organization for which the *candidate* (3.1) works on a regular basis

[SOURCE: ISO 9712:2012, 3.7]

3.5
general examination
written examination, at Level 1 or Level 2, concerned with the principles of an *NDT method* (3.13)

[SOURCE: ISO 9712:2012, 3.10]

3.6
industrial experience
experience acceptable to the *employer* (3.4) and gained under *qualified supervision* (3.21) that is needed to acquire the skill and knowledge to fulfil the provisions of qualification in the NDT specific method

[SOURCE: ISO 9712:2012, 3.11, modified — "employer" has replaced "certification body", and "in the sector concerned" has been deleted.]

3.7
job-specific training
training provided by the *employer* (3.4) in those aspects of NDT specific to the employer's products, NDT equipment, applicable codes, standards, *specifications* (3.29) and *NDT procedures* (3.14)

[SOURCE: ISO 9712:2012, 3.13, modified — "(or his agent) to the certificate holder" and "leading to the award of operating authorizations" have been deleted.]

3.8
Level 3 individual
person certified to Level 3, in accordance with ISO 9712 or equivalent (e.g. ANSI/ASNT SNT-TC-1A or ANSI/ASNT CP-189), in the method and product sector for which s/he is authorized by the *qualifying body* (3.22) to conduct, supervise and grade the *qualification examination* (3.20)

3.9
multiple-choice examination question
wording of a question giving rise to four potential replies, only one of which is correct, the remaining three being incorrect or incomplete

[SOURCE: ISO 9712:2012, 3.15]

3.10
magnetic particle testing
MPT
test performed by using finely divided ferromagnetic material capable of being individually magnetized and attracted by magnetic flux-leakage

3.11
magnetic flux-leakage testing
MFT
test performed by using magnetic flux-sensitive detectors, e.g. inductive coils, Hall-effect probes, magneto-diodes, to scan the surface of the test object to detect magnetic flux-leakage

3.12
non-destructive testing instruction
NDT instruction
written description of the precise steps to be followed in testing to an established standard, code, *specification* (3.29) or *NDT procedure* (3.14)

[SOURCE: ISO 9712:2012. 3.16]

3.13
non-destructive testing method
NDT method
discipline applying a physical principle in NDT

EXAMPLE Ultrasonic testing (UT), magnetic testing (MT).

[SOURCE: ISO 9712:2012. 3.17, modified — Magnetic testing has been added to the example.]

3.14
non-destructive testing procedure
NDT procedure
written description of all essential parameters and precautions to be applied when non-destructively testing products in accordance with standards, codes or *specifications* (3.29)

[SOURCE: ISO 9712:2012, 3.18]

3.15
non-destructive testing technique
NDT technique
specific way of using a *NDT method* (3.13)

EXAMPLE Immersion ultrasonic testing, *magnetic flux-leakage testing* (3.11).

[SOURCE: ISO 9712:2012, 3.19, modified — Magnetic flux leakage testing has been added to the example.]

3.16
non-destructive testing training
NDT training
process of instruction in theory and practice in the *NDT method* (3.13) in which qualification is sought, which takes the form of training courses to a syllabus approved by an *employer* (3.4)

Note 1 to entry: See, for example, ISO/TR 25107.

[SOURCE: ISO 9712:2012, 3.20, modified — "employer" has replaced "certification body" and the Note 1 to entry has been added.]

3.17
operating authorization
written statement issued by an *employer* (3.4), based upon the scope of qualification, authorizing an individual to carry out defined tasks

Note 1 to entry: Such authorization can be dependent on the provision of *job-specific training* (3.7).

[SOURCE: ISO 9712:2012, 3.21.]

3.18
practical examination
assessment of practical skills, in which the *candidate* (3.1) demonstrates familiarity with, and the ability to perform, the test

[SOURCE: ISO 9712:2012, 3.22]

3.19
qualification
demonstration of physical attributes, knowledge, skill, training and experience required to properly perform NDT tasks

[SOURCE: ISO 9712:2012, 3.23]

3.20
qualification examination
examination administered by the *employer* (3.4), which assesses the general, specific and practical knowledge and the skill of the *candidate* (3.1)

[SOURCE: ISO 9712:2012, 3.24, modified — "employer" has replaced "certification body or the authorized qualification body".]

3.21
qualified supervision
supervision (3.32) of *candidates* (3.1) gaining experience by NDT personnel qualified in the same method under supervision or by non-qualified personnel who, in the opinion of the *employer* (3.4), possess the knowledge, skill, training and experience required to properly perform such supervision

[SOURCE: ISO 9712:2012, 3.25, modified — "employer" has replaced "certification body".]

3.22
qualifying body
body or department, independent from that of production, authorized by the *employer* (3.4) to undertake the preparation and administration of examinations

Note 1 to entry: The qualifying body can also be an external organization operating under the mandate of the employer.

3.23
renewal
procedure for the re-validation of *qualification* (3.19) without examination at any time up to five years after success in an initial, supplementary or *re-qualification* (3.24) examination

3.24
re-qualification
process for the re-validation of *qualification* (3.19) by examination or by otherwise satisfying the qualification body that the established criteria for qualification are satisfied

3.25
re-validation
act of demonstrating that a verified procedure remains performing over time and performs its intended function

3.26
setup
mechanical and/or electronic adjustment of NDT equipment to establish the testing parameters and testing sensitivity required by the *specification* (3.29) of the product to be tested

3.27
significant interruption
absence or change of activity that prevents the qualified individual from practicing the duties corresponding to the level in the relevant method within the qualified scope for either a continuous period in excess of one year or two or more periods for a total time exceeding two years

Note 1 to entry: Legal holidays, periods of sickness or courses of less than 30 days are not taken into account when calculating the interruption.

[SOURCE: ISO 9712:2012, 3.27, modified — "qualified individual" has replaced "certified individual" and "relevant method within the qualified scope" has replaced "method and the sector(s) within the certified scope".]

3.28
specific examination
written examination, at Level 1 or Level 2, concerned with testing techniques applied in a particular sector(s), including knowledge of the product(s) tested, and of codes, standards, *specifications* (3.29), *NDT procedures* (3.14) and acceptance criteria

[SOURCE: ISO 9712:2012, 3.28]

3.29
specification
document stating requirements

[SOURCE: ISO 9712:2012, 3.29]

3.30
specimen
test sample used in *practical examinations* (3.18), containing known artificial or natural defects, which is representative of products typically tested in the applicable sector(s)

[SOURCE: ISO 9712:2012, 3.30, modified — "test sample" has replaced "sample", "containing known artificial or natural defects" has replaced "possibly including radiographs and data sets", and the Note 1 to entry has been deleted.]

3.31
specimen master report
model answer, indicating the optimum result for a *practical examination* (3.18) given a defined set of conditions (e.g. equipment type, settings, test technique, *specimens* (3.30)) against which the *candidate's* (3.1) test report is graded

[SOURCE: ISO 9712:2012, 3.31]

3.32
supervision
act of directing the application of NDT performed by other NDT personnel, which includes the control of actions involved in the preparation of the test, performance of the test and reporting of the results

[SOURCE: ISO 9712:2012, 3.32]

3.33
written internal procedure
procedure developed by the *employer* (3.4) that details the requirements for *qualification* (3.19) of the employees

4 Responsibilities

4.1 General

Under the requirements of this document, the employer has the sole responsibility for providing a declaration of competence that a person in its employ performing NDT tasks has the prerequisite qualifications and has successfully passed qualification examinations, conducted under the auspices of the employer, in one or more of the NDT methods covered by this document, in respect of one of two levels of competence: Level 1 or Level 2.

As an alternative to the use of qualified Level 1 and/or Level 2 personnel in the regular employ of the employer to carry out the required NDT operations, the employer is permitted to engage, on a contract basis, certified Level 1 or Level 2 personnel in accordance with ISO 9712 in the same product sector or equivalent.

In addition, a certified Level 3 individual, either in the regular employ of or engaged by the employer, has the responsibility for administering Level 1 and Level 2 personnel qualification examinations.

The prerequisite qualification requirements in terms of visual acuity, basic education, training and experience shall be fulfilled by each candidate for eligibility of the qualification examinations. These prerequisite requirements shall be verified by the employer and endorsed on the qualification record.

The qualification examination for Level 1 and Level 2 personnel shall consist of three parts:

a) a written general examination;

b) a written specific examination;

c) a practical examination.

The general, specific and practical examinations of the qualification examination shall be conducted, at the employer's discretion, either by the employer's qualifying body or by the employer's authorized/approved external qualifying body.

The qualification examination results shall be checked/verified by the qualifying body to ensure that the pass-mark requirements (see 8.4) have been fulfilled. The employer's qualifying body, on the qualifying body's recommendation, shall issue a qualification record in respect of the individual regarding the NDT method and level of competence (Level 1 or Level 2). The issue of the qualification record provides the individual with the authorization to carry out specified NDT tasks within the employer's production facilities (i.e. operating authorization).

This qualification record is therefore only valid while the individual is employed, or engaged, by the employer issuing the qualification record.

The employer shall develop a written internal procedure for NDT personnel that meets the requirements of this document. The procedural details that shall be followed to implement an NDT qualification programme include:

— the levels of qualification used by the employer;

— personnel responsibilities;

— training, experience and examination requirements;

— qualification and requalification requirements;

— records requirements.

The written internal procedure shall be approved by a Level 3 individual who is certified in the applicable methods used by the employer.

4.2 Employer's qualifying body

The employer's qualifying body shall be constituted by individuals independent of its production departments. These individuals will form an independent examining body, which includes at least one certified Level 3 individual who is not necessarily in the employ of the employer but who is nominated by the employer's qualifying body as an examiner for Level 1 and Level 2 personnel.

Such a certified Level 3 individual shall be responsible for administering Level 1 and Level 2 personnel qualification examinations and their proper conduct.

Employer authorized/approved external qualifying bodies shall also meet the requirements of 4.2.

5 Levels of qualification

5.1 General

NDT personnel qualified in accordance with this document shall be classified in one of two levels of competence (Level 1 or Level 2) with respect to the specific NDT tasks to be performed.

Both levels of competence are defined in terms of NDT task content and degree of responsibility in accordance with 5.2 and 5.3.

5.2 NDT Level 1

An individual qualified to NDT Level 1 shall have demonstrated competence to carry out NDT according to NDT instructions under the qualified supervision of Level 2 or Level 3 personnel.

Within the scope of the competence defined on the qualification, Level 1 personnel may be authorized by the employer to perform the following in accordance with NDT instructions:

a) setting-up the NDT equipment;

b) performing NDT;

c) recording and classifying the tests results according to written instructions;

d) reporting the results.

Level 1 qualified personnel are neither responsible for the choice of the test method or the test technique to be used, nor for the interpretation of the test results.

5.3 NDT Level 2

An individual qualified to Level 2 shall have demonstrated competence to perform NDT according to NDT procedures in the test method in which s/he is qualified.

Within the scope of the competence defined for the qualification, Level 2 personnel may be authorized by the employer to:

a) select the NDT technique for the test method to be used;

b) define the limitations of application of the test method/technique(s);

c) interpret NDT codes, standards, specifications and procedures into practical testing instructions adapted to the actual working conditions;

d) setup and verify equipment settings;

e) perform and supervise the tests;

f) interpret and evaluate results according to applicable standards, codes, specifications or NDT procedures;

g) prepare written NDT instructions;

h) carry out and to supervise all tasks at or below Level 2;

i) provide guidance for personnel at or below Level 2;

j) organize and report the results of non-destructive tests.

6 Requirements and procedures for the qualification by employer

The qualifying body, through the authorized certified Level 3 individual, shall qualify the NDT Level 1 and Level 2 candidates in accordance with Clauses 7 and 8. Once the candidate has been qualified, the employer shall issue the qualification record. The steps of the procedure of qualification are shown in Figure 1.

NOTE The Level 3 individual need not be in the permanent employment of the employer.

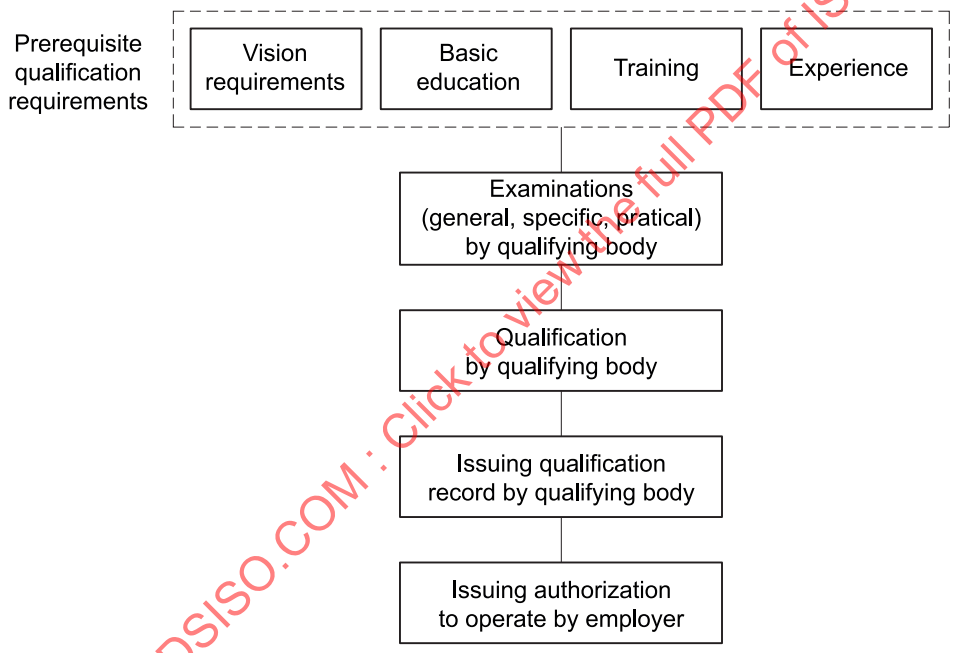

Figure 1 — Level 1 and Level 2 — Procedure of qualification

7 Qualification requirements

7.1 General

The candidate shall fulfil the requirements given in 7.2 to 7.4.

The requirements for vision, training and industrial experience shall be satisfied prior to the qualification.

7.2 Training

The candidate shall provide evidence that a course of training in the method and level for which the qualification is sought has been satisfactorily completed, and is in accordance with the requirements of the qualifying body approved by the employer.

Guidance on the NDT training course content is provided by specific standards (e.g. ISO/TR 25108).

The minimum duration of the NDT training undertaken by the candidate for qualification shall be as defined in Table 1 for the applicable NDT method.

Table 1 — Minimum training requirements[a]

NDT method	NDT technique	Level 1 hours[b]	Level 2 hours[b,c]
ET	—	40	48
LT	Pressure leak	24	32
	Tracer gas	24	40
MT[f]	Magnetic particle testing (MPT)	16	24
	Magnetic flux-leakage testing (MFT)	40	40
PT	—	16	24
RT[d]	Film radiography	40	80
	Digital radiography	40	40
UT[e]	—	40	80
	Phased array	n/a	40
VT	—	16	24

a It is recognized that, in the testing of the different steel products mentioned in the Scope, specialized NDT skills and knowledge are required to achieve satisfactory candidate performance, and the training programme should be structured to accommodate these specialized requirements.

b Training hours include both practical and theory courses.

c Direct access to Level 2 implies the total hours of Level 1 plus those of Level 2.

d For RT, training hours do not include radiation safety training

If an individual is currently qualified in a RT technique, the minimum additional training hours to qualify the other technique at the same level should be 24 hours (of which at least 16 hours should be equipment familiarization).

e Phased array testing requires completion of Level 1 and 2 UT training as prerequisites.

f MPT training hours may be counted towards MFT technique.

7.3 Industrial NDT experience

Industrial experience may be acquired either prior to or following success in the qualification examination. Documentary evidence of experience shall be confirmed by the employer and submitted to the qualification body.

In the event that the experience is sought following successful examination, the results of the examination shall remain valid for up to two years.

The minimum requirements for the duration of industrial experience to be gained shall be as specified in Table 2.

Table 2 — Minimum industrial experience requirements

NDT method	NDT technique	Experience months[a,b,c]	
		Level 1	Level 2
ET	—	3	9
LT	—	3	9
MT	Magnetic particle testing (MPT)	1	3
	Magnetic flux-leakage testing (MFT)	3	9
PT	—	1	3
RT[d]	—	3	9
UT[e]	—	3	9
	Phased array	-	3
VT	—	1	3

NOTE Considering the predominance of automated/semi-automated systems in the NDT of the different steel products mentioned in the Scope, the total experience should be balanced to accommodate the day-to-day setup of such systems.

[a] Work experience in months is based on a nominal 40 h/week (176 h/month) or the legal week of work. Any individual working in excess of 40 h per week may be credited with experience based on the total hours, but shall be required to produce documentary evidence of this experience.

[b] Credit for work experience may be gained simultaneously in two or more of the NDT methods covered by this document, with the reduction of total required experience as follows:

— two testing methods: reduction of total required time by 25 %;

— three testing methods: reduction of total required time by 33 %;

— four or more testing methods: reduction of total required time by 50 %.

In all cases where a reduction is sought, the candidate shall be required to show that, for each of the testing methods for which s/he seeks qualification, s/he has at least half of the time required in this table.

[c] For Level 2 qualification, work experience should consist of NDT work time as an individual qualified to Level 1. If the individual is being qualified directly to Level 2, with no time at Level 1, the experience shall consist of the sum of the time required for Level 1 and Level 2.

[d] If an individual is currently qualified in a RT technique, the minimum additional experience per month to qualify the other technique at the same level should be one month.

[e] Phased array testing requires completion of Level 1 and Level 2 UT experience as prerequisites.

7.4 Vision requirements — All levels

The candidate shall provide documented evidence of satisfactory vision in accordance with the following:

a) an evaluation of near-vision acuity shall meet one of the following requirements:

   1) reading at a minimum of Jaeger number 1 or Times Roman N4,5 or equivalent letters (having a height of 1,6 mm) at not less than 30 cm with one or both eyes, either corrected or uncorrected;

   2) fulfilment of ISO 18490;

b) colour vision is sufficient so that the candidate is able to distinguish and differentiate contrast between the colours or shades of grey used in the NDT method concerned, as specified by the employer.

Subsequent to qualification, the tests of visual acuity and colour vision shall be carried out annually and shall be verified by the employer.

8 Qualification examination

8.1 General

The qualification examination shall cover a given NDT method and shall consist of:

a) a general examination;

b) a specific examination;

c) a practical examination.

The qualifying body shall define the maximum amount of time allowed for the candidate to complete each examination. The examination shall be based upon the number and difficulty of the questions.

8.2 Examination content

8.2.1 General examination

The general examination shall include only questions selected in an unpredictable way from the authorized qualifying body's collection of general examination questions valid at the date of examination. The candidate shall be required, as a minimum, to give answers for a number of multiple-choice examination questions. As a guide, the average time allowed should be no longer than 3 min per multiple-choice examination question.

Where not otherwise addressed by national regulations, there shall be an additional examination on radiation safety for the radiographic test method.

Examinations on the radiographic test method may include either X- or gamma-radiation, or both, depending upon the procedure of the qualification body.

The minimum required number of questions for the general examination shall be 40 questions for each NDT method, technique and level.

8.2.2 Specific examination

The specific examination shall include a selection of questions of a specific nature on the NDT technique(s), prepared by the qualifying body. Minimum required number of questions for the specific examination shall be 20 questions for each NDT method, technique and level and includes questions related to calculations, NDT procedures and questions about codes, standards and specifications.

8.2.3 Practical examination

The practical examination shall be structured so as to verify the candidate's ability to perform testing of steel products and to record and analyse the resulting information to the degree required for the NDT level being sought, according to the following:

a) for Level 1: written instructions;

b) for Level 2: written instructions, specifications, codes and standards.

For Level 2, the candidate shall demonstrate the ability to prepare written instructions for Level 1.

The qualifying body shall select at least two specimens to be used for the practical examination for each NDT method and technique under evaluation. These specimens shall not be used for training activities.

The RT Level 2 examination shall include the evaluation of 12 radiographs relevant for the application.

Where a sector examination involves testing more than one product type, the specimens tested shall be representative of all products or shall be selected at random by the examiner from the product range or materials that make up the sector.

The qualifying body shall ensure that each specimen is uniquely identified and has a master report that includes all of the equipment settings used to detect specified discontinuities contained within the specimen.

8.3 Conduct of the examinations

The conduct of the examinations shall be as follows:

a) all examinations shall be conducted under the responsibility of the employer;

b) any candidate who, during the course of the examination, does not abide by the examination rules, or who perpetrates or is an accessory to, fraudulent conduct shall be excluded from further examinations for a period of one year;

c) examinations shall be approved by the qualifying body and invigilated;

d) an examiner shall be responsible for grading the examination in accordance with procedures established or approved by the qualification body;

e) the qualification/examination shall consist of:

   1) verification of the eligibility;

   2) a general, a specific and a practical examination;

   3) the specification of an NDT method as it is applied in the steel product manufacturing;

f) under the requirements of this document, the qualifying body has the authority to exempt Level 1 and Level 2 individuals holding certification in accordance with ISO 9712 and required product sector, or equivalent, from the qualifying examinations in accordance with 8.2;

g) the examinations shall be specifically carried out for different types/dimensions of the same products, ensuring that personnel know the related manufacturing processes, typology of imperfections and testing machines and are competent to perform the required NDT tasks;

h) the "qualification" and the "qualification record" shall be considered as "specific" for each steel product, e.g. pipes, plates.

8.4 Grading

The general examination shall be graded separately from the specific examination so that the candidate may be examined later for qualification in another part of the steel industry without having to repeat the general examination. Thus, a qualified operator changing from one steel product to another keeps the benefit of the general examination valid for all areas of the steel industry.

The composite grade N for Level 1 and Level 2 shall be calculated in accordance with Formula (1):

$$N = \left(n_g + n_s + n_p\right)/3 \tag{1}$$

with simple averaging of n_g and n_s and n_p

where

n_g is the grade for the general examination;

n_s is the grade for the specific examination;

n_p is the grade for the practical examination.

Annex A gives requirements on the percentile weighting of the practical examination.

To be qualified, a candidate shall obtain a composite grade, N, of at least 80/100 with no individual examination having a passing grade less than 70/100. In addition, for the practical examination, a minimum grade of 70/100 shall be obtained for each specimen tested and for the NDT instruction.

8.5 Re-examination

For the purposes of re-examination:

a) a candidate failing for reasons of fraud or other [see 8.3 b)] shall wait at least 12 months before re-applying;

b) a candidate who fails to obtain the pass grade required for qualification may be re-examined twice in the failed part(s), provided that the re-examinations take place not sooner than one month, unless further training acceptable to the qualification body is satisfactorily completed, nor later than two years after the original examination;

c) a candidate failing all permitted re-examinations shall apply for and take the examination in accordance with the procedure established for new candidates.

9 Qualification

9.1 General

Based on the result of the qualification examinations, the employer shall announce the qualification and issue the qualification record. This can be achieved with the issue of:

a) a hard copy of the qualification record(s); and/or

b) wallet card(s); and/or

c) by electronically recording the relevant information.

9.2 Content of the qualification record

A qualification record and/or corresponding wallet card shall include the following:

a) the full name of the qualified individual;

b) the date of qualification;

c) the date upon which the qualification expires;

d) a reference to this document, i.e. ISO 11484;

e) the level of qualification;

f) the NDT method(s);

g) the applicable sector(s) and/or product (s) concerned;

h) if applicable, the scope of limitations to the qualifications and/or special applications;

i) a unique personal identification number;

j) the signature of the qualified individual;

k) a photograph of the qualified individual;

l) the signature of a designated representative of the qualification body (on the qualification record only).

There may be a special space on either or both the qualification record and wallet card for the signature and stamp of the employer authorizing the holder to operate. With this, the employer demonstrates taking responsibility for the test results.

9.3 Digital qualification records

Digital qualification records may be provided in lieu of or as well as physical (hard copy) qualification record(s). In this case, the following data are available to interested parties:

a) the family name and forename of the qualified individual;

b) a unique personnel identification number for the qualified individual;

c) a photographic image of the qualified individual (taken within the past 10 years);

d) the dates for issue and expiry of the qualification;

e) the scope of qualification, including the level, NDT method(s), and applicable industrial sector(s);

f) any limitations to the qualification, if applicable.

Where the data listed can be printed by the qualifying body, the printed output shall include a date of print.

9.4 Validity

9.4.1 General

The maximum period of validity of qualification is five years. The period of validity shall commence (date of issue of the qualification) when all of the requirements for qualification (training, experience, satisfactory vision test, success in examination) are fulfilled.

By issuing the qualification record, the employer attests the qualification of the individual but does not give any authority to operate.

NOTE The authorization to operate is documented, issued by the employer and includes a limitation to operate.

Qualification becomes invalid:

a) at the discretion of the qualifying body, e.g. after reviewing evidence of behaviour incompatible with the qualification procedures or failure to abide by a code of ethics;

b) if the individual becomes physically incapable of performing his or her duties based upon failure of visual acuity examination taken annually under the responsibility of the employer;

c) if a significant interruption takes place in the method for which the individual is qualified;

d) if the individual fails re-qualification, until such time as the individual meets the requirements for re-qualification or initial qualification.

