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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
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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.

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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.

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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/

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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

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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.]

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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

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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

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