



SLOVENSKI STANDARD

SIST EN 16729-4:2019

01-marec-2019

Železniške naprave - Infrastruktura - Neporušitveno preskušanje na progi - 4. del: Usposabljanje osebja za neporušitveno preskušanje na progi

Railway applications - Infrastructure - Non-destructive testing on rails in track - Part 4:
Qualification of personnel for non-destructive testing on rails

Bahnanwendungen - Infrastruktur - Zerstörungsfreie Prüfung an Schienen im Gleis - Teil
4: Qualifizierung von Personal für die zerstörungsfreie Prüfung

Applications ferroviaires - Infrastructure - Essais non destructifs sur les rails de voie -
Partie 4: Qualification du personnel en charge des essais non-destructifs sur les rails

<https://standards.iteh.ai/catalog/standards/sist/545b569c-b944-4773-9e7e-3d52f2b9f281/sist-en-16729-4-2019>

Ta slovenski standard je istoveten z: **EN 16729-4:2018**

ICS:

03.100.30	Vodenje ljudi	Management of human resources
19.100	Neporušitveno preskušanje	Non-destructive testing
93.100	Gradnja železnic	Construction of railways

SIST EN 16729-4:2019

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16729-4:2019

<https://standards.iteh.ai/catalog/standards/sist/545b569c-b944-4773-9e7e-3d52f2b9f281/sist-en-16729-4-2019>

EUROPEAN STANDARD

EN 16729-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

ICS 93.100

English Version

Railway applications - Infrastructure - Non-destructive testing on rails in track - Part 4: Qualification of personnel for non-destructive testing on rails

Applications ferroviaires - Infrastructure - Essais non destructifs sur les rails de voie - Partie 4: Qualification du personnel en charge des essais non destructifs sur les rails

Bahnwendungen - Infrastruktur - Zerstörungsfreie Prüfung an Schienen im Gleis - Teil 4: Qualifizierung von Personal für die zerstörungsfreie Prüfung an Gleisen

This European Standard was approved by CEN on 17 September 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions	5
4 Symbols and abbreviations	5
5 Levels of qualifications.....	6
5.1 Level 1	6
5.2 Level 2	6
5.3 Level 3	7
6 Railway infrastructure experience.....	7
7 Examination	7
7.1 General.....	7
7.2 Content and duration of the examination.....	7
7.3 Assessment of the examination.....	7
7.4 Requalification.....	7
Annex A (informative) Theoretical and practical training.....	8
A.1 Training time.....	8
A.2 Training syllabus.....	9
A.2.1 General.....	9
A.2.2 Visual testing	9
A.2.3 Ultrasonic testing.....	13
A.2.4 GWT — Basics.....	17
A.2.5 Eddy current testing.....	18
A.2.6 Magnetic particle testing.....	21
A.2.7 Penetrant testing.....	22
Annex B (informative) Training and qualification for NDT inspectors.....	24
Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2008/57/EC aimed to be covered.....	27
Bibliography.....	29

European foreword

This document (EN 16729-4:2018) has been prepared by Technical Committee CEN/TC 256 “Railway application”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This series of European Standards EN 16729 “Railway applications – Infrastructure – Non-destructive testing on rails in track” consists of:

— Part 1: Requirements for ultrasonic inspection and evaluation principles;

— Part 2: Eddy current testing of rails in track;

— Part 3: Requirements for identifying internal and surface rail defects;

— Part 4: Qualification of personnel for non-destructive testing on rails.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 16729-4:2018 (E)**Introduction**

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

The regulatory aspects in this document follow EN ISO 9712.

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

SIST EN 16729-4:2019

<https://standards.iteh.ai/catalog/standards/sist/545b569c-b944-4773-9e7e-3d52f2b9f281/sist-en-16729-4-2019>

1 Scope

This document defines the requirements for qualification of the personnel who plan, carry out and supervise non-destructive testing in industrial sector – Railway maintenance infrastructure, on rails in switches, crossings and plain track.

Safety of staff working on or near the railway track is part of the infrastructure manager safety management system and is not part of this standard.

This document applies only to rail profiles meeting the requirements of EN 13674-1 and EN 13674-2.

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.

EN ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel (ISO 9712)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

inspector

person who inspects the rail with different NDT-methods, interprets and reports the results

3.2

operator

person who captures NDT data without evaluating the results

3.3

analyst

person who evaluates NDT data from automatic systems without capturing and reports the results

4 Symbols and abbreviations

For the purposes of this European Standard, the abbreviated terms listed in Table 1 are used in the railway sector infrastructure.

Table 1 — Methods and abbreviated terms

NDT method	Abbreviated terms
Visual testing	VT
Ultrasonic testing	UT
Eddy current testing	ET
Magnetic testing	MT
Guided wave testing	GWT
Penetrant testing	PT

Table 2 — Abbreviated terms

NDT technique	Abbreviated terms
Automatic visual testing	AVT
Distance Gain Sizing	DGS
Distance Amplitude Correction	DAC

5 Levels of qualifications

5.1 Level 1

An individual qualified to level 1 has demonstrated competence to carry out NDT according to written instructions and under the supervision of ~~level 2 or level 3~~ personnel. Within the scope of the competence defined on the examination report, level 1 personnel may be authorized by the employer to perform the following in accordance with NDT instructions:

- a) set up NDT equipment;
- b) perform the tests;
- c) record and classify the results of the tests according to written criteria;
- d) report the results;
- e) experienced level 1 personnel may mentor a newly trained level 1 personnel in practical testing.

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

5.2 Level 2

An individual qualified to level 2 has demonstrated competence to perform NDT according to NDT procedures. Within the scope of the competence record, level 2 personnel may be authorized by the employer to:

- a) select the NDT technique for the testing method to be used;
- b) define the limitations of application of the testing method;
- c) translate NDT codes, standards, specifications, and procedures into NDT instructions adapted to the actual working conditions;

- d) set up and verify equipment settings;
- e) perform and supervise tests;
- f) interpret and evaluate results according to applicable standards, codes, specifications or procedures;
- g) carry out and supervise all tasks at or below level 2;
- h) provide guidance for personnel at or below level 2;
- i) report the results of NDT;
- j) may reclassify a defect in accordance with NDT instructions;
- k) may propose to level 3 procedures, NDT instructions and modifications;
- l) may choose and adapt instructions for other NDT equipment.

5.3 Level 3

A level 3 will be qualified in accordance with EN ISO 9712 and those managing NDT in the railway maintenance infrastructure sector shall hold level 2 qualification in the railway maintenance infrastructure sector and NDT method.

6 Railway infrastructure experience

Candidates shall hold the relevant track safety qualification and be able to demonstrate good understanding of the infrastructure. Understanding of the infrastructure shall be gained from work experience or dedicated training courses.

7 Examination

7.1 General

Qualification shall cover a non-destructive testing technique as applied in the industrial sector railway maintenance infrastructure. For the examination, EN ISO 9712 applies.

7.2 Content and duration of the examination

Examinations shall comprise of a general part, a sector specific part and a practical part. The sector specific part and the practical part shall be related to industrial sector railway maintenance infrastructure. For the content and duration of the examination, EN ISO 9712 applies.

7.3 Assessment of the examination

For the assessment of the examination, EN ISO 9712 applies.

7.4 Requalification

Within 5 years of qualification a practical examination is required in order to demonstrate competence in the industrial sector railway maintenance infrastructure. The examinations shall be carried out in accordance with EN ISO 9712.

NOTE This does not apply for VT unless the inspector holds a dedicated VT competence record in accordance with EN ISO 9712. Then EN ISO 9712 applies.

Annex A (informative)

Theoretical and practical training

A.1 Training time

The training time consists of theoretical and practical parts. Table A.1 shows minimum training hours required.

Table A.1 — Theoretical and practical training time requirements

NDT method	NDT module	Level 1		Level 2	
		h ^a		h ^a	
		Theoretical	Practical	Theoretical	Practical
VT	Basics	4	4	8	8
	Infrastructure	4	4	4	4
	AVT	4	4	8	8
UT	Basics	40	16	40	40
	Infrastructure	40	16	-	-
	Manual equipment	-	-	20	20
	Automatic equipment	-	-	20	20
GWT	Basics	40	16	40	40
ET	Basics	20	20	20	28
	Infrastructure	8	8	-	-
	Manual equipment	-	-	8	16
	Automatic equipment	-	-	8	16
MT		8	8	-	-
PT		8	8	-	-

^a Training hours are based on a nominal 40 h/week or the legal week of work.

Direct access to level 2 without an examination in level 1 requires the total hours of basics and infrastructure shown in Table A.1 for levels 1 and 2.

Examples for qualification requirements of a NDT technician are given in Annex B.

For specialist NDT techniques such as Phased array, GWT, RSCM testing, candidate shall firstly attend basic training in addition to the specialist training.

A.2 Training syllabus

A.2.1 General

Training courses for manual equipment shall be attended by technicians who perform NDT on the track. Operators of inspection equipment on board inspection trains or rail reprofiling machines shall attend training courses for automatic equipment.

A.2.2 Visual testing

A.2.2.1 Basics

The content for **level 1 theoretical training** shall be as follows:

1) General knowledge:

- physical basics of light;
- technical terms;
- colours;
- process of seeing.

2) Special knowledge:

- equipment and techniques;
- surface conditions;
- magnifiers and other optical equipment;
- documentation and protocol.

iTech STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 16729-4:2019
<https://standards.iteh.ai/catalog/standards/sist/545b569c-b944-4773-9e7e-3d527b9f281/sist-en-16729-4-2019>

The **practical training** shall have the following content:

- measurement of optical quantities;
- working with magnifiers and control mirrors;
- working with special optical equipment;
- documentation and protocol.

The content for **level 2 theoretical training** shall be as follows:

a) General knowledge:

- physical basics of light;
- technical terms;
- colours;
- process of seeing;

EN 16729-4:2018 (E)

- light measurement technology;
 - testing of welds.
- b) Special knowledge:
- equipment and techniques;
 - surface conditions;
 - magnifiers and other optical equipment;
 - documentation and protocol;
 - inspection instructions for visual testing;
 - rules and standards of VT.

The **practical training** shall have the following content:

- measurement of optical quantities;
- working with magnifiers;
- working with control mirrors;
- detection and evaluation of defects in welds;
- preparing of inspection instructions for visual testing of not safety-relevant components;
- documentation and protocol.

iTeH STANDARD PREVIEW
(standards.iteh.ai)
https://standards.iteh.ai/catalog/standards/sist/545b569c-b944-4773-9e7e-3d52f2b9f281/sist-en-16729-4-2019

A.2.2.2 Infrastructure

The content for **level 1 theoretical training** shall be as follows:

- defects in rails according to rail defect catalogue;
- defects in rail welds;
- test procedures for the visual inspection.

The **practical training** shall have the following content:

- detection of defects in rail welds;
- evaluation of rail defects according to special specifications;
- track specific protocolling.

The content for **level 2 theoretical training** shall be as follows:

- defects in rail welds;
- defects railway specific components;
- evaluation of defects in rail welds.