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oSIST prEN 13231-3:2010

01-marec-2010

Železniške naprave - Zgornji ustroj - Prevzem del - 3. del: Prevzemni kriteriji za reprofiliranje vgrajenih tirnic

Railway applications - Track - Acceptance of works - Part 3: Acceptance of reprofiling rails in track

Bahnanwendungen - Oberbau - Abnahme von Arbeiten - Teil 3: Abnahme von reprofilierten Schienen im Gleis

Applications ferroviaires - Voies - Réception des travaux - Partie 3 : Critères de réception des rails reprofilés en voie

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ICS:

45.080	Traļ nice in ģelezniģki deli	Rails and railway components

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 13231-3

October 2009

ICS 45.080

Will supersede EN 13231-3:2006

English Version

Railway applications - Track - Acceptance of works - Part 3: Acceptance of reprofiling rails in track

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

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oSIST prEN 13231-3:2010

Contents

Page

Foreword 4

1 Scope 5

2 Normative references 5

3 Terms and definitions 5

4 Longitudinal profile 8
4.1 Principle 8
4.2 Measurements required 8
4.3 Acceptance criteria for longitudinal profile 9
4.3.1 General 9
4.3.2 Peak-to-peak value 9

5 Transverse profile 9
5.1 Principle 9
5.2 Measurements required 10
5.3 Acceptance criteria for the transverse profile 10

6 Metal removal 11
6.1 Measurements required 11
6.2 Acceptance criteria for metal removal 11

7 Surface roughness 11

8 Visual appearance: acceptance criteria 12

Annex A (normative) Procedures to verify reference instruments 15
A.1 Longitudinal profile 15
A.1.1 Principle 15
A.1.2 Calibration beam 15
A.1.3 Coordinate Measuring Machine (CMM) 16
A.1.4 Measurement of the calibration beam using the CMM 16
A.1.5 Data analysis 16
A.1.6 Measurement of the calibration beam using the test instrument 16
A.1.7 Data analysis using the test instrument 16
A.1.8 Acceptance criteria for reference instruments 16
A.1.9 Test report 16
A.2 Transverse profile 17
A.2.1 Principle 17
A.2.2 Calibration jig 17
A.2.3 Coordinate measuring machine (CMM) 17
A.2.4 Calibration jig verification 17
A.2.5 Rail measurements using the test instrument 17
A.2.6 Acceptance of test instruments 18
A.2.7 Test report 18

Annex B (normative) Procedures to demonstrate correlation of approved and reference instruments 20
B.1 Longitudinal profile 20
B.1.1 Principle 20
B.1.2 Characteristics of the test sites 20
B.1.3 Measurements required 20
B.1.4 Data analysis 21
B.1.5 Acceptance criteria for approved instruments 21
B.1.6 Test report 21

iTeh Standards
(https://standards.iteh.ai)
Document Preview
SIST EN 13231-3:2012
https://standards.iteh.ai/catalog/standards/sist/...-sist-en-13231-3-2012

oSIST prEN 13231-3:2010

B.2 Transverse profile **22**
B.2.1 Principle **22**
B.2.2 Characteristics of the test sites **22**
B.2.3 Measurements required **23**
B.2.4 Data analysis **23**
B.2.5 Acceptance criteria for approved instruments **25**
B.2.6 Test report **25**

Annex C (normative) **Calculation of peak to peak values** **26**
C.1 Percentage of exceedances **26**

Annex D (normative) **Method of periodic verification** **27**
D.1 Method of periodic verification of approved instruments **27**
D.1.1 Principle **27**
D.1.2 Longitudinal profile **27**
D.1.3 Static verifications **27**
D.1.4 Dynamic verification **28**
D.2 Transverse profile **29**
D.2.1 Principle **29**
D.2.2 Static verifications **29**
D.2.3 Dynamic verification **29**
D.2.4 Comparison of statistical results **29**
D.2.5 Report **32**

Annex E (informative) **Example of acceptance documentation for rail re-profiling work** **35**

Bibliography **37**

iTeh Standards
(https://standards.iteh.ai)
Document Preview

SIST EN 13231-3:2012
https://standards.iteh.ai/catalog/standards/sist/f641b7c6-8a1e-4999-b973-959c48f2a9d0/sist-en-13231-3-2012

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Foreword

This document (prEN 13231-3:2009) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13231-3:2006.

This European Standard is one of the series EN 13231 "*Railway applications – Track – Acceptance of works*" as listed below:

— *Part 1: Works on ballasted track – Plain line, switches and crossings*

— *Part 3: Acceptance of reprofiling rails in track*

— *Part 4: Acceptance of reprofiling rails in switches and crossings*

NOTE Part 2 does not exist in this series.

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1 Scope

This part of this European Standard lays down the technical requirements and the measurements to be made for the acceptance of work to reprofiled longitudinally and/or transversely the heads of railway rails, including the parts of switches and crossings that can be reprofiled.

For acceptance purposes, two classes of longitudinal profile and three classes of transverse profile tolerance are defined.

It also informs about procedures to verify reference instruments to be used for these measurements and informs about a method to approve non-reference instruments to be used for measurements.

It applies to reprofiled vignole railway rails 40 kg/m and above.

A form of acceptance documentation that may be used is given in Annex C.

2 Normative references

The following referenced documents are indispensable for the application 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 3274, *Geometrical product specifications (GPS) - Surface texture: Profile method - Nominal characteristics of contact (stylus) instruments (ISO 3274:1996)*

prEN ISO 3611:2008, *Geometrical product specifications (GPS) – Dimensional measuring instruments – Micrometers for external measurements – Design and metrological characteristics (ISO/FDIS 3611:2008)*

EN ISO 4287, *Geometrical product specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters (ISO 4287:1997)*

EN ISO 4288, *Geometrical product specifications (GPS) - Surface texture: Profile method - Rules and procedures for the assessment of surface texture (ISO 4288:1996)*

EN ISO 10360-2, *Geometrical Product Specifications (GPS) - Acceptance and reverification tests for coordinate measuring machines (CMM) - Part 2: CMMs used for measuring size (ISO 10360-2:2001)*

3 Terms and definitions

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

3.1
angle of inclination of rail
nominal angle at which rail is laid (see Figure 1(b)), e.g. 0° (vertical rails), 2,86° (1:20 inclination), 1,91° (1:30 inclination) etc., inclined towards the centre of the track

NOTE For rail which is laid in non-canted track, the angle of inclination of the rail is equal to the angle between the vertical and the centre-line of the inclined rail.

3.2
approved instrument
instrument for measurement of longitudinal or transverse profile the usage of which is justified by correlation of its performance with that of a reference instrument in accordance with the defined procedure

NOTE For procedure to demonstrate correlation, see Annex B.

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3.3
characteristic length
length on the rail travelled during one rotation of a grinding stone

3.4
class 1, class 2
classes of longitudinal profile differentiated by the proportion of a reprofiling site reaching a specified standard

NOTE For longitudinal profile, see 4.3.

3.5
class Q, class R, class S
classes of transverse profile differentiated by the proportion of a reprofiling site reaching a specified standard

NOTE For transverse profile, see 5.3.

3.6
cut-off wavelength
wavelength of a sinusoidal profile of which 50 % of the amplitude is transmitted by the profile filter

NOTE Profile filters are identified by their cut-off wavelength value, see EN ISO 11562.

3.7
deviation of the measured profile
deviation between the measured profile and the reference rail, measured normal to the surface of the reference rail when the measured profile and the reference rail are aligned at points A and B_1 or A and B_2, without rotation of either profile. The deviation is considered positive when the measured profile is above the reference rail

NOTE For deviation, see Figure 3.

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3.8
filtered profile
profile which results from applying a profile filter to the primary profile

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3.9
facet
approximately plane sector of the profile of a reprofiled rail produced by the reprofiling tool

3.10
percentage exceedance
percentage length of a test site over which a measurement of the amplitude of the filtered profile exceeds a prescribed limit

3.11
phase correct profile filter
profile filter which does not cause phase shifts which lead to asymmetrical profile distortions

NOTE For profile filter, see EN ISO 11562:1997 + AC:2008.

3.12
primary profile
representation of the measured longitudinal profile before application of any profile filter

3.13
profile filter
electronic device or signal processing which separates profiles into long-wave and short-wave components, or into components within a specified wavelength range

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3.14
rail crown
that point on the rail-head surface that is aligned with the centre-line of the web

3.15
range of deviation
difference between the maximum and minimum values of the deviation of the measured profile

NOTE For measured profile, see Figure 3.

3.16
reference instrument
instrument for the measurement of longitudinal or transverse profile the performance of which has been verified in accordance with the procedure defined in Annex A

3.17
reference line
line normal to the track's longitudinal axis and tangent to the heads of both rails

3.18
reference point A
that point towards the gauge side of a reference rail at which the angle between the reference line and the tangent to the profile is equal to the specified angle of inclination

NOTE For specified angle of inclination, see Figure 1.

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3.19
reference point B_1
that point on the gauge face of a reference rail which lies 14 mm below that line that is parallel to the reference line and which passes through reference point A

NOTE For reference point, see Figure 1(a).

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3.20
reference point B_2
that point on the gauge corner of a reference rail at which a line which is tangent to the rail lies at an angle of 45° to the reference line

NOTE For reference line, see Figure 1(b).

3.21
reference profile
transverse profile to which rail is to be reprofiled, within the specified tolerances

3.22
reference rail
rail with the reference profile, at the desired angle of inclination relative to the reference line (see Figure 1(a))

NOTE In switch and crossing work, with rails laid vertically, it may be desired to reprofile the rail so that its head profile matches that of the adjacent plain line in which rails are inclined at, e.g. 1 in 20. In this case, the angle of inclination of the reference rail will be 2,86° (1 in 20).

3.23
reprofiling
action that is undertaken to modify the longitudinal or transverse profile of a rail

3.24
reprofiling site
continuous length of track where the rail is to be reprofiled

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3.25
reprofiling zone
area of the railhead of a reference rail between the point at which the tangent to the rail lies at an angle of 70° to the reference line, measured towards the gauge side of the rail, and the point at which the tangent to the rail lies at an angle of 5° to the reference line, measured towards the field side of the rail

NOTE For side of the rail, see Figure 2.

3.26
sampling interval
distance between successive points at which a continuous record of the traced profile is sampled in order to produce the primary profile

3.27
test instrument
instrument whose use as a reference instrument or an approved instrument is being tested

3.28
traced profile
profile of the rail as recorded by the measuring system

3.29
transition length
initial or final section of a length of track where the validity of a measurement of longitudinal or transverse profile is questionable for a variety of reasons, including settling of electronic and digital components and circuits

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4 Longitudinal profile

4.1 Principle

Measurements are made using either a reference instrument, see 3.16, or an approved instrument, see Annex B. Approved instruments do not offer the same accuracy as reference instruments but are generally adequate for the purpose of demonstrating compliance with the requirements of this standard.

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NOTE An example of an approved instrument is the type of system used for routine measurements on reprofiling trains. Some of the systems used for routine measurements on reprofiling trains fall into this category.

In accordance with current practice, limits are set on the magnitude of the irregularities that can remain in track after a reprofiling operation. It is recognised, however, that it can be uneconomic to achieve 100 % compliance with these, particularly where isolated top faults, such as wheel burn, exist prior to reprofiling. Two classes are therefore offered, differentiated by the percentage of the reprofiled track meeting the specified criteria. Where isolated top faults exist, class 2 offers a lower cost option compared to class 1 as it will be achieved with fewer passes. However a larger number of isolated non-compliant zones will remain in the reprofiled site.

Class 1 also includes limits for very short (10 mm to 30 mm) and very long (300 mm to 1 000 mm) wavelength residual irregularities; these are not included in class 2. Where corrugations in these wavebands are required to be removed it will also be necessary to specify class 1.

4.2 Measurements required

The longitudinal profile of the finished reprofiled rail shall be recorded continuously using either a reference instrument or an approved instrument. Where independent verification is required a reference instrument shall be used. All measurements undertaken in order to demonstrate compliance with 4.3 shall be recorded.

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NOTE 1 For measurements in the (10 mm to 30 mm) wavelength range, it is at present unlikely that instruments other than reference instruments will have sufficient accuracy.

Longitudinal profile measurements shall be made within a distance of 15 mm laterally on the rail from the rail crown, to produce the traced profile.

NOTE 2 It is recommended that a digital form of the traced profile, the primary profile, be used for subsequent analysis.

The measurements can be undertaken immediate after work or at the latest within 8 days of reprofiling or after the track has carried 0,3 MGT (Million Gross Tons) of traffic.

4.3 Acceptance criteria for longitudinal profile

4.3.1 General

The acceptance of reprofiled sites shall be on the basis of percentage of irregularities shown in Table 1.

4.3.2 Peak-to-peak value

The percentage of any site in which the peak-to-peak value exceeds the value specified in Table 1 shall be calculated.

The primary or traced profile shall be processed to provide a filtered profile within each of the wavelength ranges given in Table 2.

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Table 1 — Acceptance criteria for longitudinal profile expressed in terms of allowable percentages of exceeding

Wavelength range (mm)	10 – 30	30 – 100	100 – 300	300 – 1 000
Class 1	5 %	5 %	5 %	5 %
Class 2	No requirement	10 %	10 %	No requirement

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Table 2 — Acceptance criteria for peak to peak limits

Wavelength range (mm)	10 - 30	30 - 100	100 - 300	300 - 1 000
Limit of peak-to-peak values (mm)	± 0,010	± 0,010	± 0,015	± 0,075

The classification concerns the total length of each grinding section, where level crossings and switches are to be excluded.

5 Transverse profile

5.1 Principle

Measurements are made using either a reference instrument, see 3.18, or an approved instrument, see 3.2. Approved instruments do not offer the same accuracy as reference instruments but are generally adequate for the purpose of demonstrating compliance with the requirements of this standard.