SLOVENSKI STANDARD
SIST EN 13231-2:2021

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Nadomešča:
SIST EN 13231-3:2012
SIST EN 13231-4:2013

Železniške naprave - Zgornji ustroj proge - Prevzem del - 2. del: Prevzem reprofiliranih tirov na odprti progi, ostric, prehodov in razširjevalnih naprav

Railway applications - Track - Acceptance of works - Part 2: Acceptance of reprofiling rails in plain line, switches, crossings and expansion devices

Bahnanwendungen - Oberbau - Abnahme von Arbeiten - Teil 2: Abnahme von reprofilierten Schienen im Gleis, Weichen, Kreuzungen und Schienenauszügen

Applications ferroviaires - Voie - Réception des travaux - Partie 2 : Critères de réception des travaux de reprofilage des rails en voie et dans les appareils de voie

Ta slovenski standard je istoveten z: EN 13231-2:2020

ICS:

45.080	Tračnice in železniški deli	Rails and railway components
93.100	Gradnja železnic	Construction of railways

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EUROPEAN STANDARD
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ICS 93.100

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English Version

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

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European foreword

This document (EN 13231-2:2020) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, 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of an identical text or by endorsement, at the latest by May 2021, and conflicting national standards shall be withdrawn at the latest by May 2021.

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 supersedes EN 13231-3:2012 and EN 13231-4:2013. The main changes compared to the previous edition are listed below:

— EN 13231-2 merges the previous EN 13231-2 and EN 13231-3;

— updated to display the state of the art;

— mistakes have been solved;

— Clause 7 is new.

This document is part 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 2: Acceptance of reprofiling rails in plain line, switches, crossings and expansion devices*

— *Part 5: Procedures for rail reprofiling in plain line, switches, crossings and expansion devices*

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document defines the technical requirements and measurements for the acceptance of works for longitudinal and/or transverse reprofiling of railway rail heads in plain line, switches and crossings and expansion devices.

This document applies to Vignole rails of 46 kg/m and above according to EN 13674-1.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

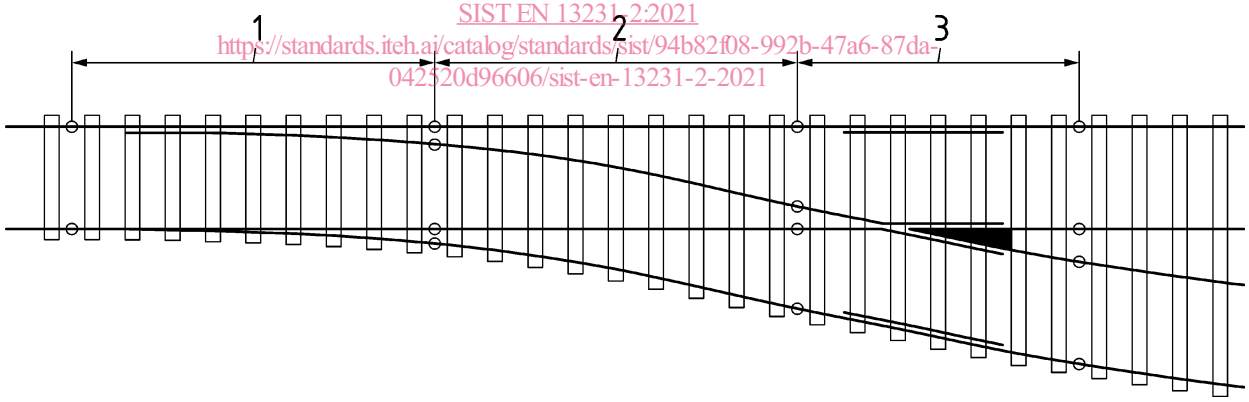
For the purposes of this document, the following terms and definitions apply.

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 https://www.iso.org/obp

3.1
reprofiling zones in switches
area where required reprofiling work is done on the switches depending on the position of the rail within the switch

Note 1 to entry: There are three general areas of treatment as shown in Figure 1.



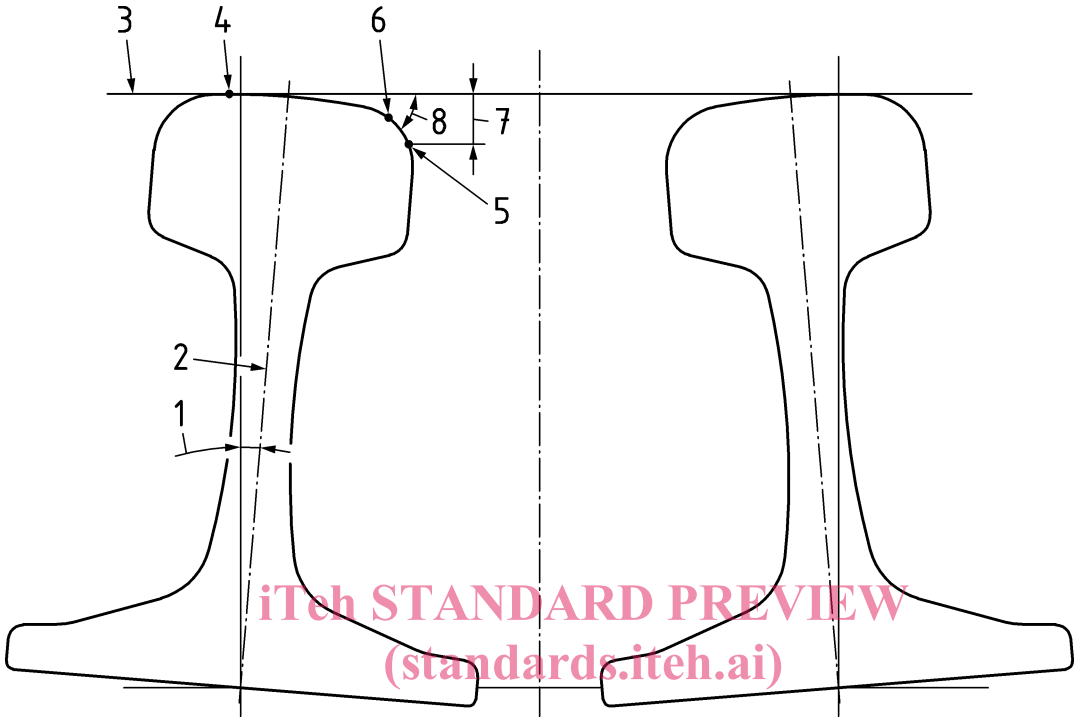
Key

○	welding/joint	2	zone G (closure panel)
1	zone F (switch panel)	3	zone H (crossing panel)

Figure 1 — Reprofiling zones in switches

3.2
reference points
points A, B_1 and B_2 that describe the area for the transverse rail head profile

Note 1 to entry: See Figure 2.



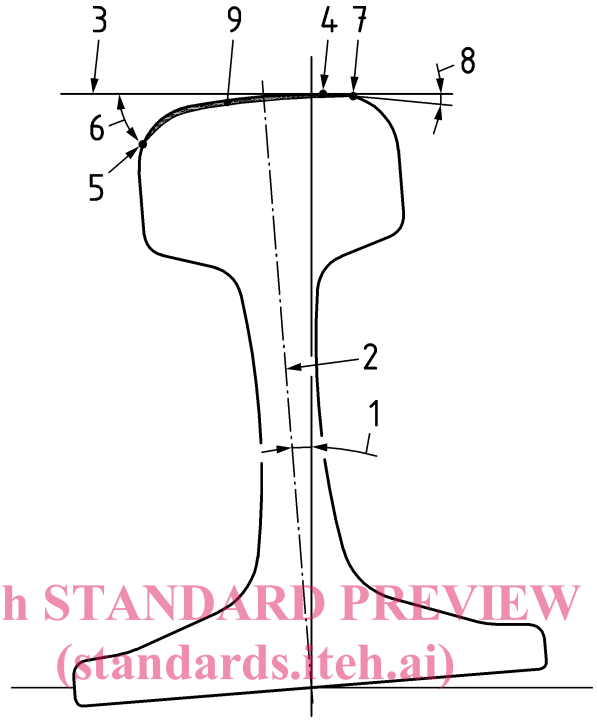
Key

1	angle of inclination	5	reference point B_1 (see 3.25)
2	rail axis	6	reference point B_2 (see 3.26)
3	reference line (see 3.23)	7	distance between point B_1 and reference line (usually 14 mm)
4	reference point A (see 3.24)	8	angle between tangent at point B_2 and reference line (usually 45°)

Figure 2 — Definition of terms, and determination of reference points A, B_1 and B_2 on the transverse profile

3.3
reprofiling zone
part of the rail head that needs to be treated in the zone described by item 9 as in Figure 3

Note 1 to entry: See Figure 3.



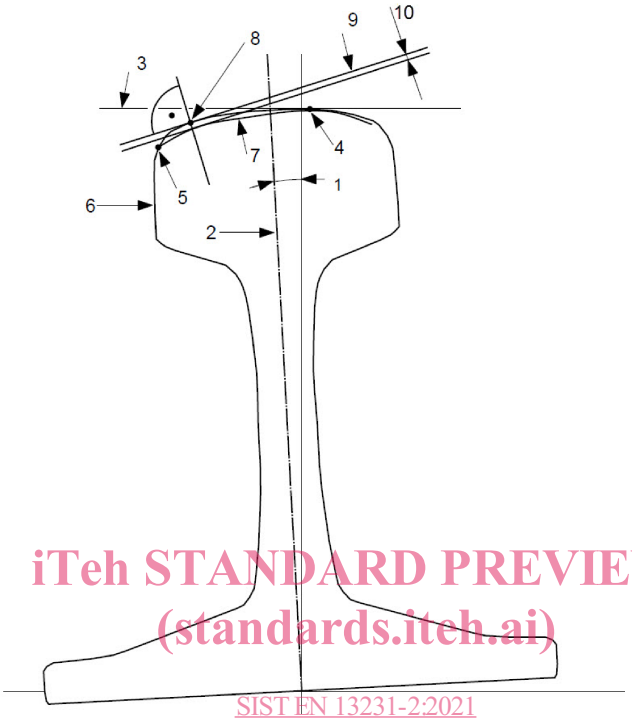
Key

1 angle of inclination (see 3.6)
2 rail axis
3 reference line (see 3.23)
4 reference point A (see 3.24)
5 point C_1 (gauge corner) where the rail profile tangent has an angle of 70° with respect to reference line
6 angle of 70°
7 point C_2 (field side) where the rail profile has an angle of −5° with respect to reference line
8 angle of 5° with respect to the reference line
9 reprofiling zone from C_1 to C_2

Figure 3 — Reprofiling zone

3.4
deviation of measured transverse profile
part described by item 10 as in Figure 4

Note 1 to entry: See Figure 4. In this example, the range of deviation is negative (measured profile below the reference rail).



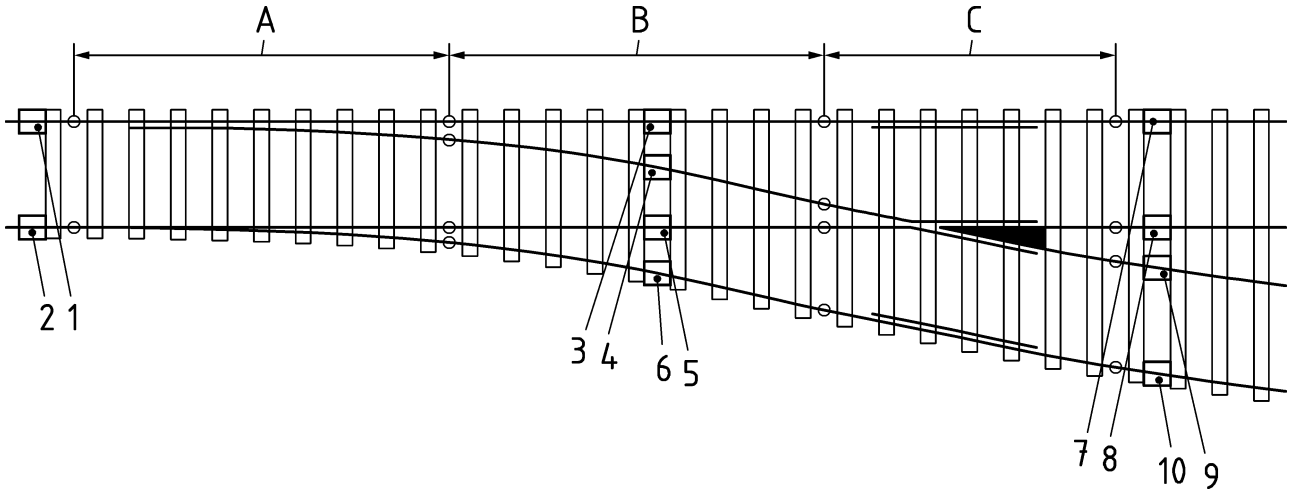
Key

1 angle of inclination (see 3.6)
2 rail axis
3 reference line (see 3.23)
4 reference point A – top of rail where deviation is zero (see 3.24)
5 reference point B_1 or B_2 where deviation is zero (see 3.25 and 3.26)
6 reference profile
7 measured profile
8 point where X is maximum
9 tangent to rail target profile at considered point
10 deviation between 6 and 7 at point 8 – perpendicular to 9

Figure 4 — Deviation of measured transverse profile from reference profile

3.5
transverse profile measurement locations for hand-measuring systems in switches
locations for measurement of the transverse profile in a switch by a non-continuous method that are defined in Figure 5

Note 1 to entry: See Figure 5.



Key

○ welding/joint 1-10 measuring points
A switch panel
B closure panel
C crossing panel

NOTE Point 1 is always on the left facing the switch towards the frog.

Figure 5 — Measuring points for transverse profile for hand-measuring systems in switches

3.6
angle of inclination of rail
nominal angle at which rail is laid; inclined towards the centre of the track

EXAMPLE: 0° (vertical rails), 2,86° (1:20 inclination), 1,91° (1:30 inclination), 1,43° (1:40 inclination), etc.

Note 1 to entry: See Figure 2.

3.7
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 1 to entry: For procedure to demonstrate correlation, see Annex B.

3.8
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 C

3.9
test instrument
instrument whose use as a reference instrument or an approved instrument is being tested

3.10
characteristic length
length on the rail travelled during one rotation of a grinding stone or milling wheel

3.11
class 1, class 2
classes of longitudinal profile differentiated by the proportion of a reprofiling site reaching a specified standard

Note 1 to entry: For longitudinal profile, see 4.3.

3.12
class P, class Q, class R, class S
classes of transverse profile differentiated by the proportion of a reprofiling site reaching a specified standard

Note 1 to entry: For transverse profile, see 5.4.

3.13
Quality class 1, quality class 2, quality class 3
classes of the surface quality of the reprofiled rail

3.14
cut-off wavelength
wavelength of a sinusoidal profile of which 50 % of the amplitude is transmitted by the profile filter

Note 1 to entry: Profile filters are identified by their cut-off wavelength value, see EN ISO 16610-21.

3.15
deviation of the measured profile
deviation between the measured transverse profile and the reference rail, measured normal to the surface of the reference rail when the measured transverse profile and the reference rail are aligned at points A and B_1 or A and B_2, without rotation of either profile

Note 1 to entry: The deviation is considered positive when the measured transverse profile is above the reference rail.

Note 2 to entry: For deviation, see Figure 4.

3.16
facet
flat sector of the transverse profile of a reprofiled rail produced by the reprofiling tool

3.17
primary profile
representation of the measured longitudinal profile before application of any profile filter

3.18
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

3.19
filtered profile
profile which results from applying a profile filter to the primary profile

3.20
peak-to-peak limit (ppl)
limit of the value in which the value of the filtered longitudinal profiles shall lie

Note 1 to entry: It is intended as the plus and minus values $(\pm A)$ in which a sinusoidal signal of amplitude A lies.

3.21
percentage exceedance
percentage length of a test site over which a measurement of the amplitude of the filtered profile exceeds a prescribed limit

3.22
phase correct profile filter
profile filter which does not cause phase shifts which lead to asymmetrical profile distortions

Note 1 to entry: For profile filter, see EN ISO 16610-21.

3.23
track section
continuous part of track with the same track geometry and the same track construction

3.24
range of deviation
difference between the maximum and minimum values of the deviation of the measured transverse profile

Note 1 to entry: For measured profile, see Figure 4.

3.25
reference line
line normal to the track's longitudinal axis and tangential to the heads of both rails

3.26
reference point A
highest point of the rail referred to the opposite rail of the track where the reference line touches the rail profile

Note 1 to entry: For specified angle of inclination, see Figure 2

3.27
reference point B_1
point on the gauge face of a reference rail 14 mm below the reference line

Note 1 to entry: For reference point B_1, see Figure 2.

3.28

reference point B_2

point on the gauge corner of a reference rail at which a line which is tangential to the rail lies at an angle of 45° to the reference line

Note 1 to entry: For reference point B_2, see Figure 2.

3.29

reference profile

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

3.30

reference rail

rail with the reference profile, at the desired angle of inclination relative to the reference line

Note 1 to entry: For reference rail, see Figure 2.

3.31

reprofiling

action that is undertaken to modify the longitudinal and/or transverse profile of a rail

3.32

reprofiling site

length of track where the rail is to be reprofiled

3.33

reprofiling zone

area of the rail head 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 1 to entry: For reprofiling zone, see Figure 3.

3.34

sampling interval

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

3.35

traced profile

profile of the rail as recorded by the measuring system

3.36

transition length

initial and/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

4 Longitudinal profile

4.1 Principle

Measurements are made using either a reference instrument, see 3.8, or an approved instrument, see 3.7. 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 document.

NOTE An example of an approved instrument is the type of system used for routine corrugation measurement. Some of the systems used 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 recognized, however, that it can be uneconomic to achieve 100 % compliance with these, particularly where isolated rail running surface defects, 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 very short waves need to be removed, in particular for noise reduction, it might also be necessary to specify a criterion for those wavelengths.

For the necessary annual metrological check, see Annex D.

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

Due to the complex geometry and short length worked on in switches and crossings and expansion devices manual measurement systems can be used alternatively. The rail containing the frog shall be measured only in “Zone G”, see Figure 1; the opposite rail shall be measured in the total ground length.

Longitudinal profile measurements shall be made within a position of 15 mm laterally on the rail from the reference point A to the gauge corner area, to produce the traced profile.

NOTE It is a known issue that some networks have corrugation on high rail gauge corner. This document does not deal with this issue. IM and contractor can agree on measurement methods and acceptance criterion.

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

If such a system is out of order or not available recording details shall be settled in the contract.

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