SLOVENSKI STANDARD
SIST EN 13231-1:2013

01-junij-2013

Nadomešča:
SIST EN 13231-1:2006
SIST EN 13231-2:2006

Železniške naprave - Zgornji ustroj - Prevzem del - 1. del: Dela na (zgornjem ustroju) tiru s tirno gredo - Odprta proga, kretnice in križišča

Railway applications - Track - Acceptance of works - Part 1: Works on ballasted track - Plain line, switches and crossings

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Bahnanwendungen - Oberbau - Abnahme von Arbeiten - Teil 1: Arbeiten im Schotteroberbau - Gleise, Weichen und Kreuzungen

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Applications ferroviaires - Voie - Réception des travaux - Partie 1: Travaux de voie ballastée - Voie courante et appareils de voie

Ta slovenski standard je istoveten z: **EN 13231-1:2013**

ICS:

45.080	Tračnice in železniški deli	Rails and railway components

SIST EN 13231-1:2013 **en,fr**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 13231-1

May 2013

ICS 93.100

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English Version

Railway applications - Track - Acceptance of works - Part 1: Works on ballasted track - Plain line, switches and crossings

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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.

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Foreword

This document (EN 13231-1:2013) 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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

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

This document supersedes EN 13231-1:2006, EN 13231-2:2006.

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* (the present document)

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

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

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

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NOTE Part 2 does not exist in this series.

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The following technical modifications have been introduced during the revision:

— merging of EN 13231-1:2006 and EN 13231-2:2006, taking into account the similarities between them;

— definition of the absent tolerances for some existing parameters;

— revision of the tolerances already set up on the former version;

— definition of new parameters and the respective tolerances.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies the minimum technical requirements and the tolerances for the acceptance of works on ballasted track situated on plain line and on switches and crossings and rail expansion devices, as part of the track, for 1 435 mm and wider track gauge railways, concerning construction of new track, track renewal and track maintenance. More particularly, this standard gives the requirements for the documentation of work parameters, for the tolerances for relative track geometry and absolute track position and for the acceptance procedures.

This standard does not deal with contractual and legal aspects and it does not cover either works related to reprofiling the railhead nor the associated measurements, except for some measurements related to safety, since these works are covered by other parts of EN 13231 series.

Related works, e.g. platform reconstruction, formation, drainage, level crossings are not covered by this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13450, *Aggregates for railway ballast*

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EN 13848-1, *Railway applications — Track — Track geometry quality — Part 1: Characterisation of track geometry*

EN 13848-2, *Railway applications — Track — Track geometry quality — Part 2: Measuring systems — Track recording vehicles*

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EN 13848-3, *Railway applications — Track — Track geometry quality — Part 3: Measuring systems — Track construction and maintenance machines*

EN 13848-4, *Railway applications — Track — Track geometry quality — Part 4: Measuring systems — Manual and lightweight devices*

EN 13848-5, *Railway applications — Track — Track geometry quality — Part 5: Geometric quality levels — Plain line*

EN 14587 (series), *Railway applications — Track — Flash butt welding of rails*

EN 14730 (series), *Railway applications — Track — Aluminothermic welding of rails*

3 Terms and definitions

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

3.1
works on ballasted track (including switches and crossings)
works on ballasted track cover:

— construction of new track;

— renewal or partial renewal and maintenance of rails, sleepers, ballast and other components;

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- removing and relaying existing track because of works on substructure (e.g. bridges, tunnels, earthworks, etc.);
- renewal or partial renewal and maintenance of switches and crossings (switch rail/stock rail, crossing, etc.), bearers and ballast;
- works to correct track geometry, e.g. track tamping/levelling/lining;
- dynamic stabilising;
- ballast cleaning;
- stressing work;
- welding

3.2
plain line
any section of ballasted track excluding switches and crossings

3.3
acceptance
declaration of the customer to the contractor that the work has been achieved in accordance with the contract

3.4
tolerance
permissible deviation from reference or designed value

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3.5
relative track geometry
group of parameters defining the position of the rails, usually comprising the following: track gauge, alignment, longitudinal level, twist and cross level

Note 1 to entry: These parameters are described in EN 13848 series.

3.6
design track position
position of the track defined in the track design process

Note 1 to entry: The design position is defined in the geodetic reference system.

Note 2 to entry: The control of the design studies and layouts for new or upgraded tracks according to EN 13803-1 and EN 13803-2 or other regulations is not part of this standard.

3.7
actual track position
position of the track when measured from external absolute references

EXAMPLE Network of geodetic reference points.

3.8
deviation from design track position
vertical and lateral difference between the design track position and the actual track position

3.9
nominal track gauge
single value which identifies the track gauge but may differ from the design track gauge

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3.10
design track gauge
single value which is obtained when all the components of the track conform precisely to their design dimensions, or their median design dimension, when there is range

Note 1 to entry: It may differ from nominal track gauge. The design track gauge is specified by the customer taking into account the materials, the method of measurement and whether the application is on plain line or in switches and crossings.

3.11
new track
new constructed track applying new materials, including formation

3.12
renewal
complete replacement of all the components of the track (rails, sleepers, fastenings, switches and crossings, rail expansion devices and ballast) applying new materials, including the formation if necessary

3.13
partial renewal
replacement of one or more (but not all) track components in a track section

3.14
maintenance
all other works than design track gauge, new track and renewal

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3.15
bearer
sleeper for switches and crossings

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3.16
stagger
deviation in longitudinal relative position between the rail joints in the left and the right rails

4 Acceptance of works on plain line and on switches and crossings and rail expansion devices

4.1 General

The requirements of this European Standard apply to works as defined in 3.1, to the extent that they are within the scope of the work.

An acceptance form shall be prepared for each item of work outlining the results achieved.

Acceptance is not given until the work is completed in accordance with the requirements of the contract.

4.2 Acceptance deadlines

Acceptance shall not be carried out until the track has been subjected to an appropriate passing tonnage described and defined by the customer. However, acceptance should occur within a period not exceeding six weeks or after the passage of a maximum of 1,500 000 tonnes after the completion of the works, although the customer may extend this timescale to permit any follow-up tamping to be carried out.

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4.3 Acceptance measurements, checks and related documentation

Before acceptance, the following measurements or checks shall be carried out when applicable (manually or by automatic means), and shall be documented:

— relative track geometry of plain line, switches and crossings as specified in 4.4;

— absolute track position of plain line, switches and crossings as specified in 4.5;

— sleeper or bearer position, voiding of sleepers or bearers as specified in 4.6.2, 4.6.3, 4.6.4 and 4.6.5;

— correct assembly and integrity of the rail fastenings, pads and insulators as specified in 4.6.6;

— welds as specified in 4.6.7 (running surface and running edge);

— joint gaps, dips and staggers as specified in 4.6.8;

— insulated joints as specified in 4.6.9;

— ballast cross section as specified in 4.6.10;

— stressing work as specified in 4.6.11;

— specific measurements or checks for switches and crossings and rail expansion devices as specified in 4.7 and 4.8;

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— tamping work as specified in 5.2;

— dynamic stabilising work as specified in 5.3;

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— ballast compaction as specified in 5.4;

— ballast replacement / cleaning work as specified in 5.5;

— damage caused to rails, sleepers, bearers, fastenings, cables and other equipment, or where the work process has displaced the sleepers, the bearers or the rail pads;

— all track materials compliance with the customer's relevant acceptance criteria or specifications, in particular acceptance of associated works as well as approval and acceptance of the material provided by the supplier.

The customer may request additional documented measurements or checks if contractually agreed.

The customer may also restrict the choice of measuring devices if contractually agreed.

Relative track geometry shall be measured by a track recording vehicle or by a track construction and maintenance machine fitted with measuring equipment, both in accordance with series EN 13848. If the measuring equipment fails, or is not available, corresponding light weight or manual devices measurements shall be taken and documented. Other use of light weight or manual devices measurements shall be in accordance with series EN 13848.

If track works affect track geometry, measurement of relative track geometry according to series EN 13848 shall be performed before allowing commercial trains to run.

For the purpose of acceptance, every section and switch and crossing shall be inspected by the experts as nominated by the customer and the contractor.

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The contract shall define who should perform the measurements and how they shall be documented.

4.4 Relative track geometry

4.4.1 Parameters

4.4.1.1 General

Measurements as defined in EN 13848-1.

4.4.1.2 Track gauge and cross level

Measurement:

— by track recording vehicles according to the requirements of EN 13848-2; or

— by track construction and maintenance machines according to the requirements of EN 13848-3; or

— by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4, with a minimum of 10 measurements on successive sleepers, every 100 m.

4.4.1.3 Longitudinal level and alignment

Measurements for longitudinal level should preferably be undertaken on both rails. Measurement for alignment should be undertaken on both rails on straight track and shall be undertaken on the outer rail in curves:

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— by track recording vehicles according to the requirements of EN 13848-2; or

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— by track construction and maintenance machines according to the requirements of EN 13848-3; or

— by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4.

4.4.1.4 Twist

Measurement:

— by track recording vehicles according to the requirements of EN 13848-2; or

— by track construction and maintenance machines according to the requirements of EN 13848-3; or

— by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4, measurements should be performed at least every 3 m.

4.4.2 Tolerances

Accepted track shall comply with the tolerances shown in Tables 1 and 2.

The tolerances in Tables 1 and 2 are for loaded track measurements, which are recommended. For unloaded track measurements, the customer shall specify the tolerances for the relative track geometry parameters, which should be stricter.

All measurements shall be sampled at constant distance based intervals not larger than 0,5 m.

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For track construction and maintenance machines that move non-continuously and measure track geometry whilst working, the sampling interval may be extended up to 1,5 m. For track gauge, values shown in Tables 1 and 2 apply to both isolated defects of track gauge and mean track gauge as defined in EN 13848-1.

The track gauge between any two adjacent sleepers shall not vary by more than 1 mm, unless otherwise specified by the customer (only applicable for hand measurements).

For measurements made by track recording vehicles, track construction and maintenance machines or track measuring trolleys, the track gauge shall not vary by more than 3 mm per 1,5 m, unless otherwise specified by the customer.

Concerning the longitudinal level and alignment for plain line and switches and crossings:

a) the customer shall decide if 10 m chord measurement results or *D*1, *D*2 or *D*3 results according to EN 13848-1 should be used;

b) the analysis method shall be "mean-to-peak";

   Recording vehicles and track construction and maintenance machines delivered prior to the issue of this standard may use the analysis method "peak-to-peak". The values of the tolerances should be set by the customer.

   For special analysis of track geometry during and after tamping and stabilising work as on short sections with difficult track geometry and on switches and crossings, track construction and maintenance machines may use the analysis method "peak-to-peak". The values of the tolerances should be set by the customer.

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c) for chord measurements the following applies:

   1) At chord measurement results, the sliding mean for each point shall be taken in a length not longer than 40 m considering a symmetric interval.

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   2) For alignment, the corridor as defined by the mean and the tolerances shall include the design value; if not, the defect shall be taken between the design value and the peak.

   3) Chord measurements by recording vehicles or track construction and maintenance machines shall be made by an asymmetrical chord with a ratio of 40 % to 60 %, which should be 10 m long; for measurements by trolleys or manually operated devices a symmetrical chord with 10 m (in curves) and 20 m (in straight tracks) may be allowed.

   4) Recording vehicles and track construction and maintenance machines delivered prior to the issue of this standard may use a symmetrical chord as well.

   5) For measurements made by a chord system with base lengths other than 10 m, the results shall be converted to 10 m asymmetrical chord (40 % to 60 %) results.

The twist base length shall normally be 3 m, and the analysis method shall be "zero-to-peak". In transition curves with design twist, the tolerances shall be considered from the design twist, but not from the zero line, without exceeding the intervention limit values of EN 13848-5.

Where a twist base length other than 3 m is used, the customer shall specify the acceptance tolerances.

For tracks built with used materials, including switches and crossings, the tolerances for the parameters shall be specified by the customer.

In case of partial renewal, the customer shall specify if Table 1 or Table 2 or a combination of both is applicable.

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Table 1 — Acceptance tolerances for loaded track – Renewals and new track (including switches and crossings)

Parameters	Type class				
	I	II	III	IV	V
	Speed range (km/h)				
	$V \leq 80$	$80 < V \leq 120$	$120 < V \leq 160$	$160 < V \leq 230$	$230 < V \leq 360$
Track gauge for plain line (mm) (deviation from design value)	+ 4/- 3	+ 4/- 3	+ 4/- 2	+ 4/- 2	+ 3/- 2
Track gauge for switches and crossings (mm) (deviation from design value)	+ 4/- 3	+ 4/- 3	+ 4/- 3	+ 4/- 3	+ 4/- 3
Cross level (mm) (deviation from design value)	± 3	± 3	± 3	± 2	± 2
10 m chord longitudinal level (mm) (mean-to-peak)	± 6	± 4	± 4	± 3	± 3
*D*1 Longitudinal level (mm) (mean-to-peak)	± 4	± 3	± 3	± 2	± 2
*D*2 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	± 3	± 2
*D*3 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
10 m chord alignment (mm) (mean-to-peak)	± 5	± 3	± 3	± 3	± 3
*D*1 Alignment (mm) (mean-to-peak)	± 4	± 2	± 2	± 2	± 2
*D*2 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	± 3	± 2
*D*3 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
Twist over 3 m (mm) (deviation from design value to peak)	± 4,5	± 3	± 3	± 3	± 3

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