SLOVENSKI STANDARD
oSIST prEN 13232-9:2020

01-marec-2020

Železniške naprave - Zgornji ustroj proge - Kretnice in križišča za Vignolove tirnice - 9. del: Kretniški sklopi

Railway applications - Track - Switches and crossings for Vignole rails - Part 9: Layouts

Bahnanwendungen - Oberbau - Weichen und Kreuzungen für Vignolschienen - Teil 9: Weichenanlagen

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Applications ferroviaires - Infrastructure - Appareils de voie - Partie 9: Ensemble de l'appareil

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Ta slovenski standard je istoveten z: **prEN 13232-9**

ICS:

45.080	Tračnice in železniški deli	Rails and railway components

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 13232-9

January 2020

ICS 93.100

Will supersede EN 13232-9:2006+A1:2011

English Version

Railway applications - Track - Switches and crossings for Vignole rails - Part 9: Layouts

Applications ferroviaires - Infrastructure - Appareils de voie - Partie 9: Ensemble de l'appareil

Bahnanwendungen - Oberbau - Weichen und Kreuzungen für Vignolschienen - Teil 9: Weichenanlagen

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

If this draft becomes a European Standard, 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.

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

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oSIST prEN 13232-9:2020

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 13232-9:2020
https://standards.iteh.ai/catalog/standards/sist/3bce65e3-1bf7-4648-8ac6-3a6b40f504d5/osist-pren-13232-9-2020

oSIST prEN 13232-9:2020

European foreword

This document (prEN 13232-9:2020) 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 13232-9:2006+A1:2011.

This series of standards “*Railway applications – Track – Switches and crossings for Vignole rails*” covers the design and quality of switches and crossings in flat bottomed rail. The list of Parts is as follows:

— *Part 1: Definitions*

— *Part 2: Requirements for geometric design*

— *Part 3: Requirements for wheel/rail interaction*

— *Part 4: Actuation, locking and detection*

— *Part 5: Switches*

— *Part 6: Fixed common and obtuse crossings*

— *Part 7: Crossings with moveable parts*

— *Part 8: Expansion devices*

— *Part 9: Layouts*

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oSIST prEN 13232-9:2020
https://standards.iteh.ai/catalog/standards/sist/3bce65e3-1bf7-4648-8ac6-3a6b40f504d5/osist-pren-13232-9-2020

Part 1 contains terminology used throughout all parts of this series. Parts 2 to 4 contain basic design guides and are applicable to all switch and crossing assemblies. Parts 5 to 8 deal with particular types of equipment including their tolerances. These use Parts 1 to 4 as a basis. Part 9 defines the geometric and non-geometric acceptance criteria for inspection of layouts.

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1 Scope

This document is to:

— define the geometrical and non-geometrical acceptance criteria for inspection of layouts assembled whether in the fabrication plant, or trackside in the case of layouts that are delivered as components, part assembled or in "kit" form;

— determine the extent of supply;

— define the minimum requirements for traceability.

This document applies only to layouts that are assembled in the manufacturing plant or that are assembled for the first time at trackside.

Other aspects such as installation and maintenance also influence performance; these are not considered as part of this standard.

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.

prEN 13232-2:2020, *Railway applications – Track – Switches and crossings for Vignole rails – Part 2: Requirements for geometric design*

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prEN 13232-5:2020, *Railway applications – Track – Switches and crossings for Vignole rails – Part 5: Switches*

oSIST prEN 13232-9:2020
https://standards.iteh.ai/catalog/standards/sist/3bce65e3-1b17-4648-8ac6-3a6b40f504d5/osist-pren-13232-9-2020

prEN 13232-6:2020, *Railway applications – Track – Switches and crossings for Vignole rails – Part 6: Fixed common and obtuse crossings*

prEN 13232-7:2020, *Railway applications – Track – Switches and crossings for Vignole rails – Part 7: Crossings with moveable parts*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
customer
term used to define one party involved in using the EN as the technical basis for a transaction: the Operator or User of the equipment, or the Purchaser of the equipment on the User's behalf

3.2
supplier
term used to define one party involved in using the EN as the technical basis for a transaction: the Body responsible for the use of the EN in response to the Customer's requirements

oSIST prEN 13232-9:2020

3.3
lead of turnout
distance between reference points of the different components of the S&C, e.g. the distance between theoretical points of crossing and switch in a standard layout

Note 1 to entry: The lead is measured parallel to the reference line, except when stated otherwise

4 Acceptance (General Design Process Step 4 – see prEN 13232-2:2020)

4.1 Inputs

4.1.1 Documents and drawings

Assembly documents as defined in prEN 13232-2:2020, 6.5, form the basis of acceptance testing.

These assembly documents will be accompanied by all detailed component drawings that are within the limits of supply.

4.1.2 Limits of supply

The limits of supply shall be clearly specified on the drawings.

4.2 Acceptance testing

4.2.1 General

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The supplier shall demonstrate to the customer that the critical dimensions have been measured and documented and the acceptance criteria defined in this standard have been met.

4.2.2 Components acceptance

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All components are accepted according the relevant specifications or standard. All necessary tests are performed and certificates delivered as requested by these documents.

The general tolerances given in Table 1 apply to all other components of the S&C.

Table 1 — General acceptance tolerances

Parameter	Tolerance
Rail lengths (up to 24 m)	±3 mm
Rail lengths (>24 m)	±4 mm
Diameter of fishbolt hole	+1/-0,5 mm
Hole position relative to fishing surface	±1 mm
Hole position relative to end of rail (for temporary fishplating)	±1,5 mm (±3 mm)
Chamfer of hole (not needed in case of cold hole expansion)	min. 0,5 mm
Surface roughness of machined wheel contact areas	Ra 6,3

4.2.3 Layout assembly acceptance

4.2.3.1 General principles

The layout shall be assembled for inspection. This can be performed in factory or at field site, according to the customer's requirements. The assembly shall be performed on the whole layout, when possible. If this is not possible, customer and supplier shall agree on assembly requirements. Panels making up parts of a

oSIST prEN 13232-9:2020

layout may be built and inspected independently, provided that the overall tolerances for the complete turnout can be demonstrated to be maintained on full assembly.

4.2.3.2 Assembly and test conditions

During assembly the panels and components shall be handled so that no permanent deformation is introduced.

The assembly shall be performed on a horizontal and plane surface, according to the specifications given in the tender documents. A reference line may be constructed at the assembly site, for example using a string line between two reference points.

The tolerances shall apply at a reference temperature T_R specified by the customer. For ambient temperature at the time of inspection, lengths shall be corrected in accordance with the following formula:

$$L = L_{nom} [1 + \alpha .(T_A - T_R)]$$

where:

α is the temperature coefficient of linear expansion $1{,}15 \times 10^{-5}$/K;

T_A is the temperature at assembly;

T_R is the reference temperature;

L_{nom} is the nominal length as given on the assembly documents.

All measures shall be checked at the reference plane except when stated otherwise.

Measuring equipment shall be proposed by the supplier and approved by the customer.

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4.2.3.3 Acceptance criteria

oSIST prEN 13232-9:2020
https://standards.iteh.ai/catalog/standards/sist/3bce65e3-1bf7-4648-8ac6-

4.2.3.3.1 General comments

This section defines the manufacturing tolerances of the critical dimensions.

If the customer imposes restrictions on the tolerances of the critical dimensions, these shall be stated in the tender documents. Dimensions and tolerances relating to special requirements (e.g. actuation, locking and detection systems) shall also be stated.

4.2.3.3.2 Geometry checking

The general geometry is checked by:

— the alignment of the reference (lead) rail to the reference line;

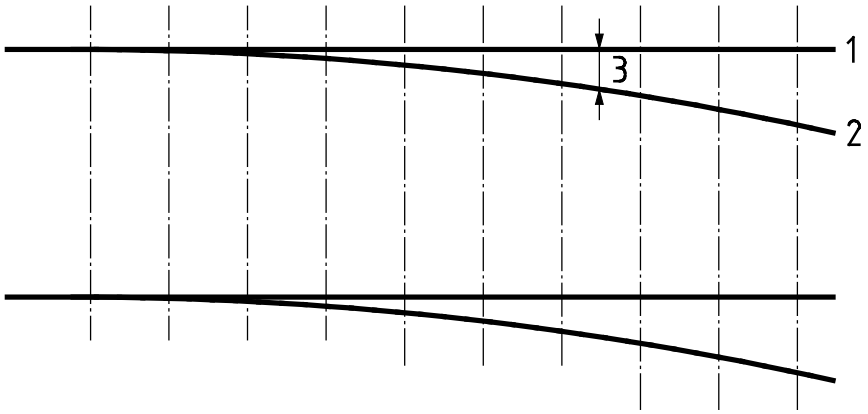
— the offsets from the other rails to the reference rail (see Figure 1);

— the track gauge;

— length of layout.

Table 2 gives tolerances for checking the geometry.

oSIST prEN 13232-9:2020



Key

1 Reference rail

2 “Curved” rail

3 Offset

Figure 1 — Offset

Table 2 — Geometry acceptance tolerances

Parameter	Tolerance (mm)
Alignment of reference rail	±3
Offsets to reference rail	±2
Track gauge	±2
Deviation of track gauge Between 2 bearers Over the whole layout	1 3
Lead ≤ 36 m > 36 m	±10 ± 15
Track centres	+5/0

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oSIST prEN 13232-9:2020
https://standards.iteh.ai/catalog/standards/sist/3bce65e3-1bf7-4648-8ac6-5a6b40f504d5/osist-pren-13232-9-2020

4.2.3.3.3 Verifying Functional and safety dimensions (FSDs)

Functional and safety dimensions (FSDs) are safety critical. The selection of limiting values depends on national and international regulations.

The nominal values for FSDs and their fabrication tolerances have an influence on the maintenance frequency and are therefore the result of the customer’s economic choice. Examples of values used by some European networks are given in prEN 13232-3:2020, Annex A.

All FSD's given in Table 3 are to be checked.

NOTE A check gauge (crossing nose protection) tolerance of 3 mm is typical. This may be stated as +2/-1 or ± 1,5 mm, or other combination, in order to achieve the requirement. It is preferred to use the check gauge dimension rather than the flangeway groove width for inspection, as this better reflects the desired function. Free wheel passage can be checked either by checking the free wheel passage itself, or by checking the flangeway. The latter is most common for fabrication tolerances.

oSIST prEN 13232-9:2020

Table 3 — Functional and safety dimensions

Parameter	Symbol
Free Wheel passage in switch area Flangeway at the open switch tongue	F_{wps} f_s
Fixed common crossing nose protection	N_{pcf}
Free wheel passage at common crossing nose	F_{wpcf} F_{wpccmp}
Free Wheel passage at check rail entry Flangeway at check rail entry	F_{wpcre} f_{cre}
Free Wheel passage at wing rail entry Flangeway at wing rail entry	F_{wpwre} f_{wre}
Fixed obtuse crossing nose protection	N_{pof}
Free wheel passage at fixed obtuse crossing nose	F_{wpof}
Switch point relief	A2
Lateral point retraction	E
NOTE For further definitions see prEN 13232-3:2020.	

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4.2.3.3.4 Gaps and clearances

In order to demonstrate that no components are deformed, possibly leading to malfunctioning of the switches, the following gaps and clearances are to be checked.

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Some values could be insufficient, depending on the ALD system used. These shall be imposed by the ALD system and are not included in following table.

For inspection the switch rail shall be fixed to the stock rail at the drive position.

Table 4 — Tolerances for gaps, squareness, etc

Parameter	Tolerance
Squareness of switches at drive positions	±2 mm
Squareness of front and heel joints	±5 mm
Bearer squareness	±5 mm
Bearer spacing	±10 mm
Switch – stock rail contact allowance	≤ 1 mm
Contact of switch studs	≤ 1 mm
Vertical gap at sliding chairs	≤ 1 mm