



**SLOVENSKI STANDARD**  
**oSIST prEN 13232-9:2014**  
**01-julij-2014**

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**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

Applications ferroviaires - Voie (Appareils de voie - Partie 9): Ensemble de l'appareil

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**ICS:**

45.080	Tračnice in železniški deli	Rails and railway components
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

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**prEN 13232-9 rev**

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

English Version

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

Applications ferroviaires - Voie - 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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## Foreword

This document (prEN 13232-9:2014) 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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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 functional and geometric dimensions and tolerances for layout assembly.

The following terms are used within to define the parties involved in using the EN as the technical basis for a transaction:

Customer    the Operator or User of the equipment, or the Purchaser of the equipment on the User's behalf.

Supplier     the Body responsible for the use of the EN in response to the Customer's requirements.

**prEN 13232-9:2003 (E)****1 Scope**

This part of this EN is to:

- define the geometrical and non-geometrical acceptance criteria for inspection of layouts assembled both in the fabrication plant and at track site in case of layouts that are delivered non or partially assembled or in a “kit” form;
- determine the limits of supply;
- define the minimum requirements for traceability.

This European Standard 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, 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.

prEN 13232-1:2013, *Railway applications – Track – Switches and crossings for Vignole rails – Part 1: Definitions*

prEN 13232-2:2014, *Railway applications – Track – Switches and crossings for Vignole rails – Part 2: Requirements for geometric design*

prEN 13232-3:2014, *Railway applications – Track – Switches and crossings for Vignole rails – Part 3: Requirements for wheel/rail interaction*

**3 Terms and definitions****3.1****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. The lead is measured parallel to the reference line, except when stated otherwise

**4 Acceptance** (General Design Process Step 4 – See prEN 13232-2:2014)**4.1 Inputs****4.1.1 Documents and plans**

Assembly documents as defined in prEN 13232-2:2014, sub-clause 6.5, form the basis of acceptance testing.

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

**4.1.2 Limits of supply**

The limits of supply shall be clearly specified in the tender documents.

## 4.2 Acceptance testing

### 4.2.1 Components acceptance

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 holes	+1/-0,5 mm
Holes position relative to fishing surface	± 1 mm
Holes position relative to end of rail (for temporary fishplating)	± 1,5 mm (±3 mm)
Chamfer of the holes	min. 0,5 mm
Surface roughness of machined wheel contact areas	Ra 6,3
NOTE	Chamfer of holes is not needed in case of cold hole expansion.

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### 4.2.2 Layout assembly acceptance (standards.iteh.ai)

#### 4.2.2.1 General principles

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The layout shall be assembled for inspection. This can be performed in factory or at field site, according to the customers' 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.

#### 4.2.2.2 Assembly and test conditions

During assembly the different components shall be handled correctly so that no permanent deformation is induced.

The assembly shall be performed on a horizontal and plane surface, according to the specifications given in the tender documents.

A reference basis is materialised at assembly site by a cord or two reference points.

The tolerances are based on workshop temperatures or a predefined reference temperature  $T_R$  specified by the customer. In case this condition can not be met, all lengths shall be corrected in accordance to following formula:

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

where:

$\alpha$  = 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 are checked at the reference plane except when stated otherwise.

**prEN 13232-9:2003 (E)**

The test equipment shall be proposed by the supplier and approved by the customer.

**4.2.2.3 Acceptance criteria****4.2.2.3.1 General comments**

This sub-clause defines the tolerances of the critical dimensions that shall be verified.

Any dimensions and tolerances relating to special requirements (e.g. operating systems) shall be verified.

If the customer imposes restrictions on the tolerances given in the following, they shall be stated in the tender documents.

**4.2.2.3.2 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.

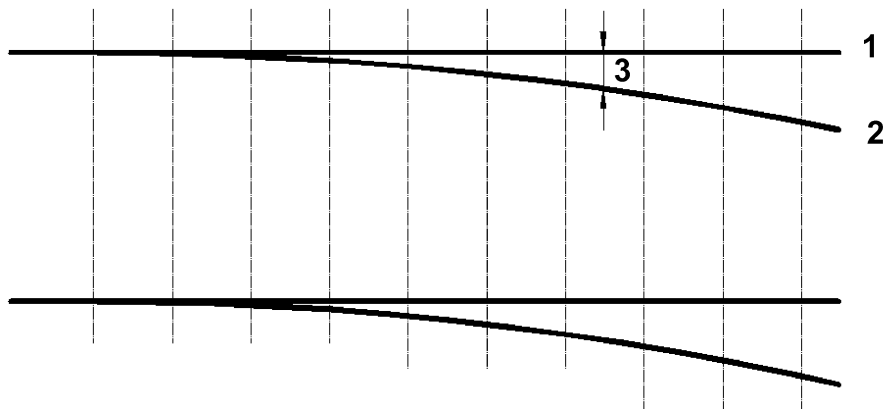
Table 2 gives tolerances for checking the geometry.

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**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	± 1
Track gauge	± 2
Deviation of track gauge Between 2 bearers Over the whole layout	1 3
Lead ≤ 36 m > 36 m	± 10 ± 15
Track distance	+5/0

**4.2.2.3.3 Functional and safety dimensions (FSD) – Checking**

Functional and safety dimensions (FSD) are safety critical. The choice for the limiting value depends on national and international regulations.

Nominal values for FSD and their fabrication tolerances have their influence on the maintenance frequency and are therefore the result of an economic choice. Their choice shall be based on the limits and belong to the customer in view of his maintenance policy. Practically used values on some European Networks are given in prEN 13232-3:2014, 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. The designer may specify +2/-1 or +/-1.5 mm or other combination in order to achieve this. It is preferred to use check gauge dimension rather than flangeway groove width for inspection, as this better reflects the desired function. Free wheel passage can be either checked by checking the free wheel passage itself, or by checking the flangeway. The latter is most common for fabrication tolerances.

**Table 3 — Functional and safety dimensions**

Parameter	Symbol
Free Wheel passage in switch area	$F_{wps}$
Flangeway at the open switch tongue	$f_s$
Fixed common crossing nose protection	$N_{pcf}$
Free wheel passage at common crossing nose	$F_{wpcf}$ $F_{wpcmp}$
Free Wheel passage at check rail entry	$F_{wpcre}$
Flangeway at check rail entry	$f_{cre}$
Free Wheel passage at wing rail entry	$F_{wpwre}$
Flangeway at wing rail entry	$f_{wre}$
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 13232-3:2014.

#### 4.2.2.3.4 Gaps and clearances

In order to guarantee that no deformed parts would cause malfunctioning, the following gaps and clearances are to be checked.

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.

**Table 4 — Tolerances for gaps, squareness, etc.**

Parameter	Tolerance
Squareness of switches at drive positions	$\pm 2$ mm
Squareness of front and heel joints	$\pm 5$ mm
Bearer squareness	$\pm 5$ mm
Bearer spacing	$\pm 10$ mm
Switch – stock rail contact allowance <sup>a</sup>	$\leq 1$ mm
Contact of switch studs <sup>a</sup>	$\leq 1$ mm
Vertical gap at sliding chairs	$\leq 1$ mm
<sup>a</sup>	For inspection the tongue shall be fixed to the stock rail at the drive position.

### 4.3 Outputs

#### 4.3.1 Documents

Acceptance documents for both assembly and components shall be agreed between customer and supplier.

These documents shall make note of all items to be checked and the corresponding measured values. When during inspection, rework has been performed this will be noted on the acceptance form.

An example of an assembly acceptance form is given in Annex A.