



SLOVENSKI STANDARD
oSIST prEN 13232-4:2014
01-julij-2014

Železniške naprave - Zgornji ustroj proge - Kretnice in križišča za Vignolove tirnice
- 4. del: Postavljalna naprava in kontrola lege ostrice

Railway applications - Track - Switches and crossings for Vignole rails - Part 4:
Actuation, locking and detection

Bahnanwendungen - Oberbau - Weichen und Kreuzungen für Vignolschienen - Teil 4:
Umstellung, Verriegelung und Lageprüfung

Applications ferroviaires - Voie - Appareils de voie - Partie 4: Manoeuvre, blocage et
contrôle

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ICS:

45.080	Tračnice in železniški deli	Rails and railway components
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Railway applications - Track - Switches and crossings for Vignole rails - Part 4: Actuation, locking and detection

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Bahnanwendungen - Oberbau - Weichen und Kreuzungen
für Vignolschienen - Teil 4: Umstellung, Verriegelung und
Lageprüfung

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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Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
3.1 General.....	4
3.2 Actuation forces.....	6
3.3 Geometrical parameters.....	7
3.4 Movement and retention of switches and crossings with moveable parts	9
3.5 Kinematics and dynamics.....	11
3.5.1 Movement of switch rails	11
3.6 Dynamics of the wheel	12
3.7 Dynamics of switches	12
4 Design criteria	13
4.1 Parameters required.....	13
4.2 Calculations and verifications.....	13
4.2.1 Object detection between stock rail and switch rail	13
4.2.2 Calculation of minimum flangeway.....	13
4.2.3 Correct closing.....	14
4.2.4 Neutral position.....	15
4.2.5 Negative force	15
4.2.6 Mechanical integrity	15
5 Test methods.....	15
5.1 Obstacle detection.....	15
5.2 Minimum flangeway / free passage of wheel	15
5.3 Correct closing.....	16
5.4 Actuation force, F_a	16
5.5 Neutral position.....	16
5.6 Negative force	16
5.7 Trailability	16
5.7.1 General.....	16
5.7.2 Factory testing	17
5.7.3 Track testing.....	17
6 Acceptance.....	17
6.1 General.....	17
6.2 Standard testing (no prototypes)	17
6.3 Prototype testing	17
6.4 Testing requirements for change in flexibility	18
Annex A (informative) Commonly used values for obstacle detection	19
Annex B (informative) Commonly used values for flangeway.....	20

Foreword

This document (prEN 13232-4:2014) 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 13232-4:2005+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 13232-4:2014 (E)**1 Scope**

This European Standard determines the interface between moveable parts and the actuation, locking and detection equipment, and defines the basic criteria of switches and crossing with moveable parts in respect of the interface.

It concerns:

- rules parameters and tolerances for alternative positions of the moveable parts;
- criteria and limits for the forces which move and restrain the moveable parts.

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

prEN 13232-5:2014, *Railway applications – Track – Switches and crossings for Vignole rails – Part 5: Switches*

prEN 13232-6:2014, *Railway applications – Track – Switches and crossings for Vignole rails – Part 6: Fixed common and obtuse crossings*

prEN 13232-9:2014, *Railway applications – Track – Switches and crossings for Vignole rails – Part 9: Layouts*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in prEN 13232-1:2013 and the following apply.

3.1 General**3.1.1****actuation system**

system that ensures the correct movement of the moveable parts of the switch and crossing. The actuation system includes the rods, links and actuators needed to ensure the operation. The actuation system may be either electric, hydraulic, manual, etc.

3.1.2**locking device**

device that ensures the moveable part of the switches and crossings stays in the desired position. It guarantees the correct position of the moveable part during the passage of the vehicle

3.1.3**detection device**

device that enables the verification of the correct positioning of the moveable part of the switch and crossing. It enables the signalling to decide whether safe train passage can be guaranteed

3.1.4**trailability**

ability of actuator and locking systems to permit the trailing of the switches and crossings by a vehicle. There are two different trailing devices – trailable devices and non-trailable devices

3.1.4.1**trailable devices**

devices which permit trailing as non-standard operation:

In this case, parts of the switch may be slightly damaged. The switches and crossings will only be released for further operation after full inspection of switch and actuator.

devices which permit trailing as standard operation:

In this case the actuator and locking system permits the trailing of the switches and crossings by a vehicle, without damaging any part of it.

In both cases the maximum trailing speed is defined

3.1.4.2**non-trailable devices**

devices which do not permit the trailing of the switches and crossings by a vehicle

3.1.5**single or multiple drives**

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3.1.5.1**single drive**

drive operated at one position, i.e. the switch toe

3.1.5.2**multiple drives**

drives operated at more than one position. In this case there may be either single or multiple locking

3.1.6**lubrication free switch operation****3.1.6.1****non-lubricated slide baseplates**

no lubrication on the slide baseplates is required to ensure the correct actuation of the switch and crossing. This can be assured by special baseplates, roller systems or other devices

3.1.6.2**lubrication free actuator and locking system**

no lubrication is required to ensure the correct actuation and locking of the switch and crossing

Note 1 to entry: Track lubrication may still be required, for other reasons.

3.1.7**open and closed position****3.1.7.1****switches and switch diamond crossings – closed position**

switch rail is applied to its corresponding stock rail

3.1.7.2**switches and switch diamond crossings – open position**

switch rail stands away from its corresponding stock rail by a defined distance (switch toe opening)

prEN 13232-4:2014 (E)

3.1.7.3

common crossings with moveable parts – closed position

running edge (of main line or branch line) is not interrupted

Note 1 to entry: An open position does not exist.

3.2 Actuation forces

3.2.1

actuation force, F_a

maximum value of the force, applied by the actuator in order to operate the moveable parts of the switches and crossings (see Figure 1).

This force is measured at the interface between actuator and the throwing or locking device

3.2.2

actuator capacity, F_{cap}

maximum force the actuator can provide (see Figure 1)

3.2.3

negative force, F_{neg}

force needed to keep the moveable part at its closed position

3.2.4

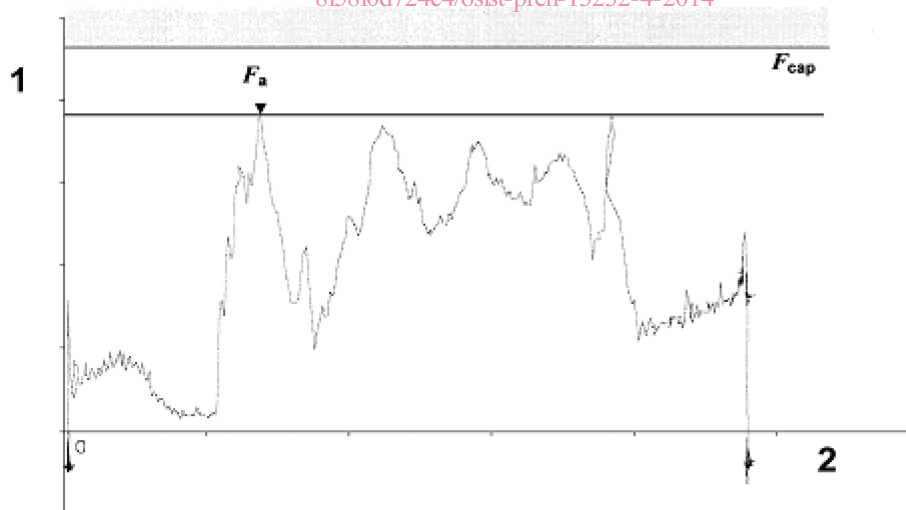
retaining force, F_R

force, provided by the actuator to keep the moveable parts in their positions, during vehicle passage

3.2.5

locking force, F_L

force the locking device guarantees and applies to the moveable parts in order to keep them at their locked position

**Key**

- 1 Actuation force
- 2 Displacement

Figure 1 — Actuation forces

3.3 Geometrical parameters

3.3.1

stud gap, d_{stud}

gap between the stud supporting surface and the corresponding surface of the moveable part (i.e. switch rail, point rail, wing rail)

3.3.2

longitudinal displacement

Note 1 to entry: longitudinal displacements may occur in the switch and crossing area due to thermal, acceleration and braking forces. These forces can create differential displacement between the various components of the switch or crossing.

3.3.2.1

switches

differential displacement between switch and stock rail is the most important with regard to the switch actuation, locking and detection system. These displacements will be defined in two main places:

- a) differential toe tip displacement (y)

This is the differential longitudinal displacement between the switch rail and the corresponding stock rail. In order to be able to measure the switch toe displacement, a reference point will be placed on the stock rail.

- b) differential displacement at the heel block (z)

This is the differential longitudinal displacement between the switch rail and the corresponding stock rail, at the switch heel

3.3.2.2

crossings with moveable parts

differential displacement between point or switch rail and the corresponding housing (wing rail) is the most important with regard to the actuation, locking and detection system. This displacement is defined at the nose point. In order to be able to measure the swing nose or switch toe displacement, a reference point will be placed on the wing rail

3.3.3

maximum gap of closed switch rail, d_{gap}

maximum permissible parallel distance between the two machined contact faces of the switch and stock rail to give detection. A different value applies in front of the first detection position (d_{gap1}) than in the rest of the machined area (d_{gap2}). See Figures 2 and 3.

The same definition applies in principle to crossings with moveable parts

3.3.4

maximum gap at switch toe, d_{toe}

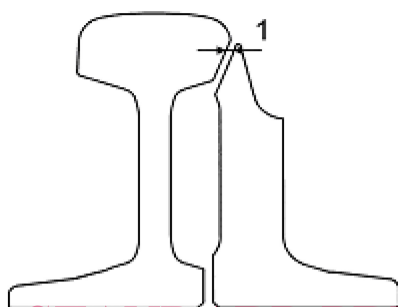
maximum permissible horizontal distance between the two machined contact faces of the switch and stock rail to give safe operation. The dimension is defined at the switch toe. This basic dimension is taken into account during switch point design to avoid derailment



Key

- 1 d_{gap} (either d_{gap1} or d_{gap2})
- 2 d_{toe}

Figure 2 — Gap of closed switch rail



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Key

- 1 d_{gap} or d_{toe}

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Figure 3 — Maximum gap of closed switch rail

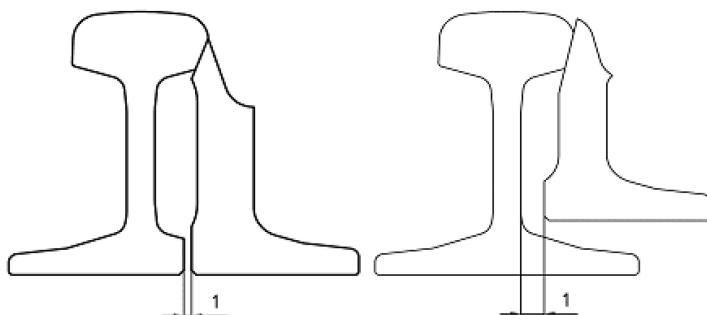
3.3.5

foot clearance, d_{foot}

distance between the foot of the switch rail and the nearest part of the stock rail or any other component (bolt, heaters etc.) fixed to it, ensuring clearance between both is maintained (see Figure 4)

For additional equipment (e.g. heaters, cable connections) this clearance has to be maintained.

Longitudinal displacements are taken into account.



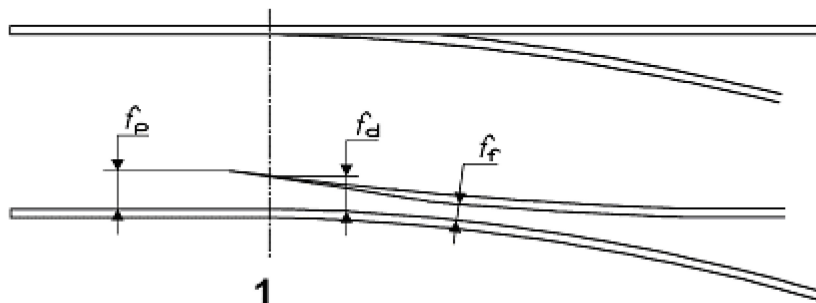
Key

- 1 d_{foot}

Figure 4 — Foot clearance

3.3.6**toe movement, f_p**

movement of the toe, when moved by the actuator. It is the distance between open and closed position at the toe (see Figure 5)

**Key**

1 Actuation position

Figure 5 — Opening and flangeway

3.3.7**opening at the drive position, f_d**

movement of the switch rail at the drive position. This movement is less than the toe movement (see also Figure 5)

3.3.8**neutral switch rail position, f_N**

position of the switch rail, if no external effort is applied to it.

The neutral position is verified at the first drive position.

The same principle applies to crossings with moveable parts

3.3.9**actuator movement, f_a**

movement of the actuator rod

3.3.10**minimum flangeway, f_f**

see prEN 13232-6:2014, 3.4.1.6 and Figure 13. (See also Figure 5)

This dimension is measured at the gauge reference plane

3.3.11**track gauge, G**

see prEN 13232-1:2013, 2.11, prEN 13232-5:2014, 3.6.6 and Figure 8, and Figure 5. (See also Figure 10)

This dimension is measured at the gauge reference plane

3.4 Movement and retention of switches and crossings with moveable parts**3.4.1****switch drives**

apparatus for operation of moveable rails to give the required route