BS EN 13232-1:2023

BSI Standards Publication

Railway applications — Track — Switches and crossings for Vignole rails

Part 1: Definitions

bsi.

National foreword

This British Standard is the UK implementation of EN 13232-1:2023. It supersedes BS EN 13232-1:2003, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/2/-/9, Railway applications - Switches & Crossings - Performance & Acceptance.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Railway applications - Track - Switches and crossings for Vignole rails - Part 1: Definitions

Applications ferroviaires - Voie - Appareils de voie pour rails Vignole - Partie 1: Définitions

Bahnanwendungen - Oberbau - Weichen und Kreuzungen für Vignolschienen - Teil 1: Definitionen

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European foreword

This document (EN 13232-1:2023) 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of an identical text or by endorsement, at the latest by April 2024, and conflicting national standards shall be withdrawn at the latest by April 2024.

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 13232-1:2003.

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*

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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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1 Scope

This document provides an accepted terminology for switch and crossing work. With the assistance of diagrams, the various components are given definitions, and these specific names are regarded as obligatory.

The terms and definitions cover the constituent parts and design geometry of switch and crossing work. Additional terminology of a more specific nature will be defined in the relevant part of the series.

The present definitions set out the terms most generally used for the geometrical form and the construction of switches and crossings.

This document applies to railways running on Vignole rails.

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:

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

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

3.1 General definitions

3.1.1
customer
operator or user of the equipment

NOTE This can sometimes be the purchaser of the equipment on the user's behalf.

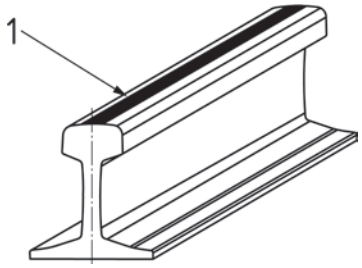
3.1.2
supplier
body responsible for the use of this EN in response to the customer's requirements

3.1.3
contact area
those parts of the rail ensuring the support and/or guidance, inside or outside, of a wheel

NOTE see Figure 4.

3.1.4
running table
upper surface of the head of a rail

NOTE see Figures 1 and 4



Key

1 running table

Figure 1

3.1.5
running surface
curved surface defined by the longitudinal displacement of a straight line perpendicular to the centre-line of the track and tangential to both running tables

NOTE see Figure 2

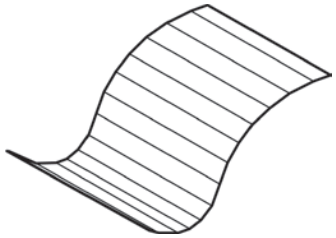


Figure 2

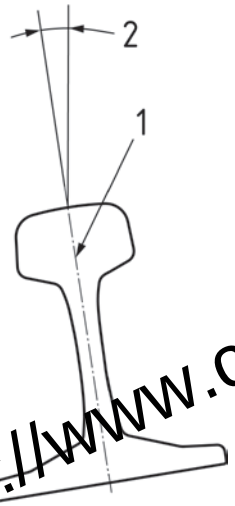
3.1.6
running plane
flat plane tangential to the running surface at the considered point

NOTE see Figure 4

3.1.7
rail inclination
angle measured as a tangent (e.g. 1 in 20) between the normal to the running surface and the y-y axis of the rail

Note 1 to entry: see Figure 3.

Note 2 to entry: Rail head inclination may be achieved by inclining the rail as shown in Figure 3 or by inclining the head profile only, for example by machining.



Key

1	y-y-axis
2	rail inclination

Figure 3

3.1.8
inclined track
where the axes of the two running rails are inclined towards each other

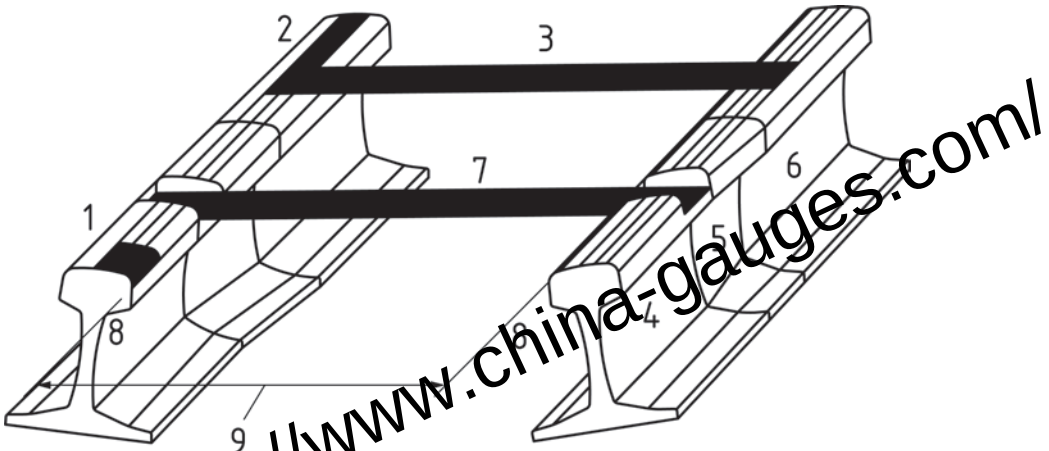
NOTE see Figure 4.

3.1.9
vertical track
where the axes of the two running rails are parallel, that is, have a rail inclination of zero

NOTE see Figure 4.

3.1.10
rail twist
change in inclination of the rail (e.g. from 1 in 20 to vertical)

NOTE see Figure 4.



Key

1	contact area	6	vertical rail
2	running table	7	gauge reference plane
3	running plane	8	running edge
4	inclined rail	9	design track gauge
5	rail twist		

Figure 4

3.1.11
gauge reference plane
plane parallel to and below the running surface at a dimension “z”. This plane is used for all design work, machining, and measurements

Note 1 to entry: see Figures 4 and 5.

Note 2 to entry: This dimension “z” is generally 14 mm.

a) **b)**

Key

z depth of gauge reference plane below running table

Figure 5

3.1.12
running edge
intersection of the gauge reference plane with the inside of the rail head

NOTE see Figure 4

3.1.13
design track gauge
nominal distance between the corresponding running edges of the two rails

NOTE see Figure 4

3.1.14
centre-line of track
line midway between the running edges on straight track, and half design track gauge inside the running edge of the larger radius rail in curved track

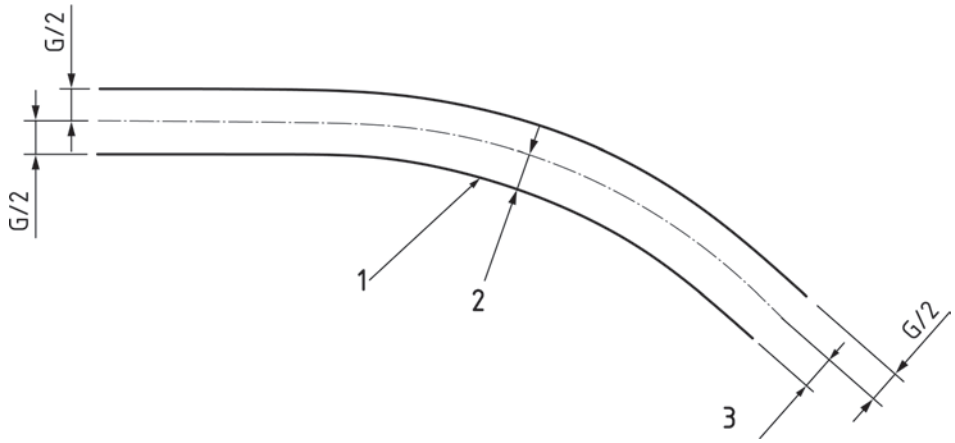
NOTE see Figures 4 and 6

3.1.15
high-side rail
on curved track, the rail with the larger radius, i.e. centre-line radius plus half of design track gauge

3.1.16
low-side rail
on curved track, the rail with the smaller radius

3.1.17
gauge widening
intended increase in design track gauge. The radius of the low-side rail is decreased, and the distance between the centre-line of track and the low-side rail is increased, by the amount of gauge widening

NOTE see Figure 6



Key
1 gauge widening on sharp curves
2 A + gauge widening
3 A + gauge widening
G design track gauge

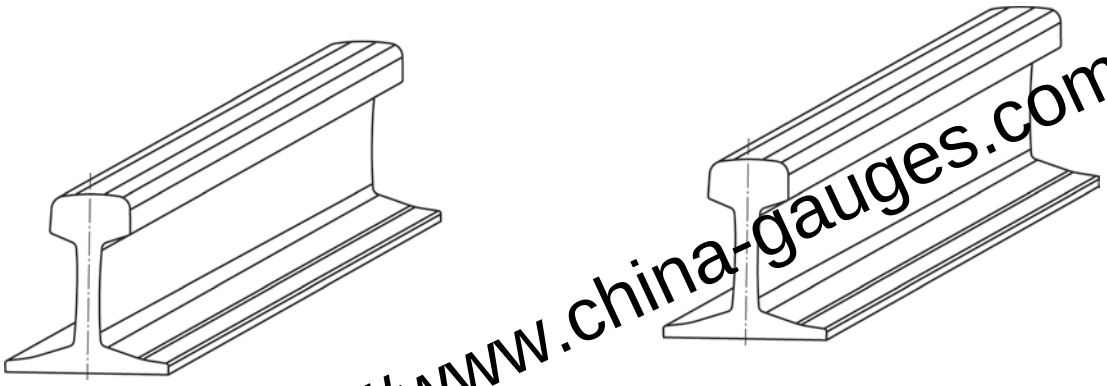
Figure 6

3.1.18
sleeper or bearer spacing
distance along the rails between the centre-lines of adjacent sleepers or bearers

3.1.19
cant
amount by which one running rail is raised above the other

Note 1 to entry: see Figure 7

Note 2 to entry: this is also sometime known as superelevation



Key

1 horizontal

2 cant (superelevation)

Figure 7

3.1.20
equilibrium cant
cant at a particular speed at which the vehicle will have a resultant force perpendicular to the running plane

3.1.21
cant deficiency
difference between the applied cant on the track and a higher equilibrium cant

3.2 Definitions of special trackwork

3.2.1
switch and crossing work
trackwork ensuring the support and guidance of a vehicle along any given route among various diverging or intersecting tracks

Note 1 to entry: Switches are in some circumstances described as points - either word is considered acceptable. (English version only)

Note 2 to entry: All sketches represent the running edges. All turnouts are viewed from the switch toe.

Note 3 to entry: The term is amplified to include certain items having other functions such as expansion devices

3.2.2
switch toe
location of the end of the switch rail from which two tracks diverge

3.2.3
turnout
layout permitting the passage of traffic between two tracks and one common track

NOTE see Figure 8

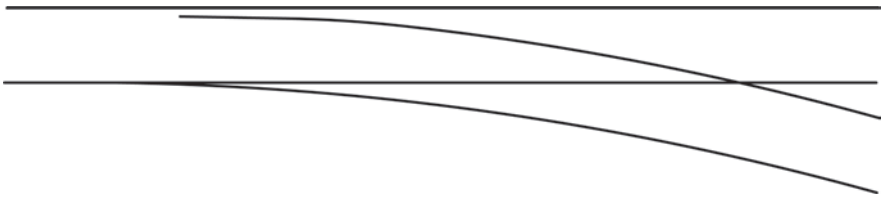


Figure 8

3.2.4
diamond crossing
layout permitting the passage of traffic on intersecting tracks

NOTE see Figure 9

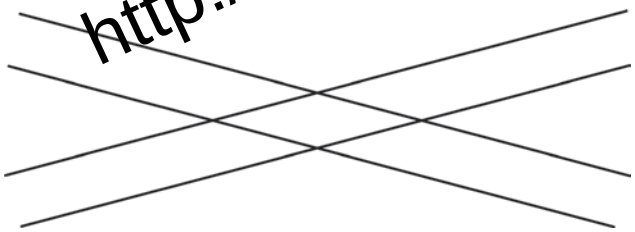


Figure 9

3.2.5
interlaced track
layout permitting the passage of traffic between two tracks either of different track gauge or not, to a common section with 4 rails

NOTE see Figure 10

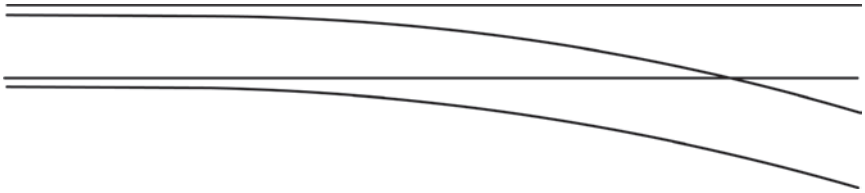


Figure 10

3.2.6
mixed gauge turnout
layout permitting the passage of traffic between two tracks of different track gauge to a common section with 3 rails

NOTE see Figure 11

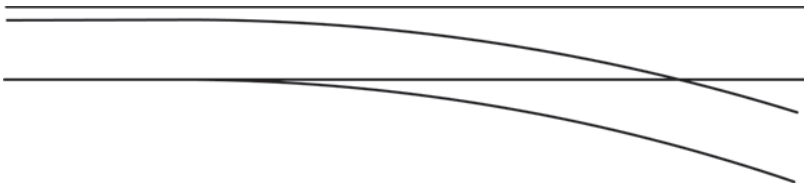


Figure 11

3.2.7
trap point
layout permitting the derailment of traffic to ensure protection of an adjacent track or structure

NOTE see Figure 12

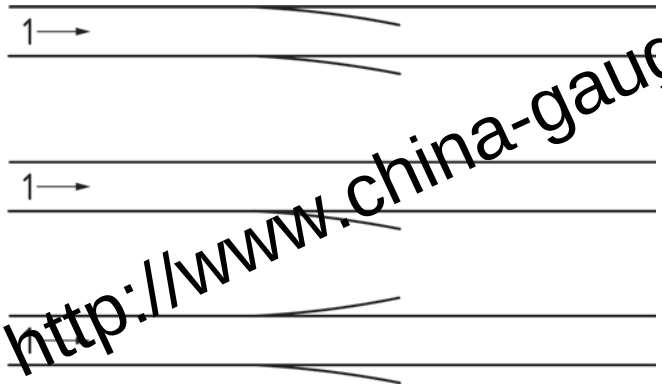


Figure 12

3.2.8
adjustment switch
device which permits longitudinal relative rail movement of two adjacent rails, while maintaining correct guidance and support

NOTE see Figure 13

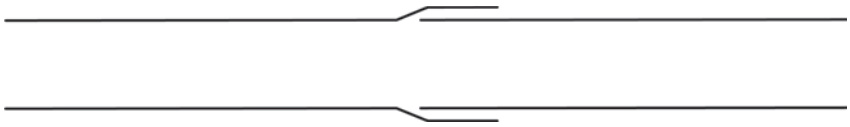


Figure 13

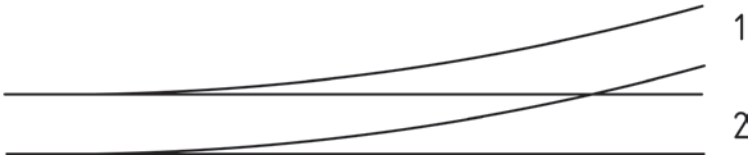
3.3 Definitions of terms in turnouts and diamonds

3.3.1
track designations
NOTE the following definitions apply even when the appearance of the layout is curved

3.3.1.1
main line
in the basic design the straight track is called the “main”

Note 1 to entry: see Figure 14

Note 2 to entry: The term “through route” is sometimes used



Key

1 branch line (diverging or turnout line)

2 main line (through route)

Figure 14

3.3.1.2
branch line
in the basic design, the curved track is called the “branch” line

Note 1 to entry: see Figure 14.

Note 2 to entry: the terms or “diverging” or “turnout” line are sometimes used

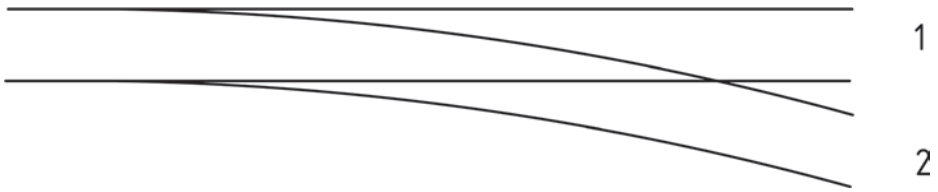
3.3.2
turnout designations
turnouts are designated by the symbols:RH diverging to the rightLH diverging to the leftS symmetrical (or equal split)

Note 1 to entry: The type of turnout depends upon the “set” of the switches, and not upon the geometry of the track layout. The “set” is defined as the bend in the stock rail at the switch toe applying to the branch (diverging or turnout) line.

Note 2 to entry: The diverging track (to left or right) is always the track with the set in the stock rail. Where the set is equally shared between the two stock rails the turnout is an equal-split turnout.

3.3.2.1
diverging turnout
when the branch line diverges to the right of the main line, it is a right-hand turnout, when the branch line diverges to the left of the main line, it is a left-hand turnout

NOTE see Figures 15 and 16

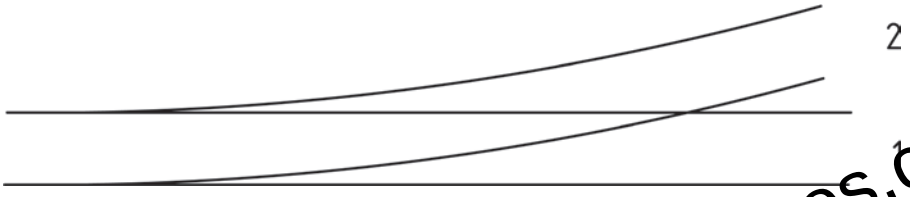


Key

1 main line

2 branch line

Figure 15



Key

1 main line

2 branch line

Figure 16

3.3.2.2
equal split turnout
when the two tracks diverge symmetrically from the common track

NOTE see Figure 17

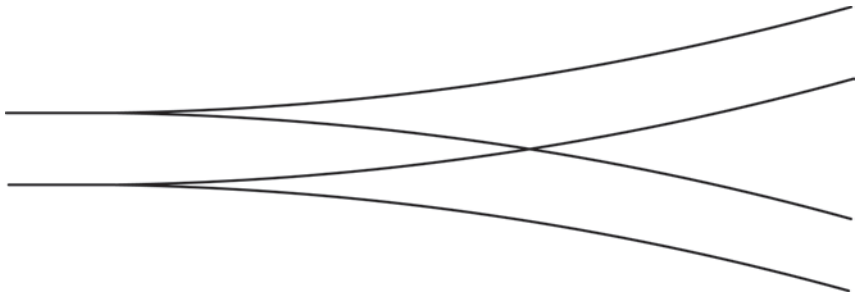


Figure 17

3.3.2.3
three-throw or tandem turnout
junction between two tracks and a common track

NOTE The different types are designated:

S3 3 symmetrical tracks (three-throw)

RR 3 asymmetrical tracks of which two diverge to the right

LL 3 asymmetrical tracks of which two diverge to the left

RL 3 asymmetrical tracks with first diverging track to the right and second diverging track to the left

LR 3 asymmetrical tracks with first diverging track to the left and second diverging track to the right

3.3.2.4
symmetrical, three-throw
two tracks with a common origin diverging symmetrically from the common central, normally straight, track

NOTE see Figure 18

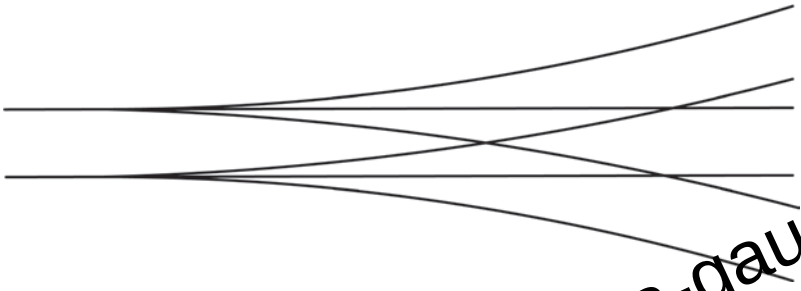


Figure 18

3.3.2.5
non-symmetrical, tandem turnout same side
two tracks of separate origin "in tandem" diverging from a common main line to the same side

NOTE Figures 19 and 20 show tracks diverging to the right designated RR, tracks diverging to the left are designated LL and are are mirror reflections

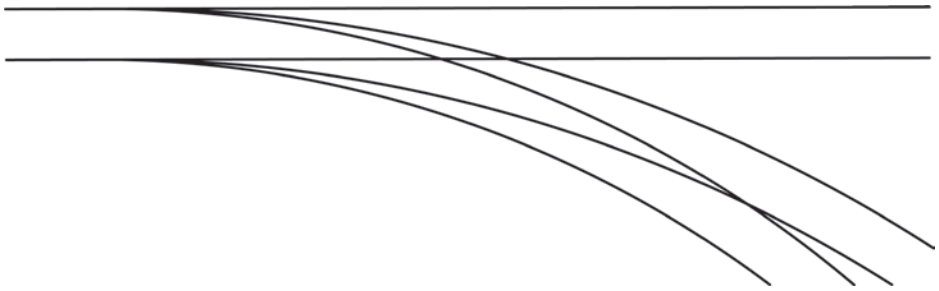


Figure 19

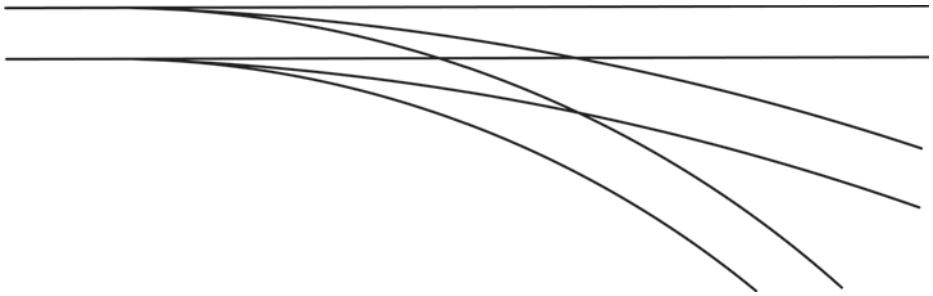


Figure 20

3.3.2.6
non-symmetrical, tandem turnout "opposite sides"
diverging to the right and to the left, designated RL or LR

NOTE see Figure 21

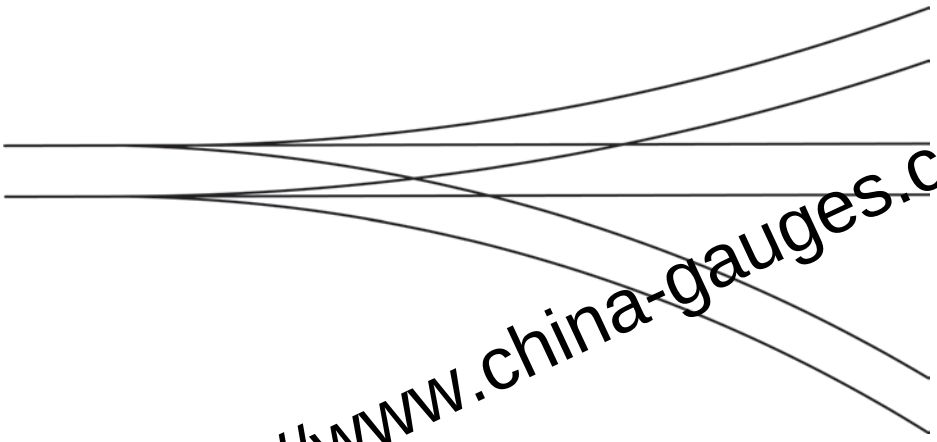


Figure 21

3.3.3
curved layout
layout in which the main line is laid on a curve

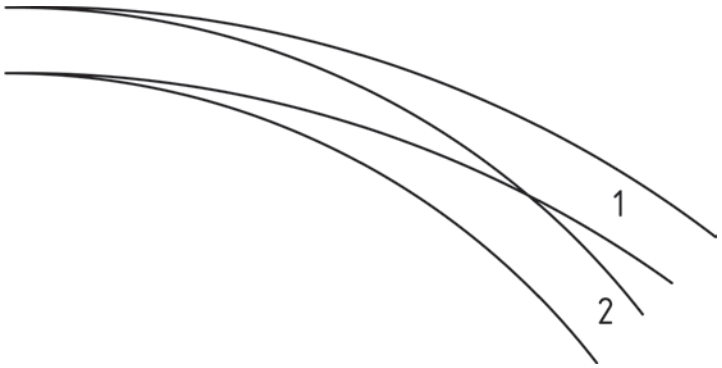
3.3.3.1
site-curved item
item curved into position on site

3.3.3.2
pre-curved item
item permanently set by the Supplier to the particular radius required

3.3.3.3
similar flexure (simiflex) turnout
turnout in which the curve of the diverging track is of the same hand as the main line

3.3.3.4
contrary flexure (contraflex) turnout
turnout in which the curve of the diverging track is of the opposite hand to the main line

3.3.3.5
inside curved turnout
curved layout, which has the branch line inside the curve of the main line (see Figure 22)



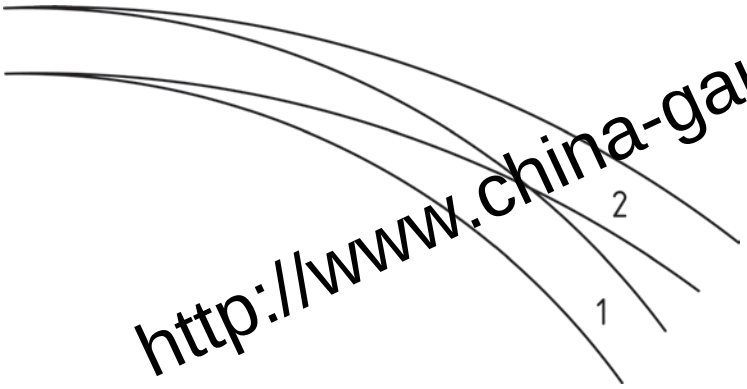
Key

1	main
2	branch

Figure 22

3.3.3.6
outside curved turnout
curved layout which has the branch line outside the curve of the main line

Note 1 to entry: For similar flexure layout see Figure 23.

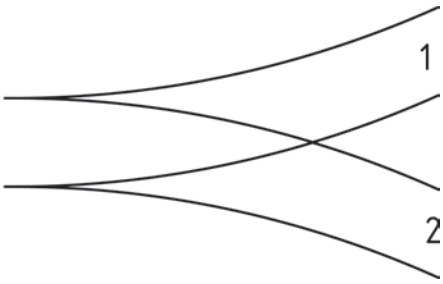


Key

1	main
2	branch

Figure 23

Note 2 to entry: For contraflexure flexure layout, see Figure 24.



Key

1	branch
2	main

Figure 24

3.3.4
diamond crossing designations
diamond crossing is either standard or non-standard

3.3.4.1
standard diamond crossing
when both tracks are straight or on curves of the same hand and radius

NOTE see Figure 25

Figure 25

3.3.4.2
non-standard diamond crossing
when one track is curved and the other straight, or when both tracks are curved to different radii or when both tracks are to the same radius but of opposite hand

NOTE see Figure 26

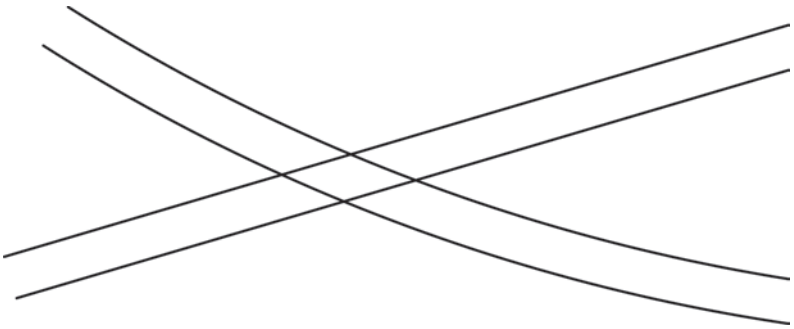


Figure 26

3.3.4.3
designations of non-standard diamonds
following designations are used to define non-standard diamonds according to whether the curved track or that of sharper radius bears away to the right (see Figure 27) or to the left (see Figure 28) of an observer standing at the position indicated (the flatter crossing end of the straight or flatter curved track) and looking towards the centre of the diamond

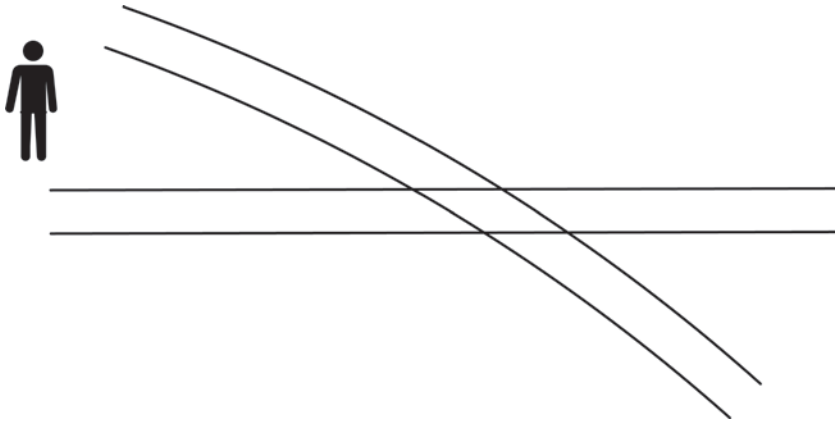


Figure 27

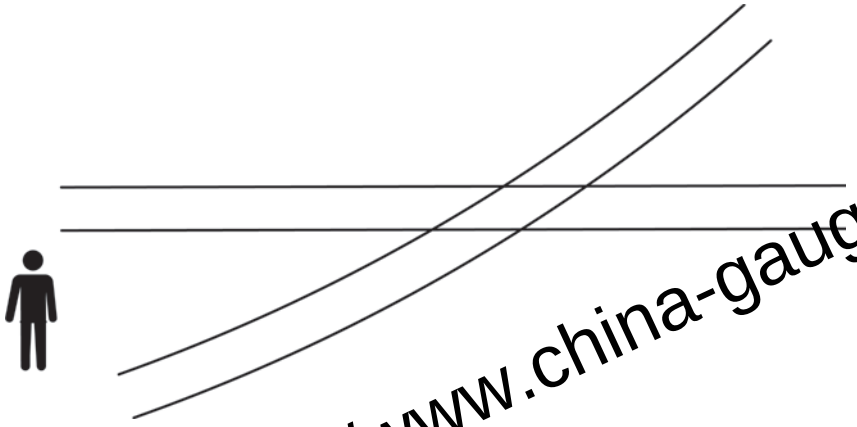


Figure 28

3.3.4.4
diamond crossing with slips
layout permitting the passage of traffic between two intersecting tracks as well as over such tracks

3.3.4.5
single slip
when only one connection is made between the intersecting tracks

NOTE These are designated SS (single slip; or diamond crossing with single slip).

3.3.4.6
inside single slip
with switches inside the diamond

NOTE see Figure 29

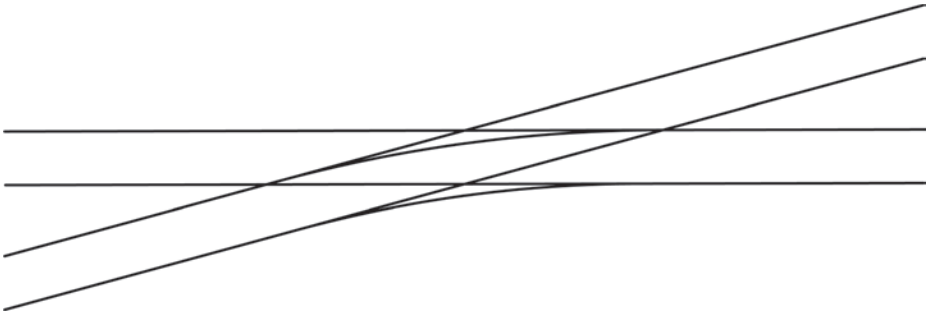


Figure 29

3.3.4.7
outside single slip
with switches outside the diamond

NOTE see Figure 30

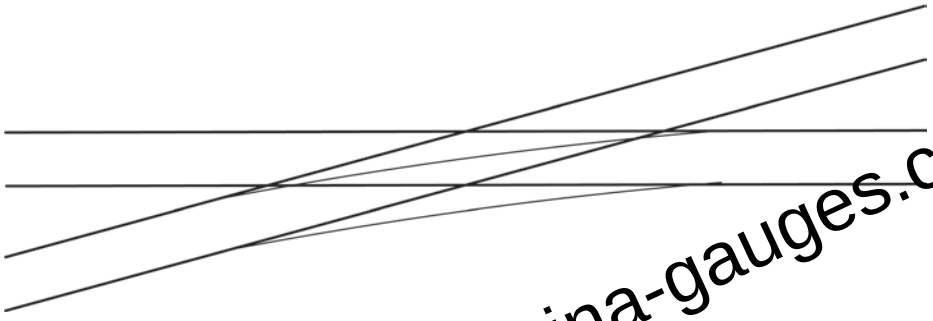


Figure 30

3.3.4.8
double slip
when both intersecting tracks are connected

NOTE These are designated DS (double slip; or diamond crossing with double slip).

3.3.4.9
inside double slip
with switches inside the diamond

NOTE see Figure 31

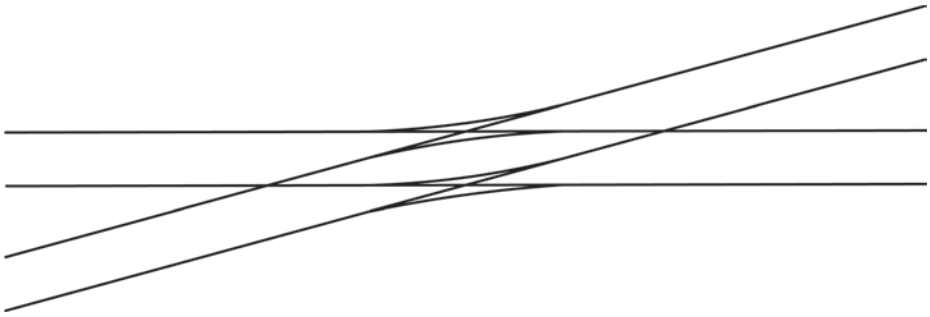


Figure 31

3.3.4.10
outside double slip
with switches outside the diamond

NOTE see Figure 32

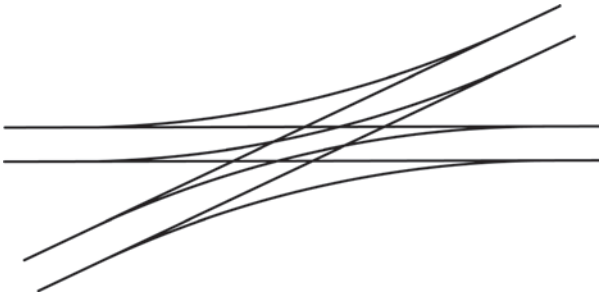


Figure 32

3.4 Definitions of terms in layouts

3.4.1
layout
any combination of switches and crossings

3.4.2
single crossover
two turnouts placed back to back combining to join two adjacent tracks

Note 1 to entry: see Figure 33

Note 2 to entry: A succession of single crossovers across successive track intervals is termed a ladder

Figure 33

3.4.3
single junction
layout of turnout and diamond crossing with or without slips, allowing the intersection of adjacent tracks by a track also partially or completely connecting them

Note 1 to entry: see Figure 34

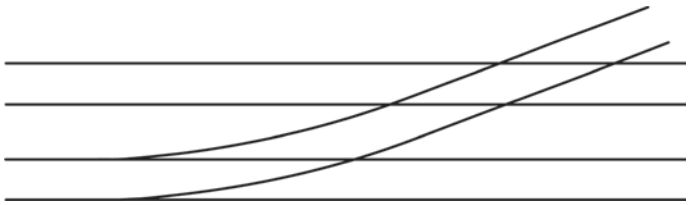


Figure 34

Note 2 to entry: The term “Single junction” in the French and German languages also covers single track multiple crossovers, using two turnouts and any number of consecutive diamonds with or without slips.

3.4.4
double junction
layout comprising two turnouts and a diamond crossing (with or without slips) combined to give a double track divergence from the double track main line

Note 1 to entry: see Figure 35

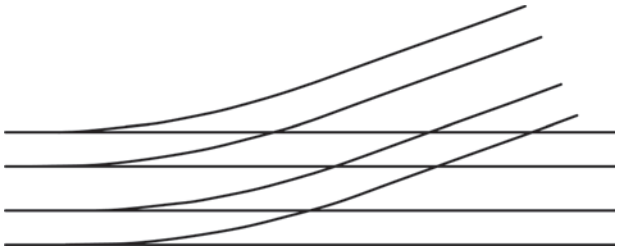


Figure 35

Note 2 to entry: A crossover, single or double junction, is said to be right or left hand according to the direction of divergence from the major route.

3.4.5
scissors crossover
layout comprising two intersecting crossovers

NOTE see Figure 36

Figure 36

3.4.6
half-scissors crossover
part layout as above comprising two turnouts of opposite hand in the same track and the central diamond crossing

NOTE see Figure 37

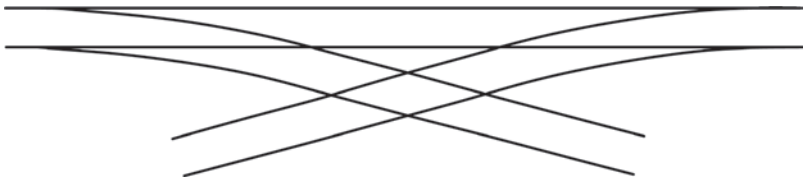


Figure 37

3.4.7
interlaced turnouts
layout comprising two turnouts laid opposite one another and mutually interlaced. They can be as follows:

3.4.7.1
normal interlaced turnouts
when the two turnouts are of opposite hand

NOTE see Figure 38

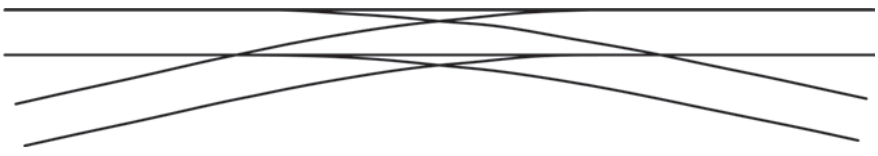


Figure 38

3.4.7.2
special interlaced turnouts
when the two turnouts are of the same hand

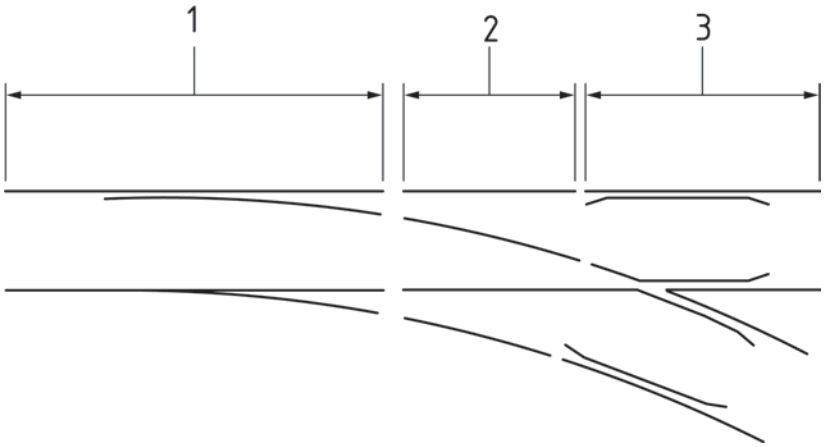
NOTE see Figure 39

Figure 39

3.4.8
special layouts
any more complex combination of switches, crossings and diamonds including those incorporating more than one track gauge

3.5 Definitions of constituent parts of switch and crossing work

3.5.1
turnout panels
see Figure 40



Key

1	switch panel
2	closure panel
3	crossing panel

Figure 40

3.5.2
switch panel
part of a turnout or layout ensuring the continuity of any one of two or three diverging tracks at the beginning of the divergence, consisting of two half sets of switches assembled together, usually with bearers

NOTE See Figure 40

3.5.3
closure panel
part of a layout or turnout situated between the switch panel and the crossing panel consisting of rails with fastening system and usually on bearers

NOTE see Figure 40

3.5.4
common crossing panel
part of a turnout or layout ensuring the continuity of two intersecting routes by means of an intersection of opposite running edges and consisting of a common crossing, 2 outside rails, and 2 check rails complete with small fittings and assembled together, usually with bearers

Note 1 to entry: see Figure 40

Note 2 to entry: If the common crossing is of a swing-nose or equivalent type, providing a continuous running surface, the 2 check rails are not usually provided

3.5.5
obtuse crossing panel
arrangement in a layout that ensures the continuity of two routes, the corresponding running edges of which intersect, and consisting of two obtuse crossings, complete with small fittings, and assembled together usually with bearers. It is the central part of a diamond crossing

3.6 Documents

3.6.1
layout drawing
drawing used for manufacture, assembly in the workshop, and for re-assembly

NOTE can also include the setting-out diagram.

3.6.2
setting-out diagram
diagram used for setting out in the fabrication depot, and on site

3.6.3
assembly drawings
individual plans of particular parts of the layout

3.6.4
detail or manufacturing drawings
drawings for manufacture of individual items

NOTE for example:

— a half-set of switches, LH or RH, straight or curved;

— a common crossing;

— an obtuse crossing;

— small fittings

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