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GIGN7616

Guidance on Interface between Station Platforms, Track and Trains

Issue Two: March 2014
Rail Industry Guidance Note for GI/RT7016



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Guidance on Interface between Station Platforms, Track and Trains

Issue record

Issue	Date	Comments
One	04 December 2010	Original document.
Two	March 2014	Replaces issue one, reflecting the up-issue of GI/RT7016, from issue four to issue five, the changes to the published Conventional Rail Infrastructure Technical Specification for Interoperability (CR INF TSI) and the new guidance on the assessment of risk from the aerodynamic effects of passing trains (see Appendix G of this document). Title changed to cover increased scope. Appendices A, B, C and D from GI/RT7016 included.

Amended or additional parts of revised pages have been marked by a vertical black line in the adjacent margin.

Superseded documents

The following Railway Group document is superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
GI/GN7616, Issue one Guidance on Station Platform Geometry	All	07 June 2014

GI/GN7616 issue one ceases to be in force and is withdrawn as of 07 June 2014.

Supply

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Part 1 Introduction

G 1.1 Purpose of this document

- G 1.1.1 This document gives guidance on interpreting the requirements of Railway Group Standard GI/RT7016 Interface between Station Platforms, Track and Trains, relating to platform geometry and specifically supports Parts 2, 3, 4, 5, 6, 7, 8, 9 and 11. It does not constitute a recommended method of meeting any set of mandatory requirements. There is no guidance to support GI/RT7016 Part 10 and Part 12.
- G 1.1.2 Guidance is also given on the Persons with Reduced Mobility (PRM) Technical Specification for Interoperability (TSI), the High Speed Infrastructure TSI (HS INF TSI) and the CR INF TSI relating to platform geometry (see Part 2).
- G 1.1.3 The guidance given in this document is most relevant to alterations (as defined) to existing stations (or re-opened stations) where the constraints of the existing infrastructure might make it unrealistic to achieve full compliance with all the requirements in GI/RT7016. The design of a new station and particularly for a new station on a new or re-opened route will be less constrained, making compliance with the requirements of GI/RT7016 easier to achieve.
- G 1.1.4 GE/RT8270 Assessment of Compatibility of Rolling Stock and Infrastructure mandates requirements and responsibilities for the assessment of compatibility of rolling stock and infrastructure. In respect of new or changed assets:
- a) A railway undertaking is responsible for ensuring that its rolling stock is compatible with the infrastructure it operates over and with other rolling stock that operates on that infrastructure.
 - b) An infrastructure manager is responsible for ensuring that its infrastructure is compatible with the rolling stock that operates over it and any other infrastructure with which it interfaces.
- G 1.1.5 The construction of new platforms or the modification of existing platforms will in most cases invoke the use of the relevant process in GE/RT8270, for example, network change.
- G 1.1.6 RIS-7700-INS Rail Industry Standard for Station Infrastructure is a voluntary standard that sets out voluntary requirements related to station infrastructure which can be referred to, together with this guidance.
- G 1.1.7 This document is independent of the work that is currently underway by the European Railway Agency (ERA) to revise the Infrastructure TSIs and develop a combined TSI covering both High Speed and Conventional lines.

G 1.2 The structure of this document

- G 1.2.1 Relevant requirements from Railway Group Standard GI/RT7016, PRM TSI, HS INF TSI and CR INF TSI are reproduced with a grey background in this document.
- G 1.2.2 Guidance is provided as a series of sequentially numbered clauses prefixed 'G' immediately below the greyed text to which it relates.
- G 1.2.3 Specific responsibilities and compliance requirements are laid down in the Railway Group Standard itself.

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G 1.4 Approval and authorisation of this document

- G 1.4.1 The content of this document was approved by Infrastructure Standards Committee on 13 November 2013.
- G 1.4.2 This document was authorised by RSSB on 18 December 2014.

Guidance on Interface between Station Platforms, Track and Trains

Part 2 Guidance on Technical Specifications for Interoperability (TSIs)

G 2.1 Requirements related to stations

- G 2.1.1 The following TSIs set out a range of requirements for stations. The requirements set out in the documents could influence the design of new platforms and the modification of existing platforms.
- G 2.1.2 The Railways (Interoperability) Regulations 2011 (Statutory Instrument 2011 No. 3066) sets out the circumstances under which conformity with the PRM TSI, the HS INF TSI and the CR INF TSI is required.
- G 2.1.3 The Department for Transport (DfT) publishes 'Interoperability Help Notes' on <https://www.gov.uk>. The Interoperability Help Notes are a modular approach, some of which are numbered, to providing guidance to the rail industry and its suppliers on interoperability and the Railways (Interoperability) Regulations 2011. They superseded the first edition of the DfT's interoperability guidance, which was published as a single volume.
- G 2.1.4 Interoperability Help Note 206 gives guidance on answering the question 'Is your project within the scope of the Railways (Interoperability) Regulations 2011?'.
- G 2.1.5 Interoperability Help Note 209 gives guidance on answering the question 'Is your project major?', which includes guidance on whether a project is new, an upgrade or renewal.

G 2.2 TSI - Persons with Reduced Mobility

- G 2.2.1 The PRM TSI section 7.3.1, sets out its requirements for existing infrastructure.

Extract from PRM TSI

7.3. Application of this TSI to existing Infrastructure/Rolling Stock

7.3.1. Infrastructure [part]

Existing Infrastructure is Infrastructure that is in service at the date of entry when this TSI comes into force.

The TSI does not apply to existing Infrastructure until it is renewed or upgraded.

7.3.1.1. General

Where items are renewed or upgraded, they shall comply with the requirements of this TSI, with the following exceptions:

Where Infrastructure upgrade or renewal work affects aspects of the Infrastructure governed by any clause of this PRM TSI, it shall be reassessed in accordance with that requirement within this TSI, subject to the following conditions:

Compliance with the content of this TSI is not mandatory if the work that would be necessary to achieve compliance requires structural alterations to any load bearing element.

Systems and components that are not included in the scope of a particular upgrade or renewal programme do not have to be made compliant at the time of such a programme.

In the event that Infrastructure is re-assessed against any other TSI as a result of renewal or upgrading works, it shall only require re-assessment against this TSI in respect of those systems and components directly affected by the works.

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There shall be two kinds of Infrastructure blocks

- Station buildings (including parking areas, toilets, sales office, etc.)
- Platforms

When any complete block is upgraded or renewed, it shall incorporate an obstacle free route (when applicable) that can be linked to the other blocks as and when they are upgraded or renewed.

The normal maintenance of the Infrastructure items shall not imply a reassessment within the limits of this TSI.

7.3.1.5. Platform width and edge of platform (4.1.2.19)

Compliance with requirements related to the minimum width of the platform is not mandatory for existing stations if the cause of non-compliance is the presence of certain platform obstacles (e.g. structural columns, stairwells, lifts etc.) that are unlikely to be moveable.

7.3.1.6. Platform height and offset (4.1.2.18)

Compliance with requirements related to platform height and offset is not mandatory in the case of renewed platforms, but remains mandatory for upgraded platforms.

7.3.1.7. Buildings of an historic nature

Where an existing station, or a part of it, is a recognised historic building and is protected by National Law, the Infrastructure Operator shall endeavour to implement the contents of this TSI. However, where it can be demonstrated that the National law for the protection of the building would be infringed, implementation of the relevant requirements of this TSI shall not be mandatory.

G 2.2.2 No GB guidance is provided with the above.

G 2.3 TSI - High Speed Infrastructure

G 2.3.1 The HS INF TSI sets out three categories for a trans-European high-speed line.

Extract from HS INF TSI

4.2 Functional technical specifications of the domain

4.2.1 General provisions [part]

The requirements to be met by the elements characterising the infrastructure domain shall match at least the performance levels specified for each of the following line categories of the trans-European high-speed rail system, as relevant.

- Category I: specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h,
- Category II: specially upgraded high-speed lines equipped for speeds of the order of 200 km/h,
- Category III: specially upgraded high-speed lines or lines specially built for high speed, which have special features as a result of topographical, relief, environmental or town-planning constraints, on which the speed must be adapted to each case.

4.2.20 Platforms

The requirements of sections 4.2.20 are only applicable to the platforms where trains complying with the High-Speed Rolling Stock TSI are intended to stop on normal commercial operation.

G 2.3.2 No GB guidance is provided with the above.

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G 2.4 TSI - Conventional Rail Infrastructure

G 2.4.1 The CR INF TSI identifies the following categories of line.

Extract from CR INF TSI

4.2. Functional and technical specifications of subsystem

4.2.1. TSI categories of line

- (1) Annex I (1.1) to the Directive recognises that the conventional rail network may be subdivided into different categories. In order to deliver interoperability cost-effectively this TSI defines 'TSI categories of line'. The functional and technical specifications of this TSI vary according to the TSI categories of line.
- (2) The requirements to be met by the infrastructure subsystem are specified for each of the following TSI categories of line of the trans-European conventional rail system, as relevant. These TSI categories of line may be used for the classification of existing lines insofar the relevant performance parameters will be met in consistency with the national migration plan.

Table 2: TSI Categories of Line for the conventional rail infrastructure subsystem

Categories of Line		Types of Traffic		
		Passenger traffic (P)	Freight traffic (F)	Mixed traffic (M)
Types of Line	New Core TEN Line (IV)	IV-P	IV-F	IV-M
	Upgraded Core TEN Line (V)	V-P	V-F	V-M
	New Other TEN Line (VI)	VI-P	VI-F	VI-M
	Upgraded Other TEN Line (VII)	VII-P	VII-F	VII-M

- (3) Note that passenger hubs, freight hubs and connecting lines are included in the above TSI categories of line, as appropriate.
- (4) The TSI category of line for every section of track shall be published in the Register of Infrastructure.

7. IMPLEMENTING THE INFRASTRUCTURE TSI

7.1. Application of this TSI to conventional rail lines

- (1) Chapters 4 to 6 and any specific provisions in Sections 7.2 to 7.6 below apply in full to the lines coming within the geographical scope of this TSI which will be put into service as interoperable lines after this TSI enters into force.
- (2) The Member States shall develop a national migration strategy which specifies for TEN lines those elements of the infrastructure subsystem, which are required for interoperable services (e.g. tracks, sidings, stations, marshalling yards) and therefore need to comply with this TSI. This migration strategy shall include plans related to renewal and upgrading. In specifying those elements the Member States shall consider the coherence of the system as a whole.

7.2 Application of this TSI to new conventional rail lines

- (1) New core TEN lines (type IV) shall satisfy the requirements of TSI category of line IV-P, IV-F or IV-M.

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- (2) New other TEN lines (type VI) shall satisfy the requirements of TSI category of line VI-P, VI-F or VI-M. It is also permissible for the line to satisfy the requirements of TSI category of line IV-P, IV-F or IV-M respectively.
- (3) For the purpose of this TSI a 'new line' means a line that creates a route where none currently exists.
- (4) The following situations, for example to increase speed or capacity, may be considered as the construction of an upgraded line rather than a new line:
 - (a) the realignment of part of an existing route,
 - (b) the creation of a bypass,
 - (c) the addition of one or more tracks on an existing route, regardless of the distance between the original tracks and the additional tracks.

G 2.4.2 The infrastructure TSIs are currently being revised and combined into a single TSI for infrastructure. The details of the categorisation of lines are being updated but the general principles remain consistent. The requirements for the platform edge position (height and offset) are being transferred from the PRM TSI to the new infrastructure TSI but the Great Britain (GB) specific case will remain (see tables G 2 and G 3 of this document).

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Part 3 Recommendations and Guidance in Documents Related to Stations

G 3.1 Introduction

- G 3.1.1 The following documents provide a range of recommendations and guidance related to the design of new platforms and the modification of existing platforms.

G 3.2 Accessible Train and Station Design for Disabled People: A Code of Practice

- G 3.2.1 Accessible Train and Station Design for Disabled People: A Code of Practice is published by the DfT pursuant to Section 71B of the Railways Act 1993, and fulfils the Secretary of State's responsibility to produce a code of practice '*protecting the interests of users of railway passenger services or station services who are disabled*'.
- G 3.2.2 The purpose of the code of practice is to assist those operating passenger trains and stations in making railway travel easier for disabled passengers. The code of practice identifies required standards (both European and national) relevant to all passenger train and station operators in GB, and which licensed operators are to follow as a condition of their licence whenever they install, renew or replace infrastructure or facilities. The document also provides advice and recommendations of good practice. The principles given in the code of practice aim to benefit all passengers (such as people with luggage or with small children and pushchairs) as well as supporting the opening up of the network to a wider range of people and helping to generate increased patronage of the railways.
- G 3.2.3 The code of practice provides examples of the appropriate standards to use when planning work at stations.
- G 3.2.4 The DfT requires all licensed passenger train operators and station operators, including Network Rail as operator of its managed stations, to follow this code of practice in line with the commitments in their Disabled People's Protection Policies.

G 3.3 London Underground Limited, Good Practice Guide 'Station Planning Standards and Guidelines' (SPSG)

- G 3.3.1 The SPSG sets out requirements and guidance on the spatial aspects of station planning in the following areas:
- a) Public areas within stations.
 - b) Operational staff accommodation.
 - c) Evacuation.
- G 3.3.2 It gives guidance on determining platform lengths and widths, and a methodology for the consideration of passenger occupancy and circulation on platforms.

G 3.4 Railway Safety Principles and Guidance: requirements related to stations

- G 3.4.1 Railway Safety Principles and Guidance (RSPG) were produced by the Health and Safety Executive (HM Railway Inspectorate) for use by organisations wishing to obtain approval for new or altered works, plant and equipment under the Railways and Other Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994 (ROTS). RSPG Part 2B provided guidance on stations.
- G 3.4.2 ROTS have been revoked by the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) and therefore compliance with the RSPG is no longer required.

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Part 4 Guidance on Location of New Platforms

G 4.1 Horizontal track alignment through station platforms

Extract from GI/RT7016

2.1 Horizontal track alignment through station platforms

- 2.1.1 Station platforms shall be located on straight track unless the particular geographical characteristics of the potential sites and the characteristics of the railway infrastructure at the proposed location of the platform do not provide a reasonable opportunity for achieving this.
- 2.1.2 Station platforms shall not be located on horizontal curves with radii less than 1000 m.
- 2.1.3 It is permitted for platform extensions to be located on horizontal curves with radii less than 1000 m but not less than 500 m.
- 2.1.4 Before station platforms are located on curved track, consideration shall be given to the following:
 - a) Train to platform stepping distances, taking the types of train likely to call at the platform into account.
 - b) Visibility (either direct, by means of CCTV screens, or by mirrors) along the length of trains for train crew and station staff responsible for dispatching trains.
- 2.1.5 GC/RT5021 requires that the normal limiting design value for cant adjacent to a station platform is 110 mm, with an exceptional limiting design value of 130 mm.

2.2 Vertical track alignment through station platforms

- 2.2.1 GI/GN7616 Guidance on Interface between Station Platforms, Track and Trains gives guidance on vertical track alignment through station platforms.

G 4.1.1 The requirement of GI/RT7016 clause 2.1.2 addresses aspects of platform curvature associated with the following issues at stations:

- a) Platform to train stepping distances.
- b) The gap between platform and train.
- c) Train dispatch.

G 4.1.2 GI/RT7016 clauses 2.1.2 and 2.1.3 recognise that in many cases it would not be reasonable to change the curvature of the adjacent track at an existing station that has curved tracks running through it, where either a platform is being extended or where a new platform is being built. The constraints could be many but would typically be the proximity of adjacent lines, bridges, junctions and the need to fit with the existing station layout. The permission for platform extensions on curves with radii less than 1000 m but not less than 500 m recognises the additional constraints for extending a platform where the extension can only be located at either end of an existing platform.

G 4.1.3 Where the requirements of GI/RT7016 section 2.1 cannot be met then a deviation from the standard might be appropriate, provided suitable risk mitigation measures are implemented. Platform stepping distances and train dispatch require particular consideration to support the case for a deviation.

G 4.1.4 GM/RT2149 sets out requirements for train footsteps for passenger use, and their relative position to platforms that meet the height and offset requirements in GI/RT7016.

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- G 4.1.5 GC/RT5212 Appendix 1 sets out particular requirements for platforms on curves less than 360 m radius, to give a larger offset. The larger offset presents an increased gap between the platform and the train and therefore locating platforms on curves less than 360 m radius is undesirable.
- G 4.1.6 RSSB Research Report T726 entitled, 'Investigation into the feasibility of increasing existing platform radii where the platform is located on a curve radius less than 200 m', considered platforms on curves less than 200 m radius. There are approximately 90 platforms on curves less than 200 m radius, and although it is unlikely that these platforms can be economically modified, new platforms on such tight radii are discouraged.
- G 4.1.7 A platform on the outside of a curved track can present sighting problems for train dispatch. The longer the train, the greater the potential for reduced sight lines for train dispatch. As a guide the following approximate sight lines (in each direction) are available for the scenario where a 2.5 m wide platform is located on the outside of a curved track and the train dispatcher can stand at the back of the platform to see the doors along the train:
- a) 1000 m radius: approximately 70 m.
 - b) 500 m radius: approximately 50 m.
 - c) 200 m radius: approximately 30 m.
- G 4.1.8 A number of deviations against GI/RT7016 section 2.1 have been approved which have addressed the following points:
- a) Stepping distances.
 - b) Length of platform on a curve; for example whether the curve is at one end of the platform, over a short length.
 - c) Whether a platform is on the inside or the outside of a curve.
 - d) Length and type of trains using the platform; the shorter the train the less severe the potential problems with sight lines.
 - e) Whether coupling / uncoupling activities are within platform limits.
 - f) Presence and nature of driver only operation equipment.

Extract from PRM TSI

4.1.2.18.3. Track layout along the platforms [part]

For platforms on the Conventional Rail Network the track adjacent to the platforms shall preferably be straight, but shall nowhere have a radius of less than 300 m.

Extract from HS INF TSI

4.2.20.6 Track layout along the platforms

Lines of category I

The track adjacent to the platforms shall preferably be straight, but shall nowhere have a radius of less than 500 m.

Lines of category II and III

If the values prescribed in point 4.2.20.4 are not possible due to the track layout (i.e. $R < 500$ m), the heights and the distances of the edges of platforms are designed with values compatible with the layout and the rules related to the gauge described in point 4.2.3.

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- G 4.1.9 The requirements in the HS INF TSI for lines of category II are not relevant for GB because of the specific case for platform height (see Part 5 of this document).
- G 4.1.10 The CR INF TSI refers to the requirements of the PRM TSI with respect to minimum radius of horizontal curve through platforms.
- G 4.1.11 Table G 1 sets out the compliance cases for track radius at a platform.

Track radius	Compliant with (if 'No' deviation required)		
	PRM TSI*	HS INF TSI*	GI/RT7016
Straight or radius > 1000 m	Yes	Yes	Yes
500 m ≤ radius < 1000 m	Yes	Yes	Platform extensions only
360 m ≤ radius < 500 m	Yes	No	No
300 m ≤ radius < 360 m	Yes	No	No (increased offset)
200 m ≤ radius < 300 m	No	No	No (increased offset)
Radius < 200 m	No	No	No (increased offset)

Table G 1 Compliance cases for track radius at a platform

* Only if the project is within the scope of the Railway (Interoperability) Regulations 2011.

G 4.2 Vertical track alignment through station platforms

- G 4.2.1 The mandatory requirement for vertical track alignment through station platforms was withdrawn in issue four of GI/RT7016, based on work carried out to support deviations against issue two of GI/RT7016 for specific stations and the findings of RSSB Research Report T815 entitled 'Limits of vertical track alignment through station platforms'.
- G 4.2.2 For many years it had been considered good practice in GB to locate platforms on gradients not steeper than 1:260, except where geographic constraints made this unavoidable. This requirement was later changed to refer to a gradient of 1:500, possibly because of a shift from plain bearings to roller bearings across all rolling stock.
- G 4.2.3 In the circumstances where the Infrastructure TSIs impose limiting gradients through passenger platforms (see G 4.2.11 and G 4.2.12), the limit is 2.5 mm/m - that is, 1:400.
- G 4.2.4 However, there are many platforms on the GB network that are located on gradients steeper than 1:400 and of those, a significant number are on gradients steeper than 1:100. These platforms continue to accommodate a range of train services without having operational constraints on their use imposed because of track gradient.
- G 4.2.5 Where platform extensions and new platforms are proposed, it is good practice to implement a design top and alignment scheme (see Part 5), although usually the overall track gradient profile will not be altered. The platform extension or new platform will, in most cases, be constrained as to where it can be located with respect to the existing track gradient.
- G 4.2.6 The gradient through a platform should be constant, unless the particular geographical characteristics of the site and the characteristics of the railway infrastructure at the proposed location of the platform do not provide a reasonable opportunity for achieving this. Where the gradient is not constant, the average gradient should be measured over the length of any train likely to use the platform in its planned stopping position.

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- G 4.2.7 In this context the average gradient is to be understood as the representative gradient under a stationary train, derived by combining the values and lengths of the different track gradients through the platform, and taking account of the stopping position of the trains using the platform. For example, if a train stops on a track at a platform with a 1:600 gradient for 90% of the train's length and a 1:200 gradient in the same direction for the remainder of its length, the average gradient is 1:500.
- G 4.2.8 When considering locating platform extensions or new platforms on a gradient (steeper than 1:500), points to consider when assessing the risk arising from the proposed change include:
- a) Actual gradients and length of gradients.
 - b) Position of the train relative to the gradient.
 - c) Whether trains terminate, reverse or stand for an extended period at the platform.
 - d) Operation of trains in platform, for example being coupled / uncoupled, driver changing ends.
 - e) Braking capability of trains using the platform.
 - f) Engine noise from trains when pulling away from the platform.
 - g) Power limitations of trains when pulling away from the platform.
 - h) Mitigating circumstances in the event of a runaway (for example catch points, TPWS fitment and adjacent geography and gradients).
- G 4.2.9 For terminal platforms additional considerations include:
- a) Approach speed.
 - b) Signalling and control arrangements (for example approach control signals and TPWS).
 - c) Buffer stop and end impact wall arrangements.
 - d) Structures and facilities in overrun risk zone.
- G 4.2.10 Any vertical curvature between different track gradients should be taken into account when determining platform heights.

Extract from CR INF TSI

4.2.4.3. Maximum gradients [part]

TSI categories of line IV-P and VI-P [part]

- (2) Gradients of tracks through passenger platforms shall not be more than 2.5 mm/m, where passenger carriages are intended to be regularly attached or detached.

TSI categories of line IV-F, IV-M, VI-F and VI-M [part]

- (6) Gradients of tracks through passenger platforms shall not be more than 2.5 mm/m, where passenger carriages are intended to be regularly attached or detached.

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Extract from HS INF TSI

4.2.5 Maximum rising and falling gradients [part]

Lines of category I [part]

Gradients of main tracks through passenger platforms shall not be more than 2,5 mm/m.

- G 4.2.11 The requirement in the CR INF TSI clause 4.2.4.3 applies to 'new' lines only as defined therein.
- G 4.2.12 The requirement in the HS INF TSI clause 4.2.5 applies to 'specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h'.

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Part 5 Guidance on Standard Platform Position Relative to Adjacent Track

G 5.1 Platform height

Extract from GI/RT7016

3.1 Platform height

3.1.1 For new platforms and alterations (as defined) to existing platforms, the height at the edge of the platform shall be 915 mm (within a tolerance of +0 mm, -25 mm).

3.1.2 Where a new platform or an alteration (as defined) to an existing platform abuts an existing platform, any discrepancy in height of the platform shall be gradually tapered into the existing platform. The transition gradient shall not exceed 1:20.

- G 5.1.1 The standard position of the platform edge relative to the track provides for boarding and alighting of trains, assuming that the trains are built to the requirements of GM/RT2149. It also provides for the passage of trains at speed, including freight trains.
- G 5.1.2 For the GB railway, which for most routes provides for network wide utilisation of passenger and freight vehicles and open access, the standard platform position is the target system. It is possible that a case could be made for a nominal level access platform for dwell times and accessibility reasons. To avoid promulgating a range of heights of platforms on different parts of the network, with the resulting effects on stepping distances and gauge compatibility, it is important that the consequences of such an arrangement are fully considered. Appendix F of this document sets out the factors and measures to be considered for a nominal level access platform.
- G 5.1.3 When building a new platform or extending a platform the design geometry of the adjacent track should be used for setting out before platform building works commence. This is because the platform edge is usually set out with a platform gauge and any irregularities in the top and line of the track will be reflected, and then 'locked in' to the platform edge alignment.
- G 5.1.4 To allow for track geometry maintenance, new platforms and alterations (as defined) to existing platforms should be built to a tolerance tighter than +0 mm, -25 mm.
- G 5.1.5 For the lengthening of existing high platforms (above 915 mm ARL) an option to achieve an overall platform height of 915 mm ARL is to implement a track lift / recant in connection with the platform works.
- G 5.1.6 For the lengthening of existing platforms that are to a substandard height GI/RT7016 requires that the new length of platform is built to a height of 915 mm (within a tolerance of +0 mm, -25 mm) and therefore there needs to be a transition length not steeper than 1:20 between the new and existing platforms. The actual position of this transition length should be sited to best suit boarding and alighting of the trains that call at the platform (for example if possible avoiding alignment with doors) and also to best suit station access and egress arrangements (for example not to be opposite stairs or lifts).
- G 5.1.7 Where the height of the platform is lower than 915 mm with a low footfall, and usually there are limited classes of train calling at the station, an option for improving the boarding and alighting of trains could be to install a short section of standard height platform with ramps each side down to the existing low platform. This 'raised' section of platform should be located to best suit train door positions and access arrangements to the platform (see Figure G 1). Guidance on platform cross falls for this arrangement is given in G 12.1.5.

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Figure G 1 Harrington Station - example of a localised alteration to achieve standard height platform

- G 5.1.8 GC/RT5021 requires that the normal limiting design value for cant adjacent to a station platform is 110 mm, with an exceptional limiting design value of 130 mm. Therefore if the new or extended platform is to be built on a curve with cant greater than 130 mm, the track geometry should be assessed for possible recanting.
- G 5.1.9 Where the applied cant is greater than 130 mm at a location, GC/RT5212 Appendix 1 requires that the platform height is reduced by 10 mm when the platform is located on the inside of the curve.
- G 5.1.10 In considering platform heights due allowance should be taken for vertical curvature of the track.
- G 5.1.11 Once built, datum plates should be fixed to the platform wall to record the design offset, level and cant of the track.

Extract from PRM TSI

4.1.2.18.1. Platform height

For platforms on the Conventional Rail Network, two nominal values are permissible for platform height: 550 mm and 760 mm above the running surface. The tolerances on these dimensions shall be within $-35 \text{ mm}/+ 0 \text{ mm}$.

For platforms on the Conventional Rail Network where tramways (e.g. Stadtbahn or Tram-Train) are intended to stop, a nominal height of platform between 300 mm and 380 mm is permitted. The tolerances on these dimensions shall be within $\pm 20 \text{ mm}$.

In curves with a radius of less than 500 m, it is permitted for the platform height to be greater or less than those specified provided that the first useable step of the vehicle complies with figure 11 in clause 4.2.2.12.1.

Guidance on Interface between Station Platforms, Track and Trains

7.4. Specific cases [part]

7.4.1.1. Platform height [part]

Great Britain, Northern Ireland and Eire 'P'

It is permitted for the height of the platform to be 915 mm above the running surface.

Extract from HS INF TSI

4.2.20.4 Platform height

Lines of category I, II and III

The nominal platform height above the running plane shall be either 550 mm or 760 mm, unless otherwise specified in section 7.3.

The tolerances perpendicular to the running surface with reference to the nominal relative positioning between track and platform are -30 mm/+ 0 mm.

7.3. Specific cases [part]

7.3.6. Particular features on the British network [part]

7.3.6.2 Lines of category II [part]

Platforms (section 4.2.20)

1. Platform height

For platforms on upgraded lines in Great Britain where trains complying with the High Speed Rolling Stock TSI are intended to stop in normal commercial operation, the height at the edge of the platform shall be 915 mm (within a tolerance of + 0, - 50 mm) measured at right angles to the plane of the rails of the track adjacent to the platform.

- G 5.1.12 The CR INF TSI refers to the requirements of the PRM TSI with respect to platform height.
- G 5.1.13 With respect to the HS INF TSI there are no GB specific cases for lines of category I or III.
- G 5.1.14 Table G 2 summarises the GB applicable platform height and tolerances.¹

Trans-European Network line type	Platform height	Tolerances
'New' high-speed	550 mm or 760 mm	+ 0 mm / - 30 mm
'Upgraded' high-speed	915 mm	+ 0 mm / - 50 mm
'New' conventional	915 mm	+ 0 mm / - 25 mm
'Upgraded' conventional	915 mm	+ 0 mm / - 25 mm
GI/RT7016 'domestic' lines	915 mm	+ 0 mm / - 25 mm

Table G 2 Applicable platform heights and tolerances

¹ Note that the GB tolerances set out in GI/RT7016 are within the range permitted by the GB specific cases.

Guidance on Interface between Station Platforms, Track and Trains

G 5.2 Platform offset

Extract from GI/RT7016

3.2 Platform offset

- 3.2.1 For new platforms and alterations (as defined) to existing platforms, the platform edge shall be the minimum distance from the adjacent track (within a tolerance of +15 mm, -0 mm) consistent with the lower sector structure gauge set out in GC/RT5212 Appendix 1.
- 3.2.2 For most platforms, curves with radii greater than or equal to 360 m require a platform offset of nominally 730 mm (within a tolerance of +15 mm, -0 mm). GC/RT5212 sets out exceptions where Class 373 trains or 2.6 m wide containers are required to pass the platform. GC/RT5212 also sets out requirements where the curve radius is less than 360 m.
- 3.2.3 Where a new platform or an alteration (as defined) to an existing platform abuts an existing platform, any discrepancy in alignment of the platform shall be removed over a length commensurate with complete platform copier unit lengths, but at a rate not steeper than 1:80.

- G 5.2.1 The standard position of the platform edge relative to the track provides for boarding and alighting of trains, assuming that the trains were built to the requirements of GM/RT2149. It also provides for the passage of trains at speed, including freight trains.
- G 5.2.2 For the GB railway, which for most routes provides for network wide utilisation of passenger and freight vehicles and open access, the standard platform position is the target system. It is possible that a case could be made for a nominal level access platform for dwell times and accessibility reasons. To avoid promulgating a range of heights of platforms on different parts of the network, with the resulting effects on stepping distances and gauge compatibility, it is important that the consequences of such an arrangement are fully considered. Appendix F of this document sets out the factors and measures to be considered for a nominal level access platform.
- G 5.2.3 When building a new platform or extending a platform, the design geometry of the adjacent track should be used for setting out before platform building works commence. This is because the platform edge is usually set out with a platform gauge and any irregularities in the top and line of the track will be reflected, and then 'locked in' to the platform edge alignment.
- G 5.2.4 To allow for track geometry maintenance, new platforms and alterations (as defined) to existing platforms should be built to a tighter tolerance than +15 mm, -0 mm.
- G 5.2.5 Where the platform is adjacent to a ballasted track, foundations to platform support structures below sleeper level should have a minimum horizontal offset from the nearest rail of 730 mm plus an allowance for track curvature to a minimum depth of 600 mm below underside of sleeper. This is to avoid disturbance to the foundations during track renewal and maintenance work, however there are circumstances where this is not practicable, for example on underbridges.
- G 5.2.6 For the lengthening of existing platforms that are to a substandard offset, GI/RT7016 only requires that the existing section of platform is rebuilt to the standard platform offset if there is a reasonable opportunity to do so. For platform extensions where there is a transition between the existing and new platform offset, it should be sited to best suit boarding and alighting of the trains that call at the platform (for example if possible avoiding alignment with doors) and also to best suit station access and egress arrangements (for example not to be opposite stairs or lifts).
- G 5.2.7 A restraint to lateral movement of platform copers should be provided to prevent them, in case of bed separation, from moving and thereby infringing clearances. Designs of copers have been used that have a triangular cut out at the edge that provide for a shear key to be installed.

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Figure G 2 Platform copers with a shear key

Extract from PRM TSI

4.1.2.18.2. Platform offset

Text of PRM TSI not reproduced here, see G 5.2.7.

7.4. Specific cases [part]

7.4.1.2 Platform offset [part]

Great Britain 'P'

The platform offset:

At straight and level platforms.

$\infty \geq R \geq 360$	$360 \geq R \geq 160$
$b_{q0} = 1\,447,5$	$b_{q0} = 1375,5 + \frac{26000}{R}$

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For the lines operated with (Class 373) Eurostar and lines where freight containers of 2,6 m operate.

$\infty \geq R \geq 360$	$360 \geq R \geq 160$
$b_{q0} = 1\,447,5$	$b_{q0} = 1405,5 + \frac{26000}{R}$

For the lines where freight containers of 2,6 m operate.

	$\infty \geq R \geq 500$	$500 \geq R \geq 160$
Internal side of the curve	$b_{q0} = 1\,447,5$	$b_{q0} = 1381,5 + \frac{33000}{R}$
	$\infty \geq R \geq 360$	$360 \geq R \geq 160$
External side of the curve	$b_{q0} = 1\,447,5$	$b_{q0} = 1375,5 + \frac{26000}{R}$

Extract from HS INF TSI

4.2.20 Platforms [part]

4.2.20.5 Distance from the centre of the track

For platform edges positioned at the nominal heights, the nominal distance L from the track centre parallel to the running plane shall be obtained from the formula:

$$L \text{ (mm)} = 1650 + 3750/R + (g - 1435)/2$$

When R is the radius of the track, in metres, and g the track gauge, in millimetres.

This distance shall be respected from a height upwards of 400 mm above the running surface.

Tolerances for the positioning of the platform edges or their maintenance shall be adopted such that distance L is not reduced under any circumstances and not increased by more than 50 mm.

7.3 Specific cases [part]

7.3.6. Particular features on the British network [part]

7.3.6.2 Lines of category II [part]

Platforms (section 4.2.20)

2. Platform horizontal distance (platform offset) [part]

For platforms on upgraded lines in Great Britain where trains complying with the High Speed Rolling Stock TSI are intended to stop in normal commercial operation, the platform edge shall be the minimum distance from the adjacent track (within a tolerance of + 15, - 0 mm) consistent with the lower sector structure gauge set out in Appendix 1 to Railway Group Standard GC/RT5212 (Issue 1, February 2003).

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For most rolling stock, this requirement is met on curves with radii greater than or equal to 360 m by a platform offset of 730 mm (within a tolerance of + 15, 0 mm). Appendix 1 to Railway Group Standard GC/RT5212 (Issue 1, February 2003) sets out exceptions where Class 373 (Eurostar) trains or 2,6 m wide containers are required to pass the platform. Appendix 1 to Railway Group Standard GC/RT5212 (Issue 1, February 2003) also sets out requirements where the curve radius is less than 360 m.

- G 5.2.8 Requirements for platform offset in connection with a platform height of either 550 mm or 760 mm are set out in the PRM TSI clause 4.1.2.18.2. The GB specific case provides for a 915 mm platform height with a corresponding specific case for platform offset that provides for adjustment of offsets that is consistent with GC/RT5212 Appendix 1.
- G 5.2.9 The CR INF TSI refers to the requirements of the PRM TSI with respect to platform offset.
- G 5.2.10 Table 3 summarises the applicable platform offset and tolerances (distances taken from running edge adjacent to the platform and in plane of rail unless otherwise stated).

Trans-European Network line type	Platform offset	Tolerances
'New' high-speed	$L \text{ (mm)} = 1650 + 3750/R + (g - 1435)/2$ Where: L is platform edge from track centre (mm) R is the radius of the track (m) g is track gauge (mm)	+ 50 mm / - 0 mm
'Upgraded' high-speed	730 mm for radius ≥ 360 m Exception for where class 373 (Eurostar) or 2.6 m wide container trains are required to pass: 760 mm for radius ≥ 360 m GC/RT5212 sets out requirements where the curve radius is less than 360 m	+ 15 mm / - 0 mm
'New' conventional	Refers to PRM TSI. GB specific case requires offset as GI/RT7016 'domestic lines'	+ 15 mm / - 0 mm
'Upgraded' conventional	Refers to PRM TSI. GB specific case requires offset as GI/RT7016 'domestic lines'	+ 15 mm / - 0 mm
GI/RT7016 'domestic' lines	730 mm for radius ≥ 360 m Exception for where class 373 (Eurostar) or 2.6 m wide container trains are required to pass: 760 mm for radius ≥ 360 m GC/RT5212 sets out requirements where the curve radius is less than 360 m	+ 15 mm / - 0 mm

Table G 3 Applicable platform offset and tolerances

Guidance on Interface between Station Platforms, Track and Trains

G 5.3 Footsteps of new trains relative to standard platform position

Extract from GI/RT7016

3.3 Footsteps of new trains relative to standard platform position

- 3.3.1 GM/RT2149 sets out the requirements for footsteps for passenger use on new trains relative to a platform positioned in accordance with sections 3.1 and 3.2.

- G 5.3.1 The maximum horizontal, vertical and diagonal stepping distances are considered to be extreme dimensions. The target should be within these limits subject to providing normal clearances for gauging. GM/RT2149 Appendix A indicates a target nominal footstep height of 130 mm relative to a platform positioned in accordance with GI/RT7016. The PRM TSI clause 4.1.2.21.1 sets out the requirements with respect to stepping distances for unassisted boarding.

Extract from PRM TSI

4.1.2.21. Boarding aids for passengers using wheelchairs

4.1.2.21.1. Subsystem requirements

When a platform in a station that has obstacle free access routes in accordance with 4.1.2.3.1 is intended to receive trains stopping in normal operation with wheelchair-compatible doorway, a boarding aid shall be provided to be used between that doorway and the platform to allow a passenger in a wheelchair to board or alight,

- unless it is demonstrated that the gap between the edge of the door sill of that doorway and the edge of the platform is not more than 75 mm measured horizontally and not more than 50 mm measured vertically;

And

- unless there is a station stop within 30 km, on the same route, provided with boarding aids.

- G 5.3.2 To obviate the need for boarding aids the PRM TSI, states the gap between the edge of the door sill of the vehicle doorway and the edge of the platform is to be not more than 75 mm measured horizontally and not more than 50 mm measured vertically, which means that the design arrangement needs to provide a closer relationship to allow for tolerances of movements and wear in service. Depending on the track fixity the design vertical gap would be less than 50 mm and the design horizontal gap would be less than 75 mm.

- G 5.3.3 The Department for Transport study called 'Significant Steps', investigated the effect of the vehicle-platform gap on the ability of passengers to board and alight from a train. The study concluded that, to enable the majority of participants to use rail vehicles, the step between the platform and train should not exceed 200 mm when the gap height and width are added together.

- G 5.3.4 It is recognised that the step position arrangements need to take account of the actual position of platform edge at all stations where the train passes.

G 5.4 Increased stepping distances associated with achieving the standard platform position

Extract from GI/RT7016

3.4 Increased stepping distances associated with achieving the standard platform position

- 3.4.1 Not all footsteps of existing trains are compliant with the nominal footstep height set out in GM/RT2149.

- 3.4.2 Not all existing platforms are compliant with this document.

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3.4.3 Setting the position of a platform edge to meet the requirements of sections 3.1 and 3.2 could therefore result in the stepping distances quoted in section 3.3 being exceeded in the case of some trains that do not meet the current requirements of GM/RT2149.

3.4.4 Where this is the case, measures to protect the safety of passengers when boarding or alighting from trains scheduled to call at the particular platform (or section of platform) shall be put in place before the usable platform length is brought into use.

3.4.5 The measures considered shall include the following:

- a) Provision of warning signs and platform markings.
- b) Provision of announcements.
- c) Staff attendance.

G 5.4.1 Where platforms are located on curves consideration should be given to the provision of 'Mind the gap' or 'Mind the step' warnings on the platform edge. Where required such warnings should be in white paint, and placed as near as is reasonably practicable to the position of the greatest gap between train and platform adjacent to the typical stopping position of the train footsteps and at least at a spacing suited to the different train configurations.

G 5.4.2 GI/RT7033 sets out requirements for lineside operational safety signs including the specification for 'Mind the gap' or 'Mind the step' warnings. The specification sets out requirements for the size and presentation of the lettering, positioning on the platform and its alternate orientation for those entering or leaving the vehicle.

G 5.4.3 Where achieving the standard platform position would deliver calculated clearances less than the Special Reduced category achieving positive clearances should take precedence.

G 5.5 S&C adjacent to a platform

Extract from GI/RT7016

3.5 S&C adjacent to a platform

3.5.1 Where switches and crossings (S&C) are located adjacent to the platform, the effects of vehicle end throw shall be taken into account.

G 5.5.1 It is usually not desirable to have a switches and crossings (S&C) layout adjacent to a platform, however there are situations where this is the case and it is conceivable that there could still continue to be a need to site S&C in platforms due to operational and site constraints. Before starting work on a new platform or platform extension, a check should be made to see if there are any plans or schemes in place to renew or remodel the S&C. If there is a plan to carry out works to the S&C then the proposed platform works also need to be considered with respect to the S&C scheme in order to achieve an improved platform arrangement. It is likely that a deviation against GI/RT7016 section 3.2 with respect to platform offset would be required.