

Railway Group Standard

GI/RT7073

Issue One

Date December 2015

Requirements for the Position of Infrastructure and for Defining and Maintaining Clearances

Synopsis

This document mandates requirements for positioning infrastructure and maintaining the position of track relative to infrastructure to achieve gauge compatibility with rolling stock.

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Issue record

Issue	Date	Comments
One	December 2015	Original document. Supersedes GC/RT5212 issue one Requirements for Defining and Maintaining Clearances. Requirements out of scope of the RGS Code issue four are not taken forward in GI/RT7073 issue one. Lower sector infrastructure gauge replaces lower sector structure gauge. Requirements for new infrastructure, alterations to reduce stepping distances at platforms and cross-winds clarified.

Superseded documents

The following Railway Group Standard is superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
GC/RT5212 issue one Requirements for Defining and Maintaining Clearances	All	05 March 2016

GC/RT5212 issue one Requirements for Defining and Maintaining Clearances, ceases to be in force and is withdrawn as of 05 March 2016.

Supply

The authoritative version of this document is available at www.rssb.co.uk/railway-group-standards. Enquiries on this document can be forwarded to enquirydesk@rssb.co.uk.

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Part 1 Purpose and Introduction

1.1 Purpose

- 1.1.1 This document mandates requirements for positioning infrastructure and maintaining the position of track relative to infrastructure to achieve gauge compatibility with rolling stock.

1.2 Introduction

1.2.1 Background

- 1.2.1.1 The gauging principles set out in GI/RT7073, GE/RT8273 and GM/RT2173 are based upon a requirement for maintaining adequate clearances between the vehicle and adjacent structures, and maintaining adequate passing clearances between the vehicle and other vehicles operating on adjacent tracks.
- 1.2.1.2 The prime requirement is that there are always to be positive clearances between rolling stock and rolling stock, or rolling stock and infrastructure (excluding items designed to be in contact). In order to provide this, the documents set out in 1.2.1.1 mandate control measures which become progressively more stringent as clearances decrease. Thus, where large clearances exist, few control measures are required. Where small clearances exist, controls are required to maintain adequate clearances. Clearances are categorised as normal, reduced or special reduced.

1.2.2 Related requirements in other documents

- 1.2.2.1 The following Railway Group Standards (RGSSs) contain requirements that are relevant to the scope of this document:
- a) GE/RT8073 Requirements for the Application of Standard Vehicle Gauges – this document defines standard vehicle gauges and the associated application rules for rolling stock and for infrastructure. GE/RT8073 defines lower sector vehicle gauge (LSVG).
 - b) GE/RT8270 Assessment of Compatibility of Rolling Stock and Infrastructure – this document sets out requirements and responsibilities for the assessment of compatibility of rolling stock and infrastructure.
 - c) GE/RT8273 Assessment of Compatibility of Rolling Stock and Infrastructure - Gauging and Stepping Distances – this document sets out specific requirements and responsibilities for the assessment of gauge compatibility and stepping distances between rolling stock and infrastructure.
 - d) GI/RT7016 Interface between Station Platforms, Track and Trains – this document sets out the target height for new, extended and altered platforms.
 - e) GM/RT2173 Requirements for the Size of Vehicles and Position of Equipment – this document sets out the methods of determining, and the requirements for maintaining, the swept envelope of rail vehicles. It sets out the format of the prescribed parameters for defining the size of railway vehicles and sets out particular requirements for components required to interface with the infrastructure.
 - f) GL/RT1210 AC Energy Subsystem and Interfaces to Rolling Stock Subsystem – this document sets out the requirements for the AC energy system and the interfaces to rolling stock operating over the AC electrified railway.

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- g) GL/RT1212 DC Conductor Rail Energy Subsystem and Interfaces to Rolling Stock Subsystem – this document defines the requirements for the DC conductor rail energy subsystem and the interfaces to rolling stock operating over the DC electrified railway.
- h) GE/RT8025 Electrical Protective Provisions for Electrified Lines – this document sets out provisions for electrical clearances for third rail electrified lines.

1.2.3 Supporting documents

1.2.3.1 The following Railway Group documents support this RGS:

- a) GE/GN8573 Guidance on Gauging – this document provides information and advisory material in support of the application of the various RGSs covering gauging. It also provides background material on the original derivation of the vehicle gauges in common use.
- b) RIS-2773-RST Format for Vehicle Gauging Data – this document provides a standard format for defining the swept envelope of a vehicle for the purposes of compatibility assessment when undertaking absolute or comparative gauging. The data can also be used for the purposes of assessment against standard dynamic vehicle gauges.

1.3 Approval and authorisation of this document

- 1.3.1 The content of this document was approved by Infrastructure Standards Committee (INS SC) on 09 September 2015.
- 1.3.2 This document was authorised by RSSB on 09 October 2015.

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Part 2 Requirements for New and Altered Infrastructure

2.1 Introduction to the requirements for new infrastructure

- 2.1.1 The Infrastructure TSI (2014) sets out requirements for gauge included in the relevant category of line. There is a Great Britain (GB) specific case that permits the use of National Rules for all categories of line, except category P1, a new dedicated high speed line.
- 2.1.2 Requirements for gauge clearance are related to either the upper sector or lower sector. The boundary between upper sector and lower sector is considered to be 1100 mm above rail level. Part 3 sets out the framework for clearances related to each sector.

2.2 Requirements for new infrastructure for the upper sector

2.2.1 Requirements for new infrastructure on a new railway line

- 2.2.1.1 New infrastructure on a new railway line shall be designed to accommodate:
 - a) The installation of overhead line equipment.
 - b) At least normal clearances in the upper sector to all standard vehicle gauges in GE/RT8073.
 - c) At least normal clearances in the upper sector to all types of rolling stock which the infrastructure manager (IM) may reasonably foresee using the route in future.
 - d) Access for staff (for example, lineside access routes and cess walkways).
- 2.2.1.2 Guidance on factors to be taken into account when determining clearances to allow space for overhead line equipment and access for staff is given in GE/GN8573.
- 2.2.1.3 Requirements for overhead line equipment construction and electrical clearances are set out in GL/RT1210.
- 2.2.1.4 The required clearances shall be calculated in accordance with 3.2.

2.2.2 Requirements for new infrastructure on an existing section of railway

- 2.2.2.1 New infrastructure on an existing section of railway shall be designed to provide at least normal clearances in the upper sector (see 3.1.2) to all types of rolling stock that use the route or have a statement of compatibility for the route involved.
- 2.2.2.2 New infrastructure shall be designed to accommodate the installation of overhead line equipment.
- 2.2.2.3 Guidance on factors to be taken into account when determining clearances to allow space for infrastructure systems (for example signalling and electrification systems) and access for staff is given in GE/GN8573.
- 2.2.2.4 Requirements for overhead line equipment construction and electrical clearances are set out in GL/RT1210.
- 2.2.2.5 The required clearances shall be calculated in accordance with 3.2.

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2.2.3 Additional clearances at vehicle window level for new infrastructure

2.2.3.1 The following clearances shall be provided at the level of opening vehicle windows between 2000 mm and 3000 mm above the plane of the rails:

- a) 450 mm where passenger vehicles operate with opening windows allowing passengers to lean out.
- b) 250 mm where vehicles operate with opening windows for the use of train crew.

2.3 Lower sector infrastructure gauge (LSIG) for new infrastructure

2.3.1 New infrastructure shall not intrude inside the LSIG, as set out in Appendix A.1.

2.3.2 New track shall be positioned to ensure adjacent infrastructure does not intrude inside LSIG, as set out in Appendix A.1.

2.3.3 When designing new infrastructure, allowance shall be made for construction tolerances to ensure these requirements are met once the infrastructure has been built.

2.3.4 Requirements for platform height, and for the tapering of any discrepancy in height or alignment of the platform edge where a platform is altered or extended, are set out in GI/RT7016.

2.3.5 Station platforms are necessarily close to trains to enable safe boarding and alighting. Additional requirements for platforms, including stepping distances, are set out in GI/RT7016. Requirements for footsteps for passenger use on new trains are set out in GM/RT2173.

2.4 Particular requirements for equipment in LSIG

2.4.1 Certain items of equipment have to be in close proximity to rolling stock for system compatibility. The equipment set out in Table 1 shall be positioned as shown in the appendices.

Equipment	Appendix
Conductor rails	A.2
Conductor rail guard boarding	A.3
Automatic power control (APC) magnets	A.4
Mechanical trainstops	A.5
Tripcock testers	A.6
Automatic warning system (AWS) magnets	A.7
Treadle actuating arms	A.8

Table 1 Equipment in LSIG

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2.5 Track intervals for new infrastructure

- 2.5.1 For each section of track the track intervals to be used for new infrastructure shall take into account:
- a) The requirement to provide normal clearances, as set out in 2.2.
 - b) Where necessary, the requirement to provide additional clearances for opening windows, as set out in 2.2.
 - c) If required, the space needed for trackside equipment, for example, signals and speed signs.

2.6 Alterations to existing infrastructure

2.6.1 Alterations other than to permit the passage of larger rail vehicles

- 2.6.1.1 Where existing infrastructure conforms to LSIG, any alterations shall not intrude inside LSIG.
- 2.6.1.2 When existing infrastructure is altered for reasons other than to permit the passage of larger rail vehicles, the alteration shall be designed so that the gauge capability in terms of standard vehicle gauges and vehicle classes is maintained.

2.6.2 Alterations to reduce stepping distances at platforms

- 2.6.2.1 It is permissible for platforms to be altered to reduce stepping distances by making clearances smaller to vehicles that use the route, or have a statement of compatibility for the route involved, provided the control measures appropriate to the resulting clearance category, for example, reduced clearance, are implemented.
- 2.6.2.2 Requirements for the altering of platforms relative to adjacent track are set out in GI/RT7016.
- 2.6.2.3 Requirements for the assessment of platform stepping distances if a change is made to the platform edge are set out in GE/RT8273.

2.6.3 Alterations to permit the passage of vehicles with a larger swept envelope

- 2.6.3.1 When existing infrastructure is altered to permit the passage of vehicles with a larger swept envelope, it is permissible for the alteration to be limited to that which is sufficient to allow the passage of the vehicle with a larger swept envelope, provided the control measures appropriate to the resulting clearance category (see 3.1), for example, reduced clearance, are implemented.

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Part 3 Management of Clearances

3.1 Categorisation of clearances

3.1.1 Application of clearances

- 3.1.1.1 For both upper sector and lower sector, a minimum clearance between the swept envelope / gauge of a vehicle and the infrastructure and / or swept envelope / gauge of a vehicle on an adjacent track shall be calculated.
- 3.1.1.2 Clearances shall be calculated under conditions leading to the generation of that minimum clearance.
- 3.1.1.3 Clearances are to be determined by the consideration of the aggregation of all system tolerances and allowances (track, structure and swept envelope) together with the application of vehicle dynamic movements, taking account of measurement accuracies.
- 3.1.1.4 Where clearances are being calculated in the upper sector / lower sector boundary area (for example, the infrastructure is in the lower sector and the vehicle step height is in the upper sector), the categorisation of clearance (i.e normal, reduced or special) shall be related to the vehicle or standard vehicle gauge.

3.1.2 Categorisation of clearances

- 3.1.2.1 Clearances in the upper sector between structures and vehicles, and between vehicles, shall be categorised as normal, reduced or special reduced, as set out in Table 2.

	Speed (see section 3.2.5)	
	≤ 125 mph (200 km/h)	> 125 mph (200 km/h) and ≤ 140 mph (225 km/h)
Normal clearance	≥ 100 mm	≥ 100 mm
Reduced clearance	≥ 50 mm to < 100 mm	Not applicable
Special reduced clearance	> 0 mm and < 50 mm	> 0 mm and < 100 mm

Table 2 Clearances in the upper sector to structures and between vehicles

- 3.1.2.2 Clearances in the lower sector between structures and vehicles, and between vehicles, shall be categorised as normal, reduced or special reduced, as set out in Table 3.

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	Speed (see section 3.2.5)	
	≤ 125 mph (200 km/h)	> 125 mph (200 km/h) and ≤ 140 mph (225 km/h)
Normal clearance	≥ 50 mm (see note 1)	≥ 50 mm
Reduced clearance	≥ 25 mm to < 50 mm (see note 1)	Not applicable
Special reduced clearance	> 0 mm and < 25 mm	> 0 mm and < 50 mm

Table 3 Clearances in the lower sector to structures and between vehicles

Note

1. In the case of suspension failure (see GM/RT2173) a clearance ≥ 25 mm shall be categorised as a normal clearance and reduced clearance is not therefore applicable.

3.2 Calculation of clearances (method of calculation)

3.2.1 Method of calculation – Calculation of an effective position of the track

- 3.2.1.1 The maintained position of the track, relative to adjacent structures or tracks, shall be adjusted to allow for track tolerances (see 3.3) to arrive at an effective position of the track, relative to adjacent structures or tracks. Accuracy of measurements shall also be considered.

3.2.2 Calculation of clearances to standard vehicle gauges

- 3.2.2.1 Structure clearances shall be determined using the minimum calculated distance between structures and the standard vehicle gauge on track in its effective position(s).
- 3.2.2.2 Passing clearances shall be determined using the minimum calculated distance between the standard vehicle gauge and either a swept envelope or a standard vehicle gauge associated with a vehicle demonstrated to have gauging compatibility on the adjacent track, on tracks in their effective position(s).

3.2.3 Calculation of clearances for absolute gauging

- 3.2.3.1 Structure clearances shall be determined using the minimum calculated distance for upper sector and lower sector between structures and the vehicle swept envelope (see 3.2.4.1), on track in its effective position(s).
- 3.2.3.2 Passing clearances shall be determined using the minimum calculated distance between the vehicle swept envelope and either a swept envelope or a standard vehicle gauge associated with a vehicle demonstrated to have gauging compatibility on the adjacent track, on tracks in their effective position(s).

3.2.4 Selection of relevant swept envelopes for absolute and comparative gauging

- 3.2.4.1 Requirements for vehicle swept envelopes to be determined are set out in GM/RT2173, and include:
 - a) The full permissible range of operating speeds, cant excesses and cant deficiencies for which the vehicle has been designed.
 - b) Movements caused by dynamic inputs from track on the routes for which gauging compatibility is required.