



GM/TT0123

Issue: 1

Revision: A

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Part A

Synopsis

This document prescribes the loading cases for doors and gangways on vehicles carrying passengers, train crew and personnel. It covers external and interior doors, cab side doors, external steps and grabrails, and inter-vehicle gangways.

Approval and Authorisation

Signatures removed from electronic version

Submitted by:
Nominated Responsible Manager

Approved by:
Chairman, T&RS Subject Committee

Authorised by:
Board Member, Engineering

Structural Requirements for Doors and Gangways on Railway Vehicles



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Issue/ Revision Record

This standard will be updated when necessary by distribution of a complete replacement. Amended or additional parts of revised pages will be marked by a vertical black line in an adjacent margin.

Issue	Rev	Date	Comments
1	A	June 93	Original Document

Responsibilities and distribution

This standard applies to BR businesses, private owners and other organisations that operate railway vehicles on BR lines. Businesses shall ensure that the provisions of the standard are communicated to all persons and organisations with responsibilities for the structural specification, design, development, procurement and testing of new vehicles and the refurbishment of existing vehicles.

Implementation

The provisions of this standard are mandatory, and the process of implementation shall begin immediately on receipt of this document. The standard shall be applicable from 1 September 1993 to all new procurement contracts for new vehicles and to all new refurbishment programmes for existing vehicles.

Supply

Controlled and uncontrolled copies of this standard may be obtained from the TDCC Manager, Central Services, Dovedale House, RTC, Derby.

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Part B

1 Purpose

The purpose of this document is to prescribe the structural requirements for external and interior doors and their attachments, for external steps and grabrails, and for inter-vehicle gangways on vehicles running on British Railways. The objective is to ensure safety under normal operation and minimise risks to passengers and train crew in the event of collision or derailment.

2 Scope

The requirements of this standard apply to all new railway vehicles which carry passengers, train crew or personnel. The requirements also apply to existing vehicles undergoing refurbishment insofar as it is opportune and practicable to incorporate them.

The requirements for doors apply only to doors associated with the primary passageways for passengers, train crew and personnel. They do not apply to doors for equipment access, for payload stowage, or for inspection or maintenance purposes.

3 General

- 3.1** All doors, external steps and grabrails, and gangways shall meet the proof and ultimate load requirements specified in reference (1).
- 3.2** The strength of door frames, door locks and associated equipment shall be compatible with the strength of the doors.
- 3.3** Glazed areas incorporated in doors shall comply with reference (2).

4 Doors



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- 4.1** An external door shall withstand the following separate load cases without significant permanent deformation or loss of normal function.
- (a) a concentrated perpendicular load, acting from within the vehicle, of 2.5kN applied over an area of 0.1 m square anywhere on the surface of the door.
 - (b) a pressure of 2.5kN/m² applied over the external surface of the door.
 - (c) a pressure of 2.5kN/m² applied over the internal surface of the door plus a concentrated perpendicular load, acting from within the vehicle, of 0.8 kN applied over an area of 0.1 m square anywhere on the surface.
- 4.2** An external door shall withstand without fracture or collapse a sustained pressure of 6 kN/m² over its internal surface. The door and associated components may not necessarily remain operational after the application of this load.
- 4.3** An interior door shall withstand the following separate load cases without significant permanent deformation or loss of function.
- (a) a concentrated perpendicular load of 2.5 kN applied over an area of 0.1 m square anywhere on the surface of the door; this load shall be applied to both sides of the door independently.
 - (b) a pressure of 2.5 kN/m² applied over the entire surface of the door plus a concentrated perpendicular load of 0.8 kN applied over an area of 0.1 m square anywhere on the surface; this combination of loads shall be applied to both sides of the door independently.
- 4.4** Handles on external doors shall withstand a downward vertical load of 1.7 kN without significant permanent deformation.
- 4.5** Forward-facing exterior doors shall comply with reference (3).

5 External Steps and Grabrails



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- 5.1** A step shall withstand a concentrated downward vertical load of 1.7 kN applied anywhere on its surface, without significant permanent deformation.
- 5.2** A step shall withstand a uniformly distributed downward vertical load of 4 kN per metre over its length, without significant permanent deformation.
- 5.3** A grabrail shall withstand a perpendicular load of 1.7 kN applied at any point along its length, without significant permanent deformation.
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6 Inter-Vehicle Gangways

- 6.1** A gangway, including all its flexible elements, shall be stable under the aerodynamic forces experienced up to maximum train speed. These include pressure transients created by other trains, by lineside structures, and by passage through tunnels. No dangerous gaps shall be exposed.
- 6.2** A gangway shall withstand without permanent deformation the following loads:
- (a) A differential pressure between the inside and outside of the gangway of $\pm 2.5 \text{ kN/m}^2$.
 - (b) A pressure load of 6 kN/m^2 on the standing floor area.
 - (c) A concentrated perpendicular load, acting from within the gangway, of 0.8 kN applied over an area of 0.1 m square anywhere on the surface of the side walls.
- 6.3** Any flexible elements used on the floor and sides shall be strong enough and stiff enough to provide safe support to passengers and crew.
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7 Verification

The capability to withstand the specified loads shall be demonstrated by tests, calculations, or other appropriate means.

Appendix A

Definitions

**Structural Requirements for Doors and
Gangways on Railway Vehicles****GM/TT0123**

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Page 6 of 7**External Door**

A door on the side of a vehicle which provides access between the outside and the inside.

Interior Door

A door which provides access from one part of the vehicle interior to another part.

Inter-Vehicle Gangway

A throughway between two adjacent vehicles.

Refurbishment

A programme of interior/exterior work undertaken on a vehicle to restore or enhance the level of design, performance or the materials used in its construction.



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Appendix B

References

(1) GM/TT0179

Structural Requirements for Body-Mounted Equipment on Railway Vehicles

(2) GM/TT0122

Structural Requirements for Windscreens and Windows on Railway Vehicles

(3) GM/TT0265

Structural Requirements for Railway Vehicles

Related Documents

GM/TT0121

Structural Requirements for Passenger Vehicle Interiors

GO/OTS220

Emergency Egress from Passenger Rolling Stock

GM/TK0005

Technical Commentary on the Structural Requirements for Windscreens, Windows, Doors and Gangways

UIC 560

Doors, Entrance Platforms, Windows, Steps, Handles, and Handrails of Coaches and Luggage Vans

UIC 566

Loadings of Coach Bodies and their Components.
