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Railway applications — Platform barrier systems

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 269, *Railway applications*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

0.1 Purpose

Platform barrier systems provide a movable barrier between trains and other guided transit vehicles, and passengers waiting at stations and boarding points.

Platform barrier systems are used increasingly on metro and other rail networks to ensure the safety of passengers on the station platform who are waiting to board vehicles. Such systems are also used on "people-mover" guided systems for short-distance transits, for example, at airports. Their use is recommended by IEC 62267 for any fully automated transit system.

In particular, platform barrier systems can be used to control the risk of:

— incursion by passengers or other persons on the railway track (deliberate or accidental); and

— contact between passengers and moving vehicles.

These risks can be especially significant where there is the possibility of overcrowding on station platforms at busy locations. Barriers can increase the safely useable space in the station for passengers waiting and circulating on the platforms.

Platform barrier systems integrate the operation of the platform barrier doors and gates with opening and closing of train doors and also assist in the management of station operations, to safely permit higher speeds for trains entering and exiting the stations.

Barrier installations can also be part of a continuous partition between the running tracks and the station areas for the purposes of:

— fire safety (including smoke management);

— tunnel and station ventilation (including reduction of the piston effect);

— trackside noise reduction; and

— passenger comfort at climate-controlled stations.

Additionally, the terminology used in connection with platform barrier systems, in particular to improve the specification and understanding of safety requirements, should be standardized.

0.2 National annex with relevant national standards

There are several standards required for the successful implementation of this document, relating to specific regions or countries, that are currently not suitable for inclusion within an international standard. As such, national standards bodies are encouraged to compile and document the standards, relevant to the region or country they represent, within a national annex. National annexes can also provide localized guidance and advice on how to implement this document for projects of varying complexity.

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Railway applications — Platform barrier systems

1 Scope

This document specifies requirements for the design, construction and operation of platform barrier systems positioned at the edge of a station platform immediately adjacent to the rail or other guided vehicles in stations and boarding points for passenger services. This document includes:

— requirements for the fixed structure and fixed parts along the platform;

— physical requirements for the movable doors and gates normally used by passengers;

— requirements for emergency doors;

— requirements for driver access doors;

— requirements for platform extremity doors; and

— requirements for the management of safety risks that are particular to barrier systems.

NOTE This document provides requirements for doors and gates on conventional panel construction from platform level to the top of the door, or gate.

This document also gives requirements for the integration of barriers within the overall rail system, including:

— synchronization of vehicle and platform barrier doors/gates;

— audible and visible alerts;

— integrity of control systems;

— testing of the barrier installation;

— operational performance; and

— requirements relating to other interfacing sub-systems, notably signalling and vehicles.

This document does not cover barrier systems set back from the platform edge, which are used to control access to trains or for crowd management, however, relevant sections of the document can be used as guidance.

This document applies to rail services, e.g. metro, tram systems and main line railway system services as requested by a project specification. It applies to small systems, working in conjunction with a single vehicle, or with larger systems working with a complete train.

This document applies to platform barrier systems used at sub-surface stations, enclosed surface stations (e.g. those enclosed for the purposes of providing an air-conditioned environment for waiting passengers), and those fully in the open-air.

This document applies to all persons involved in the implementation and system integration of a platform barrier system, including infrastructure owners, designers, installers and operators.

This document does not cover barrier systems using doors/gates that utilize multiple panels, bars, ropes, etc. or which operate in a vertical direction.

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This document does not cover requirements:

— relating to fire performance or fire requirements arising from use of platform barrier systems as fire barriers; or

— for platforms, or other foundations and structures to which the barrier system is secured.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12543-1, *Glass in building — Laminated glass and laminated safety glass — Part 1: Vocabulary and description of component parts*

ISO 29584, *Glass in building — Pendulum impact testing and classification of safety glass*

IEC 60364-4-41, *Low-voltage electrical installations — Part 4-41: Protection for safety — Protection against electric shock*

IEC 60364-5-54, *Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors*

IEC 60364-6, *Low-voltage electrical installations - Part 6: Verification*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

IEC 61140, *Protection against electric shock - Common aspects for installation and equipment*

IEC 62061, *Safety of machinery - Functional safety of safety-related control systems*

IEC 62128-1:2013, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 1: Protective provisions against electric shock*

IEC 62128-2, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 2: Provisions against the effects of stray currents caused by d.c. traction systems*

IEC 62236-4, *Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus*

IEC 62278, *Railway applications - Specification and demonstration of reliability, availability, maintainability and safety (RAMS)*

IEC 62279, *Railway applications - Communication, signalling and processing systems - Software for railway control and protection systems*

IEC 62425, *Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling*

IEC 62290-2, *Railway applications - Urban guided transport management and command/control systems - Part 2: Functional requirements specification*

IEC 62305-1, *Protection against lightning - Part 1: General principles*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

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

3.1
correct alignment
correct position of the doors of the vehicle relative to the corresponding *platform* (3.17) barrier doors/gates, to permit safe and efficient transfer of passengers between vehicles and platform

3.2
closed and locked
status of doors/gates, which is closed and kept closed through a locking device (via mechanical or other means)

3.3
doorway
section of a *platform* (3.17) barrier through which passengers can board or alight from vehicles when *platform doors* (3.19)/*gates* (3.22) are open

3.4
driver access door/gate
openable panel in a *platform door* (3.19) or *gate* (3.22) system designed to align with the driving cab door of a *train* (3.28) stopped at the *station* (3.25) or boarding point

Note 1 to entry: Such panels (if provided) can open with a hinged or sliding action.

3.5
emergency egress device
operating element for manual opening from the trackside, in case of emergency, of any type of *platform door* (3.19) or *gate* (3.22)

3.6
emergency egress door/gate
panel in a *platform door* (3.19) or *gate* (3.22) system which can be opened in an emergency, or if the vehicle(s) are not in *correct alignment* (3.1) with the platform doors/gates

Note 1 to entry: Emergency egress doors/gates can be of any design – hinged, sliding, push-out, etc.

3.7
entrapment
trapping of a person between the vehicle bodyside and the *platform* (3.17) barrier after the vehicle and *platform doors* (3.19)/*gates* (3.22) have been closed

3.8
facade
complete framework and panels (fixed and moving) of the *platform* (3.17) barrier

3.9
finished floor level
level of the *platform* (3.17) floor when all surface finishes (e.g. tiles, screed, threshold) have been applied

3.10
glazing
glass or equivalent transparent material fixed in frames as part of a *platform barrier system* (3.18)

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3.11
leading edge
vertical edge of a door or gate, leading during closing movement

3.12
local control panel
centralized control panel adjacent to or in the vicinity of the *platform* (3.17) barrier which enables opening and closing of a complete set of doors/gates in a barrier system by operations staff

3.13
mechanical gap filler
movable device mounted at the *platform* (3.17) edge, at a *platform door* (3.19) or *gate* (3.22), fully automatic and actuated/controlled in conjunction with the barrier system opening/closing sequences

Note 1 to entry: The purpose of a mechanical gap filler is to reduce the horizontal stepping distance to a vehicle to acceptable limits, or to facilitate access to a vehicle by persons with reduced mobility. Its structural integrity does not rely on support from the vehicle.

3.14
operations staff
persons including *train* (3.28) crew and *station* (3.25) personnel authorized to perform tasks concerning train operation or direct service to passengers

3.15
passive gap filler
strips, of frangible or partly flexible material at a *doorway* (3.3) threshold such that the clearance between a moving vehicle and the threshold can be safely reduced below that normally specified for gauge clearance between infrastructure and vehicles

3.16
person with reduced mobility
PRM
person whose mobility when using transport is reduced due to any physical disability (sensory or locomotory, permanent or temporary), intellectual disability or impairment, or any other cause of disability, or as a result of age, and whose situation needs appropriate attention and adaptation to his or her particular needs of the service made available to all passengers

Note 1 to entry: This population covers as well persons of small stature, elderly ones, pregnant women, persons carrying heavy luggage or accompanied by children (including children in strollers).

3.17
platform
section of pathway, alongside tracks at a railway, metro or other guided transit system *station* (3.25) at which passengers can board or alight from vehicles

3.18
platform barrier system
PBS
system providing a protective barrier between vehicle and *platform* (3.17), having power operated movable panels with associated drive and control equipment, such panels moving horizontally and parallel with the edge of the platform, allowing passenger transfer through the barrier when a *train* (3.28) is positioned at the platform

3.19
platform door
movable panel or panels and forming part of a *platform door system* (3.20) through which passengers normally access and egress vehicles

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3.20
platform door system
platform barrier system (3.18) in which the movable panels are carried on a portal structure having headers or lintels above the moving panels, carrying all or part of their weight

Note 1 to entry: Such a system can form part of a structure completely enclosing the *platform* (3.17) area and separating it entirely from the track on which vehicles move.

3.21
platform extremity door/gate
panel at the extremity of a *platform door system* (3.20) or *platform gate system* (3.23) (usually, but not necessarily, at right angles to the main structure) to allow access by authorized persons to the track, or to a tunnel walkway beyond the *station* (3.25), or as emergency egress for persons evacuating from the track area

Note 1 to entry: Such panels can open with a hinged or sliding action.

Note 2 to entry: *Platform* (3.17) extremity door/gates does not have to form part of the *platform barrier system* (3.18).

3.22
platform gate
movable panel or panels forming part of a *platform gate system* (3.23) through which passengers normally access and egress vehicles

3.23
platform gate system
platform barrier system (3.18) in which the movable panels are supported from the bottom, or by cantilever arrangement at an intermediate height on the barrier

3.24
routine test
conformity test performed on each individual item of equipment during or after manufacture

3.25
station
unit comprising buildings and structures containing technical equipment, loading or unloading areas or *platforms* (3.17) and any associated areas for reception and shelter

3.26
synchronization of vehicle and platform doors/gates
co-ordinated movement of vehicle doors with *platform doors* (3.19)/*gates* (3.22)

3.27
system integration
process of assuring that the design, installation and operation of the barrier system is consistent with the overall safety and operational targets of the complete rail system, of which the barrier system is part

Note 1 to entry: The activity of system integration is detailed in Annex C.

3.28
train
single self-propelled rail vehicle or a self-propelled group of physically coupled rail vehicles

[SOURCE: EN 17343:2023, 3.1.7.9[8]]

3.29
type test
conformity test made of one or more system and its components representative of the production to prove that the design meets this document and the relevant specifications

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3.30
user population
range of persons [including *operations staff* (3.14)] expected to use a *platform barrier system* (3.18), defined in terms of their physical characteristics

4 System design requirements

4.1 Physical and structural requirements of the platform barrier

4.1.1 General structural requirements

4.1.1.1 Platform barrier systems form a safety barrier separating customers/passengers from moving trains until it is safe to grant access. As such, they shall be designed to resist crowd loading. Platform barriers are also subject to aerodynamic loads induced by trains passing the structure. Platform barrier systems installed in open sections shall also resist wind loading. In addition, platform barrier systems can be subject to pressures generated by tunnel ventilation systems and can be required to resist earthquakes. These separate actions shall be combined in accordance with the relevant regional or national design standard(s) as described in the corresponding national annex, if any.

4.1.1.2 Tunnel ventilation systems can be associated with platform barrier systems that completely enclose the platform area, separating it from the track on which vehicles move. In this case, detailed modelling/simulation shall be undertaken during system integration and shall consider all operating and degraded modes of operation of the ventilation system to determine their effect on the platform barrier system and how they combine with the aerodynamic actions from trains. In particular, pressures generated by operation of ventilation systems for smoke extraction or fire management shall not inhibit operation of emergency doors in accordance with 4.1.7. The ventilation and aerodynamic loading values from the modelling/simulation shall form an input to the specification for the platform barrier system.

4.1.1.3 Structural design shall take into account the requirements arising from the physical interface with trains intended to operate in conjunction with the barrier system, in particular regarding entrapment (see 4.1.10) and gauging (see 5.1.3).

4.1.1.4 General construction of platform barriers shall be in accordance with the relevant regional or national design standard(s) related to structural requirements [e.g. imposed load combination(s)].

4.1.1.5 Specific consideration shall be given to the nature of railway platforms as areas susceptible to large crowds when applying the relevant regional or national design standard(s) that do not specifically cover platform barrier systems.

4.1.1.6 Consideration should be given to accidental loadings that a barrier system can sustain during its operation life, e.g. impact from electric wheelchair, machinery operated on the platform (e.g. floor cleaning machine).

4.1.1.7 Deflection of the platform barrier system towards the track under any loading conditions as defined in the relevant regional or national design standard(s) shall not exceed the limits defined by the gauging strategy for the platform barrier system as described in 5.1.3.

4.1.1.8 Infill panels (i.e. glazing, or sheets of other materials, which separate the platform area from the running tracks and are secured to the main structural framework of the barrier system) shall sustain the applied loads.

Additionally, it is recommended that deflection of an infill panel that is structurally safe should not alarm station users through large visible deformations relative to the frame in which the panel is mounted, when subject to normal service conditions. Therefore, for serviceability considerations, the limiting condition for deflection should be that the total horizontal displacement of the infill panel relative to the frame at any

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