

Design guidelines

Stations and passenger platforms

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1. Relevant Standards and Guidelines

The following documents shall be applied for the design of Stations and passenger's platforms:

TYPE	REFERENCE	TITLE
Standard	NFPA 130	National Fire Protection Association Standards - Standard for Fixed Guideway Transit and Passenger Rail Systems
Standard	Chapter 7 and 12 of NFPA 101	National Fire Protection Association Standards
Guidelines	Transit Capacity and Quality of Service Manual_3d Edition	Transit Capacity and Quality of Service Manual_3d Edition – Transportation Research Board
Standard	EN 81-70	Safety rules for the construction and installation of lifts – Particular applications for passenger and goods passenger lift – Part 70: Accessibility to lifts for persons including persons with disability
Standard	EN IEC 60268-16	Sound system equipment – Part 16: Objective rating of speech intelligibility by speech transmission index

Note: The NFPA 130 (National Fire Protection Association Standards) is an American standard. This standard specifies fire protection and life safety requirements for underground, surface, and elevated fixed guideway transit and passenger rail systems. We recommend applying this standard for the whole line in addition to the relevant national standards and mandatory legal requirements of Estonia, Latvia and Lithuania.

The following documents recommended for the design of Stations and passenger's platforms:

TYPE	REFERENCE	TITLE
Standard	ISO 21542	Building construction — Accessibility and usability of the built environment
Standard	ISO 2813	Paints and varnishes — Determination of gloss value at 20°, 60° and 85°
Standard	EN 14041	Resilient, textile, laminate and modular multilayer floor coverings – Essential characteristics
Standard	NF XP 05-011	Floor coverings – Classification of locations according to their slip resistance
Standard	EN 13893	Resilient, laminate and textile floor coverings. Measurement of dynamic coefficient of friction on dry floor surfaces
Standard	CEN/TS 16165	Determination of slip resistance of pedestrian surfaces – Methods of evaluation
Standard	EN 1338	Concrete paving blocks — Requirements and test methods
Standard	EN 1339	Concrete paving flags — Requirements and test methods
Standard	EN 1341	Slabs of natural stone for external paving — Requirements and test methods

Note: Relevant National regulations shall be used instead of given recommended standards to cover mandatory legal requirements of Estonia, Latvia and Lithuania if necessary. It is required to ensure that no contradiction with Technical Specifications for Interoperability will arise.

2. Passenger platform dimensioning

The design shall establish and confirm railway station passenger platforms dimensions individually with respect to specific ridership forecasts, equipment and access configurations while complying with minimum requirements set in Design Guidelines and the indications in the annexes of RBDG-MAN-031.

The design shall carry out dynamic simulations through adequate computer modelling to demonstrate the basis of passenger platform and access walkway sizing in railway stations. The hypotheses and assumptions for these models shall be discussed with and approved ex-ante by the contracting authority.

Different types of infrastructure facilities are defined in RBDG-MAN-025 Infrastructure facilities.

3. Safety and security

All below mentioned requirements in this document regarding safety and security are related to the regional stations.

Railway station passenger platforms design shall ensure the safety of the occupants as far as it is practically possible.

Design shall provide safety and security on all sections of station passenger platforms including operating area, station perimeter and non-station structures directly adjacent to station operating area.

The fire and life safety design for the rail system shall be based on the requirements established in National Fire Protection Association (NFPA) 130 – Standards for Fixed Guideway Transit and Passenger Rail Systems of the NFPA, United States and in association with other related NFPA Standards as quoted in NFPA 130. The NFPA 130 is an American regulation, it is commonly used for the internationally and on EU level, the particular country has no or only general guidelines related to passenger railway systems.

Railway station public areas shall be without dead-ends, cul-de-sacs or hidden recesses that are difficult to supervise.

Railway station platforms shall be designed so that emergency evacuation shall be as quick and straightforward as is practically possible, and without crushing or over-crowding (please refer also to RBDG-MAN-031A and RBDG-MAN-031B).

Emergency evacuation shall be primarily directed to the designated station entrances. Alternative solutions might be proposed for rural areas.

Functional design for fire prevention shall be as required by NFPA 130 with potential sources of fire reduced by the following on the part of the design:

- Use of layouts which permit ease of maintenance for equipment and cleaning of the station;
- Provision of special storage spaces for combustible materials such as paint and oil; and
- Provision of cigarette and litter bins.

Facilities and installations shall be considered a part of railway station platforms safety. They shall include facilities for the visually impaired, facilities for the audibly impaired and facilities for the physically disabled. Slip-resistant walking surfaces: In compliance with accessibility requirements, floor materials shall have slip-resistant qualities to increase pedestrian safety. Entrances, stairways, platform edge strips and areas around equipment shall have high slip-resistant properties. The following static coefficients of friction as defined in ASTM C1028 shall be provided as a minimum coefficient of friction:

- Public horizontal surfaces – 0.6;
- Non-public horizontal surfaces, exterior – 0.6;
- Non-public horizontal surfaces, interior – 0.5;
- Platform edge strips – Textured visually contrasting material;
- Stairs, ramps, sloping sidewalks – 0.8; and
- Area around equipment – 0.6.

Otherwise, within the station buildings there shall be no irregularities more than 0.5 cm at any given point in floor walking surface areas, except for thresholds, drainage channels and tactile walking surface indicators.

The spoken information shall have a minimum STI-PA level (speech transmission index) of 0,45 in accordance with EN 60268-16.

Highlighting of transparent obstacles should comply with requirements of ISO 21542.

A gloss level of 50 or lower is acceptable for reflectance of the floor surface (see ISO 2813).

Slip resistance of floor surfaces should comply with requirements of EN 14041, NF XP 05-011, EN 13893 and/or CEN/TS 16165.

Slip resistance of ground surfaces should comply with requirements of EN 1338, EN 1339, EN 1341 and/or CEN/TS 16165.

4. Functional requirements for passenger platform

Specific fittings on the passenger platforms:

1. Urban furniture (seats, waste paper basket, illuminated advertising boards, public lighting)
2. Partial passenger platform cover
3. Speakers
4. Clock (s)
5. Screens for passenger informations

All items of furniture and free-standing devices at stations shall contrast with their background and have rounded edges.

Within the station confines, furniture and free-standing devices (including cantilevered and suspended items) shall be positioned where they do not obstruct blind or visually impaired persons, or they shall be detectable by a person using a long cane.

On each passenger platform where passengers can wait for trains, and at every waiting area, there shall be a minimum one area fitted with seating facilities and a space for a wheelchair.

When this area is weather protected, it shall be accessible by a wheelchair and bicycle users.

Platforms shall be the main spaces where passengers wait for board or alight from a train.

Platforms shall be sufficiently sized for normal peak demand and be equipped with furniture such as seats and litter bins.

Railway station platforms shall be designed with unobstructed areas to facilitate free flowing bidirectional user movement and to maximize capacity of the passenger platform area.

Passenger platform width shall be determined based on fire and life safety requirements, passenger load forecast, train operation and station layout including locations and sizes of stairs, escalators and structural elements.

4.1. Functionality of passenger platforms and passenger station

All passenger stations and platforms shall be united in architectural and functional perspective, in all three Baltic states. For architectural and visual layout of the platforms please refer to RBDG-MAN-031A and RBDG-MAN-031B.

Functional requirements for passenger platforms and terminal facilities:

- International station Passenger platforms shall be designed to accommodate possible security checks, check-in services, luggage drop-off / collection , secured baggage and parcel loading services in terminal and on platforms and border guard services which shall be placed inside passenger station.
- International station shall provide possibility to separate the passenger flows with / without security checks (possible regional / local and international train operation separation).
- International station Passenger platforms and terminals shall be designed to allow separation of secure / non-secure areas in the waiting rooms and service / commercial rooms
- International platforms shall be able to service international and regional trains. Regional platform shall be able to service regional and local trains.
- International and regional Passenger platforms shall be PRM TSI compatible
- All services in international and regional passenger stations should be in compliance with TAP TSI

Requirements for international passenger stations:

- Station design shall consider future postal/mail/cargo/luggage service terminal (minimal area of storage room shall be 15.0m² with possibility for future expand) – with possibilities to store containers and have direct and secured access to passenger platform by direct lift and access to road network or other facility what is integrating the service from terminal, by implementing direct and secured connection
- In terminals shall be implemented waiting rooms for business class travelers

4.2. Additional requirements for railway stations

All buildings shall aim to reach zero energy levels and self-sustainability, all solutions shall be economically justified.

Additional requirements are:

- Lighting
- Ventilation
- Heating
- Water supply and sewage

- Power supply
- Security solutions
- IT

5. Universal design

The design must comply with PRM TSI requirements. **PRM TSI are mandatory requirements with priority, all else (including NFPA, local code, etc.) should not contradict to them.**

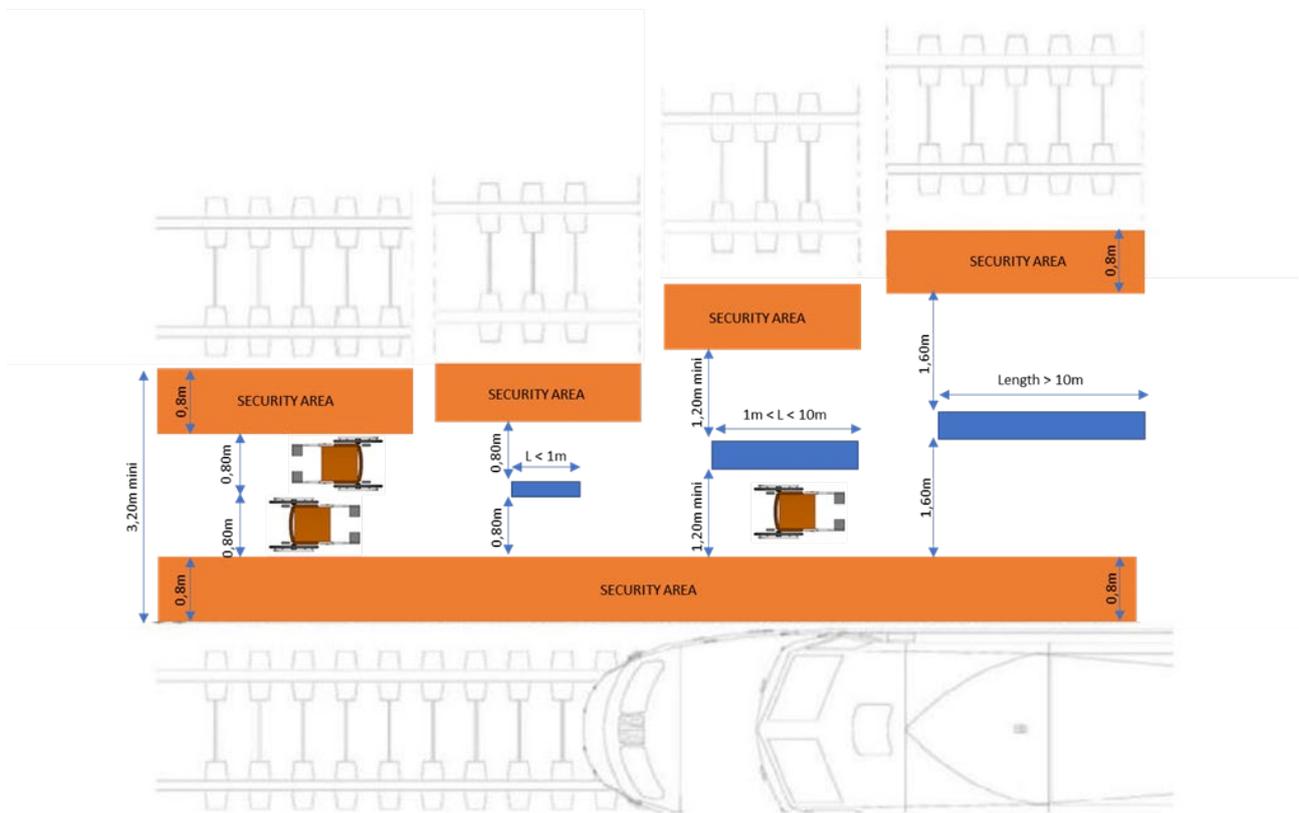
Principle of the journey of a handicapped person with reduced mobility:

1. Park
2. Access the passenger terminal building, inquire, orientate, locate, purchase ticket,
3. Wait
4. Access to all services in the station,
5. Circulate "horizontally" by footbridge or underground,
6. Circulate "vertically" by lifts, fixed stairs, escalators, ramps,
7. Be forewarned of the existence of potential obstacles and potential dangers,
8. Access the passenger platform, get information, wait
9. Access the train.

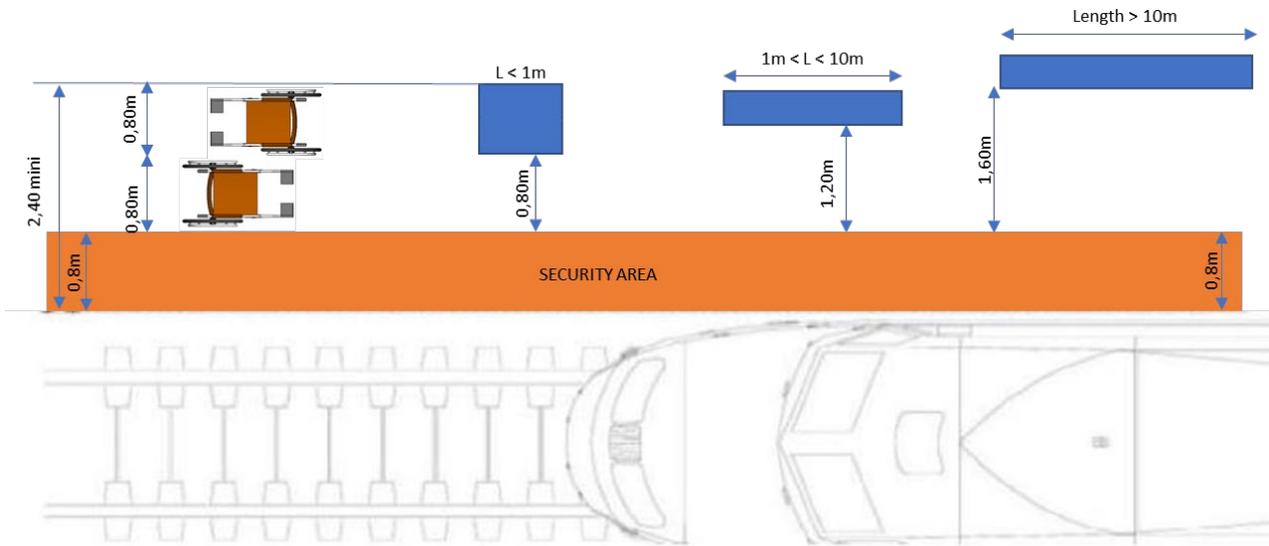
The design shall take into consideration the following prescriptions:

- a) Tactile paving shall be provided for visually impaired. This shall be consistent with other tactile measures in use locally and shall not constitute a tripping hazard.
- b) The visual marking shall be a contrasting, slip resistant, warning line with a minimum width of 10 cm.
- c) Tactile walking surface indicators can be one of the two types:
 - an attention pattern indicating a hazard at the boundary of the danger area
 - a guiding pattern indicating a path of travel at the safe side of the platform.
- d) The passenger platform shall have one row of dotted guiding blocks for persons with impaired vision, 900 mm or more from the edge.
- e) Tactile guide paths shall be provided along the platform edge zone and elsewhere for the visually impaired.
- f) The material at the rail side edge of the platform shall contrast with the darkness of the gap.

- g) The paved surface of the platform must be made with a non-slip material.
- h) Stairs, kiosks and litter bins on the passenger platform must not hinder the clear passage of persons with impaired vision and wheelchair users.
- i) At least one bench for mobility impaired persons shall be installed on the platform.
- j) It is permitted to have permanent obstacles inside the freeway. The freeway must constitute at least 160 cm. Equipment required for the signalling system and safety equipment shall not be considered as obstacles in this point. The minimum distance from obstacles to the danger area shall be according to the following drawings:
 - a. between two (2) tracks



b. Along one (1) track:



- k) If there are auxiliary facilities on-board trains, or on the platform, to allow wheelchair users to board on or alight from trains, a free space (no obstacles) of 150 cm from the edge of the facility towards the direction where the wheelchair boards/lands at/to the platform level, shall be provided where such facilities are likely to be used. A new station shall meet this requirement for all trains that are planned to stop at the platform.
- l) The end of the passenger platform shall either be fitted with a barrier that prevents public access or shall have a visual marking and tactile walking surface indicators with an attention pattern indicating a hazard.
- m) Universal design principles have been explained in RBDG-MAN-0310, RBDG-MAN-031A, RBDG-MAN-031B, RBDG-MAN-031C, RBDG-MAN-031D, RBDG-MAN-031E, RBDG-MAN-031F and RBDG-MAN-031G
- n) For Regional station platform layouts please refer to RBDG-MAN-031B.

6. Safety and security on platforms

Platforms shall be adequately sized to accommodate the anticipated passenger patronage forecasts without crushing or overcrowding.

Platforms edges shall not to be obstructed by structural columns.

Signs shall be clearly visible while leaving a clear view for CCTV cameras.

Adequate headroom clearance is to be provided for all passengers with no projections or down-stands.

Barriers 1.100 mm high shall enclose areas of low headroom (i.e. 2.000 mm beneath stairs or escalators). The barriers shall be designed with no gaps or minimal gaps to restrict entry especially by children.

At least two means of egress remote from each other shall be provided from each station platform.

6.1. Passenger platform in curve

If it is impossible for the driver or for the train attendant to see the whole area of the platform, a CCTV system with cameras monitoring the platform and sending the images to VDU located inside the train and a monitor on the platform shall be provided for platform in curve.

6.2. Access to passenger platforms

To provide safety on passengers standing on platforms located along the main track while a passing through train could be running, unmanned station shall be equipped with platform fences. For manned stations, gates shall be provided at the access to retain people from accessing to the platform and to allow the access once the calling train will arrive. For the typical passenger platform layout please refer to RBDG-MAN-031B.

6.3. Audible warning system

In stations with high speed trains passing through without stopping, audible announcements shall notify passengers standing on the platform of approaching trains. The message shall follow the local regulations and could be: "Stand well back from the platform edge. The approaching train is not scheduled to stop at platform X and will pass at speed". Such announcement should be automatically triggered broadcasted and should be ranked as priority message. Additional station generated message shall notify when train will start moving or will open/close doors.

6.4. Lighting

The illuminance level of the external areas of the station shall be sufficient to facilitate way finding and to highlight the changes of level, doors and entrances.

All indoor areas (except for Toilets and Back of House rooms) should be illuminated by natural light.

Outdoor area illuminance shall be adaptive to external illuminance.

Requirements for illuminance in different areas should be according to local rules.

The illuminance level along obstacle-free routes shall be adapted to the visual task of the passenger. Particular attention shall be paid to the changes of levels, ticket vending offices and machines, information desks and information displays.

Emergency lighting shall provide sufficient visibility for evacuation and for identification of fire-fighting and safety equipment.

For lighting approach in platforms and stations, please refer to RBDG-MAN-031B and RBDG-MAN-031D.

7. Passenger circulation functional requirements

7.1. General requirements for passenger circulation

Passenger circulation in Railway stations and on passenger platforms shall be accomplished in a fluid and intuitive manner.

The exit route from the train to the outside of the station shall be even more intuitive and easier than the access as many passengers arrive simultaneously, and areas might become crowded.

Information on the obstacle-free route shall be given to visually impaired people by tactile and contrasting walking surface indicators as a minimum.

Technical solutions using remotely controlled audible devices or telephone applications are permitted to be used in addition or as an alternative. When they are intended to be used as an alternative, they shall be treated as innovative solutions.

If there are handrails or walls within reach along the obstacle-free route to the platform, they shall have brief information (for example platform-number or direction-information) in Braille or in prismatic- letters or numbers on the handrail, or on the wall at a height between 145 cm and 165 cm.

Where an obstacle-free route includes a change in level, there shall be a step-free route providing an alternative to stairs for mobility impaired people.

All means of access and egress shall comply with NFPA 101 and 130 requirements.

7.2. Passenger circulation and waiting

Clear and unobstructed circulation routes shall be provided for all passenger flows.

Clear and unobstructed sightlines for passengers and staff are mandatory.

The locations of elements of structure and enclosure shall not compromise passenger flows, sightlines or the functional relationship of spaces.

Stations shall provide adequate space for all circulation and waiting functions.

Circulation routes and decision points shall be clear to all users.

Station planning shall allow passengers to transfer simply and efficiently between trains, the surrounding environment and other means of transportation.

Passenger movement patterns shall be straightforward as much as possible with minimal change in direction.

Dead-end and no-return conditions shall be avoided wherever possible.

Circulation patterns and station layouts shall enable passengers to see where they are and where they are going at all times.

Station design shall arrange decision points such as ticketing areas, vertical circulation elements and diverging paths so that they are clearly identifiable and perceived as part of a logical sequence of events.

Station layouts shall minimize the potential for confusion and congestion by avoiding crossflows in passenger movement.

Queuing space shall be provided at all circulation elements.

While queuing space shall be considered part of a general circulation area for a given location, queuing spaces shall not overlap.

Station concourse areas shall be sufficient to allow unimpeded circulation when long queues form at TVOs and TVMs.

The station architecture itself shall be the primary means of finding one's way, supported by signs and graphics.

To avoid potentially dangerous congestion within the station, and in particular on platforms and escalators, the station design shall provide sufficient circulation elements to allow for the free flow of passengers based on forecast volumes.

Escalators and stairs shall be of adequate quantity and width to accommodate projected passenger volume and shall be evenly spaced along the platforms.

Adequate clearances shall be allowed at ends of escalators and stairs and adequate headroom clearance shall be maintained for all passengers, with no projections or down-stands.

Lifts and escalators shall be provided with full safety features such as emergency signs and emergency stop buttons plus facilities for the disabled.

The means to change levels shall be based on the following differences between levels:

- a) Less than 0.5 m for ramps;
- b) 0.5 m to 3 m for staircases (with a minimum of three risers) and a ramp or lift;
- c) 3 m to 5 m for staircase, escalator (if benefits are justifiable) and a lift; and
- d) Over 5 m for staircase and lift and escalator going up (escalator going down if benefits are justifiable).
- e) Over 7m for staircase and lift and escalator going up and down

7.3. Horizontal circulations

All obstacle-free routes, footbridges and subways, shall have a free width of a minimum of 160 cm except:

- Doors shall have a minimum clear useable width of 90 cm and shall be operable by persons with disabilities and persons with reduced mobility.
- The minimum width of the passenger platform without obstacles shall be the width of the danger area plus the width of two opposing freeways of 80 cm (160 cm). This dimension may taper to 90 cm at the passenger platform ends.

To avoid possible risks all horizontal surfaces, in public areas, should be on equal level, no thresholds should be implemented, exclusions can be specific rooms and the high shall not be higher than 2.0 cm.

7.4. Access and interchange

Passageways, intermediate concourses, escalators, passenger conveyors, lifts, stairs and ramps shall be arranged to minimize walking distances and to make wayfinding through the station as obvious as possible.

Where stairs are located in passageways, the passageway shall be at least as wide as the stairs, plus any other element (lift, escalator, ramp).

All routes shall be free from obstructions and shall avoid recesses that could harbour litter and provide possible hiding places.

7.5. Escalators

In order to provide an optimal, safe and comfortable use of the station, and in order to satisfy accessibility requirements, every significant change of level shall be provided with escalators running both ways.

In addition to NFPA 101 and 130 requirements, it is recommended escalators meet the following requirements (the following requirements are compatible with European regulations):

- a) Step speed: 0.5 m/s;
- b) Step width: 1 m; and
- c) Headroom above escalator step: 2.5 m.

Inclination recommended: 30 degrees - inclination of 30 degrees recommended because beyond that it can become anxious for passengers.

It is recalled that the points above are good practices, these points do not constitute obligations. PRM TSI are mandatory requirements with priority, all else (including NFPA, local code, etc.) should not contradict to them.

7.6. Stairs

Stairs shall be provided with handrails on both sides and at two levels.

All changes in level shall include stairways, unless there is a ramp.

Staircases on the obstacle-free routes shall have a minimum width of 160 cm measured between the handrails. As a minimum, the first and last steps shall be indicated by a contrasting band and, as a minimum, tactile warning surface indicator shall be installed before the first descending step.

In addition to NFPA 101 and 130 requirements, stairs shall respect the following:

- a) Risers per flight shall be 3 risers minimum;
- b) Clear width for normal movement of passengers shall be 1.600 mm minimum;
- c) Clear width for emergency use of passengers shall be 1.120 mm minimum;
- d) Length of flood landing (entrances with stairs only) shall be 2.500 mm minimum;
- e) Vertical clearance measured from the finished step level (on line of nosing) to underside of suspended ceiling shall be 3 m minimum; and

The width of a staircase shall be measured from the finished surfaces of the inside faces of the balustrades or staircase walls. The only permitted projection into this width shall be the handrail.

No open risers shall be allowed.

7.7. Ramps

Ramps shall be provided with handrails on both sides and at two levels.

Ramps shall be installed for persons with disabilities and persons with reduced mobility unable to use stairs where lifts are not provided. They shall have a moderate gradient. A steep gradient is allowed for ramps on short distances only.

Ramps shall have a pitch not exceeding 1 in 12 internally and 1 in 20 externally.

Intermediate landings shall be provided so that the maximum vertically change without a landing shall not exceed 750mm.

Ramps design shall comply with NFPA Standards.

Installation of ramps should comply with requirements of ISO 21542 regarding guarding of suspended items.

7.8. Lifts

Lifts shall be installed as a means to enable passengers with disabilities to move between floors.

Passenger lifts shall be located along the path of passengers entering the station.

For international stations where lifts are required for change in level in main spaces such as concourses and platforms, at least two lifts shall be installed to ensure one of them is available in case the other one is not operational.

Appropriate steps must be taken to ensure that operating rules provide for the necessary functionality required to ensure accessibility for persons with disabilities and persons with reduced mobility.

Where a lift is not available and not duplicated, information systems shall be capable of advising passengers of the alternative step-free route. Where this involves using a different station, the information shall be available on trains approaching the decision point for the alternative route.

Lifts shall comply with requirements of EN 81-70 standard.

7.9. Doors and entrances

This point applies to all doors and entrances that are on obstacle-free routes, with the exception of doors giving access to the toilets which are not dedicated to persons with disabilities and persons with reduced mobility.

Doors shall have a minimum clear useable width of 90 cm and shall be operable by persons with disabilities and persons with reduced mobility.

It is permitted to use manual, semi-automatic or automatic doors.

Door operating devices shall be available at a height of between 80 cm and 110 cm.

Door operating devices should comply with applicable requirements of ISO 21542 standard.

7.10. Queuing area and standard run-offs

Spaces shall be provided for queuing at all circulation and passenger service elements.

The queuing area shall provide space for passengers to queue at various circulation elements, service areas and decision points without disturbing the movement of other passenger flow routes.

Queuing spaces shall be placed end to end and shall not overlap.

Queuing spaces and run-offs shall be considered as part of the general space requirements for any given area as indicated below:

- a) Escalator to escalator: 8–12 m;
- b) Escalator to staircase: 6–10 m;
- c) Escalator to passageway (e.g. corridors, public circulation): 6 m;
- d) Escalator to street: 6 m;
- e) Escalator to control line: 8–12 m;
- f) Staircase to passageway: 4 m;
- g) Staircase to street: 4 m;
- h) Staircase to control line: 6–10 m;
- i) Run-off in front of lifts: 3 m;
- j) Queuing distance in front TVM and TVO: 4 m;

The variable lengths of run-off shall depend upon the level of passenger flows.

The run-off from control lines adjacent to platforms shall be in addition to the passenger platform width and length.

8. Public area sizing requirements

8.1. General requirements

Sizing of public spaces shall be based on two aspects: comfort for the everyday user, and security in case of an emergency.

All public areas of the stations shall be sized based on forecast demand. This includes all public areas such as the passenger platform and queuing areas integrated in these zones.

Stations shall be designed based on scenarios including normal operations and degraded operations. A degraded operation situation occurs when a train is late for any given reason.

All stations shall be size-validated by the dynamic simulation of passenger flows during normal, delay and emergency conditions.

The stations shall be designed to integrate all aspects of the system operation requirements such as train capacity, passenger platform length and headway between trains.

The stations shall be designed to integrate access from people using wheelchairs, baby carriage and bicycles to the trains.

The stations public areas shall be expandible in order to implement future expansions as shown in RBDG-MAN-031D.

8.2. Sizing for normal situation

The danger area (security area) of a passenger platform commences at the rail side edge of the passenger platform and is defined as the area where passengers are not allowed to stand when trains are passing or arriving.

It is permitted for the width of the passenger platform to be variable on the whole length of the platform.

Sizing of public areas shall be done based on the levels of service (LOS) concept and scale, as developed by Dr Fruin.

The size of the passenger platform is calculated for the effective area of the passenger platform at the right of the train to ensure comfort to the up and down passengers of the train:

a) $Net\ area = (Boarding + Alighting) \times C\ heterogeneity \times LOS = L\ platform \times L\ train - S\ obstacle$

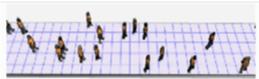
(C heterogeneity = 1.5 if passengers are considered not uniformly distributed on the passenger platform and = 1 if passengers are considered uniformly distributed on the platform)



b) The dimensioning of the platforms is carried out for the most constraining situation (the one where the most people are found on the platform), defined from:

- traffic forecasts: peak train traffic;

- of the assumptions of service of the passenger platform studied: international long-distance service or regional / local service;
 - of the configuration: side platforms or central platform.
- c) Platforms are sized so that the level of service (LOS) is not lower than 1.4m² / pers. At any point of the passenger platform (Level of service of Dr Fruin limit C / D).
- d) Taking into consideration the heterogeneity of the passenger's distribution on the platform, the passenger platform shall size so that the level of service is not lower than 2.1m² / pers. on average: 1.5 x LOS local mini (1.4m² / pers.) = LOS average mini (2.1 m² / pers.).
- e) The passenger platform widths thus obtained, in accordance with the two criteria, are increased by 0.80m for a side passenger platform and 1.60m for a central platform, in order to reserve a safety area to the edge of the passenger platform (this corresponds to the width of safety area and the podotactile band). This dimension may taper to 90 cm at the passenger platform ends.
- f) Level of Services (LOS)

LEVEL OF SERVICE	AREA m ² /pers.	CONDITION OF PROGRESSION	
A (excellent)	>3,2	- Free choice of speed - Free movements - Unlikely collisions - Totally free movements	
B	2,3 à 3,2	- Free choice of speed - Easy overtaking - Easily avoidable conflicts (at crossings and changes of direction)	
C	1,4 à 2,3	- Possibility of travel at normal speed - Light congestion - Some travel restrictions - Slight collision risks requiring adaptation of speed and trajectory	
D	0,9 à 1,4	- Reduced speed and constraint - Difficult overtaking - Changes in direction lead to conflict flows - Need to adapt speed and trajectory to make reasonable progress	
E	0,4 à 0,9	- Reduced travel speed (irregular gait, frequent stops) - Overtaking virtually impossible - Very difficult direction changes - Highly probable collisions	
F (very bad)	<0,4	- Very slow speed (trampling) - Impossible overruns - Inevitable contact between people - Crossings or semi-turns virtually impossible	

Preferred level of services shall be, not less than C

8.3. Platforms Evacuation:

The platforms fluidity shall be determined by the maximum waiting time at the access level, i.e. the maximum waiting time on the passenger platform for a passenger wishing to use vertical circulation (ramp, staircases, etc.) in order to leave the platform.

The calculation of the waiting time shall take account of the passenger movement on the platforms taking into consideration:

- a) The number of passengers in the train;

- b) The geometry of the train according to the rolling stock and its composition;
- c) The passenger platform and access: depending on the spatial configuration of the station;
- d) Flow at train gates: 1 passenger / second;
- e) Access flow;
- f) The speed of travel of passengers: 1.40m / s for regular visitors and 1.10m / s for casual visitors

The intend purpose of the passenger platform evacuation, excluding the journey / walk on the platform, is normally fixed at 2 minutes in dense area and 3 minutes in other cases – in order to reduce the risk of wild crossing of tracks and crowd movements that could lead to personal accidents.

9. Sizing for emergency evacuation

9.1. Generalities

With the exception of those places where the public is stationed, the number and dimensions of clearances shall be calculated on the basis of the theoretical size, the speed of movement and flows.

This theoretical number shall be calculated and increased, when the platforms are underground, of the number of passengers on board the train likely to be present on the passenger platform at the time of the evacuation.

The theoretical effective shall be declared with the assumptions used and the details of the calculations.

The calculation of the transfer time from the public to an out-of-disaster area shall be calculated. This note must specify the assumptions used and the calculation method.

9.2. Specific requirements

Egress design shall be done following NFPA 130 and Chapters 7 and 12 of NFPA 101 requirements. The requirements of these standards are not reproduced in this document, as it is expected that the design of the stations shall be compliant with all the requirements of these standards.

Stations shall include the required areas of refuge in accordance with NFPA 101.

Requirements for railway operations:

- a) A space where the public is stationed and transited shall have at least two exits. Where the population of public is more than 200 persons, each normal exit shall be at least superior at 1.40 meter;
- b) The dead-end shall be less than 20 meters;

Regulatory travel speeds and speeds for a national guided transport system:

ELEMENTS	DEBITS (passengers per minute)	OBSERVATIONS
Corridors	60	1-meter width
Fixed stairways going up	40	1-meter width
Fixed stairways going down	50	1-meter width
Operating Escalators	90	1 passenger line
Operating escalators	120	2 passenger lines
Stopped escalators	30	1 passenger line - going up
Stopped escalators	40	1 passenger line - going down
Stopped escalators	40	2 passenger lines - going up
Stopped escalators	50	2 passenger lines - going down
Doors	50	By door vent
Speed to take into account: level: 1.00 meter / second; fixed stairways: 0.40 meter / second		

9.3. Considering escalators

For passenger evacuation in the emergency, all the escalators shall be considered stopped

The stations which are very deep and the escalators which are very long (crossing over 10 meters) may be the subject of a special study on the maintenance in operation in the direction of evacuation, on a case-by-case basis, subject to the security commission.

In all cases, escalators normally used in the opposite direction to the evacuation are considered stationary.

A single escalator at level crossing is considered impractical (this calculation will be done for each passenger platform and the passenger platform with the worst flow will be considered).

Up to eight (8) escalators, one (1) staircase shall be considered impracticable and the other shall be considered stationary.

Beyond eight (8) escalators, two (2) escalators are considered impracticable and the others are considered stationary.

The direction of normal operation or the reversibility of escalators shall be detailed in the presentation of the evacuation note.

10. Operational areas functional requirements for international stations

10.1. General:

Operational areas shall be used by station staff and shall not be accessible to passengers or the public.

It should be taken into account, while calculating the necessary capacity/space, that several railway undertakings (train operating companies) are foreseen operating on the Rail Baltica line. Additionally, in international stations in accordance with the Article 13 of the Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area, access to facilities related to their business (vending machines, ticket offices, passenger information facilities, staff rooms etc.) shall be granted to them in a non-discriminatory manner.

For regional stations layouts and requirements please refer to RBDG-MAN-031B.

10.2. Ticket vending machine

At least two TVM areas shall be located in the station's unpaid area.

Expected passenger flows shall be considered in determining the number of automatic machines in station.

10.3. Ticket office

Every station shall provide a ticket office,

The ticket office is the area where staff will sell and process tickets and assist passengers.

The ticket office shall be in the unpaid area with direct access to the station operating area and close to the cash room.

It shall have a window counter facing the unpaid area.

A queuing area in front of the ticket office shall be provided. This queuing area shall be adequate for predicted passenger flows.

The ticket office shall include vending offices and vending machines. Their number shall depend on the traffic.

This room shall be accessible to people with disabilities (in Railway station staff with disabilities).

In international stations this room shall be design to be equipped with luggage drop-off / collection services and self-check inn desk.

In international stations there shall be direct and secured connection to the postal/mail/cargo/luggage service terminal.

10.4. Passenger information desk

The passenger information desk is a counter where an employee can give answer to a passenger's queries. This counter only provides information and does not sell tickets.

The desk shall be in the unpaid area, next to the ticket office with direct access to the station operating area.

The Passenger Information Desk shall be equipped with a MMTIS (Multimodal Traveller Information System) terminal and a 24" interactive screen.

This room shall be accessible to people with disabilities (in Railway station staff with disabilities).

10.5. First aid room

The first aid room shall be a restricted area where initial first aid can be provided to passengers or staff until the arrival of other medical assistance, as necessary. A store of first aid equipment and supplies shall be maintained in it.

The public shall visit the first aid room only when accompanied by station or medical staff.

The room shall be in the unpaid area of the public concourse.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

10.7. Cleaners' room

Cleaning staff shall store cleaning supplies and equipment in the cleaners' room.

A cleaner's sink with a cold-water supply and drainage shall be provided.

The railway station layout planning shall utilize redundant spaces in back-of-house areas and/or under escalators, as appropriate or where the opportunity exists.

10.8. Refuse room

The design shall provide a refuse room to hold refuse collected in the railway station until it can be disposed of by public or contract disposal agents.

The room shall be in the station operation area, close to entrances.

10.9. Operation room

The Contractor shall provide a room to store equipment and supplies for use in the railway station.

The station layout planning shall utilize redundant spaces in back-of-house areas and/or under escalators, as appropriate or where the opportunity exists.

This room shall be accessible to people with disabilities (ie Railway station staff with disabilities).

In regional stations, technicals rooms can be joined in only one room (where possible).

10.10. Staff toilets, changing rooms

These areas shall provide a location where staff can change clothes, store personal items and issued documentation or equipment, relax on work breaks and eat food.

This zone shall include toilet and washing facilities for staff working in the railway station.

Toilets and changing rooms shall have separate areas for use by male and female staff.

At each toilet area, a toilet and washstand suitable for use by wheelchair users shall be included.

Size of the areas shall be adapted to the number of employees expected to be present in the building during the busiest work shift.

This zone shall be located near other operations rooms.

This room shall be accessible to people with disabilities (ie Railway station staff with disabilities).

10.11. Controller's staff room

This is a staff room specifically for inspectors who shall be moving throughout the line, where they can safely store the collected revenue. This room shall be equipped with a safe.

It shall contain a meeting room and a rest room.

This room shall be accessible to people with disabilities (ie Railway station staff with disabilities).

In regional stations, technicals rooms can be joined in only one room (where possible).

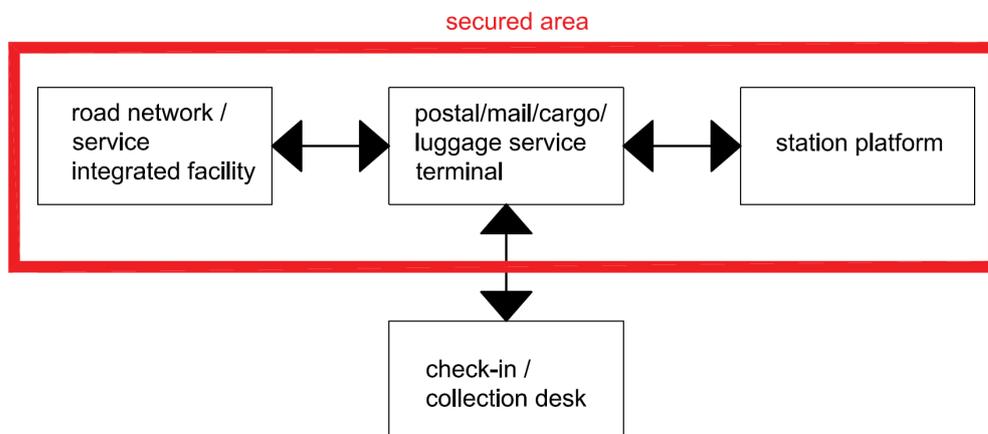
10.12. Station master’s room.

The working place of the station master shall be provided at the track level, e.g., on the platform. Possibility to equip this room with controls and communications (local station points and signal control, point heating control, communication with the Traffic control centre etc.) shall be provided.

In regional stations this room may be integrated in station building, if possible.

10.13. Postal/mail/cargo/luggage storage room.

Storage room for postal, cargo, mail and luggage services shall be considered with direct connection to ticket office and drop-off/ collection area in it, road network or other facility what has also integrated the service or is a part of service chainage. Minimal area of storage room shall be 15.0m² with possibility for future expand.

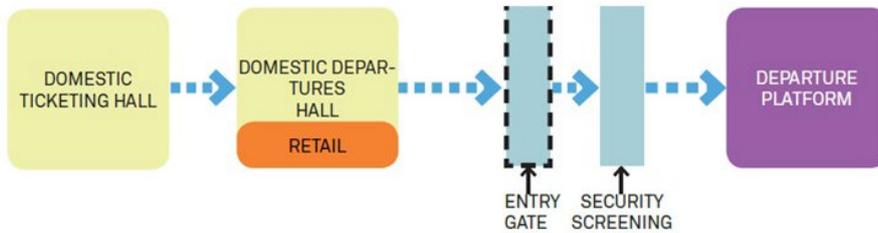


Principle scheme of postal/mail/cargo/luggage service flow connections

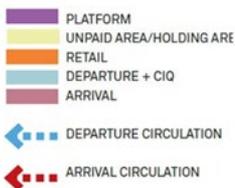
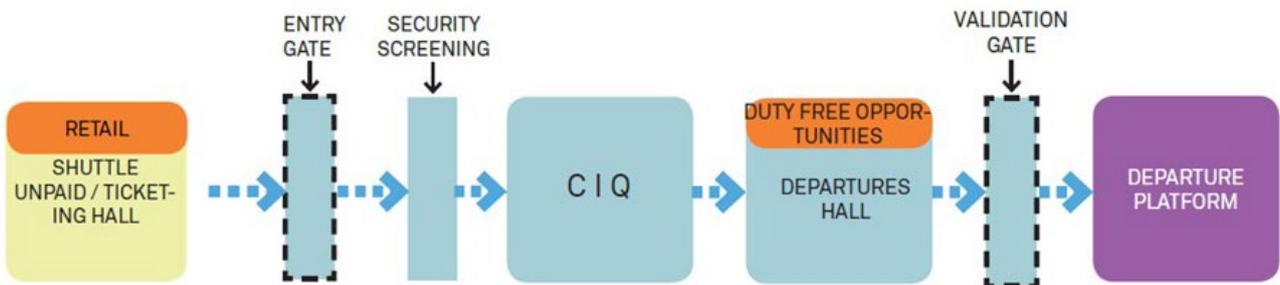
11. Train control access and Luggage verification for international stations

Provisions bellows are applicable for countries outside the Schengen area or will of the country authorities in the matter of immigration and luggage control. Such arrangements will have to be discussed before the project with the client and the competent authorities.

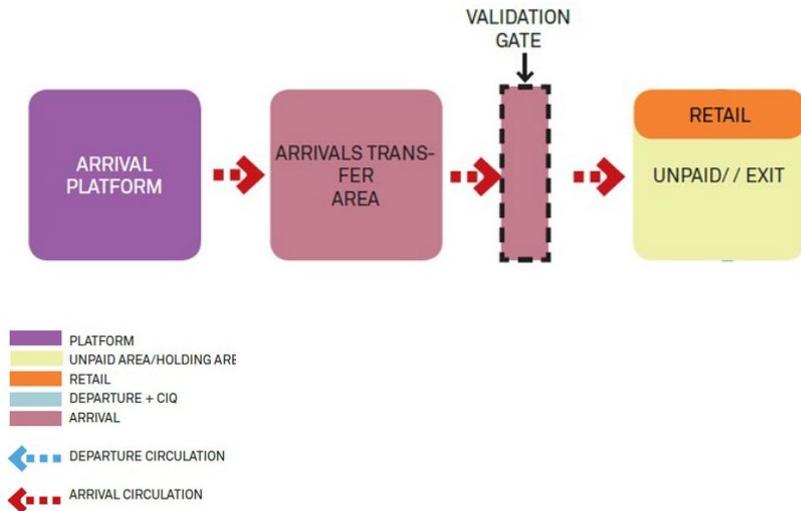
11.1. Passengers Flow | Domestic departure



11.2. Passengers Flow | International departure



11.3. Passengers Flow | Arrivals Flow



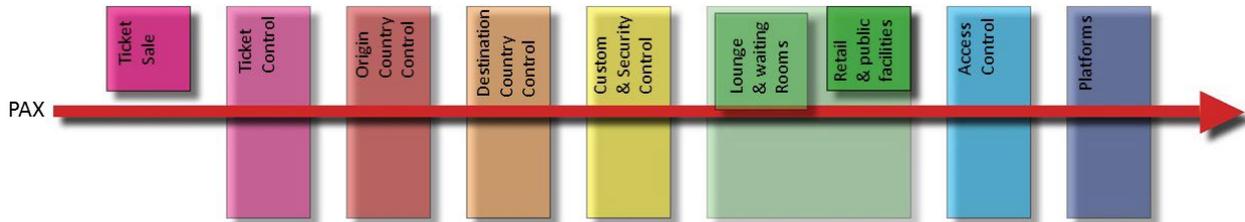
11.4. Customs, Immigration & Quarantine

A CIQ (Customs, Immigration & Quarantine) area shall be implemented in the railway station for all the international trips.

A CIQ area shall be composed by the followings functionalities:

- Ticket sale
- Ticket control
- Origin Country border control
- Destination country border control
- Custom & security control
- Lounge & waiting rooms
- Business VIP lounge
- Retail & public facilities
- Access control
- Platforms
- Access to the train

CIQ principle (reference to Railway between France and England – exit of Schengen zone)



For the national movements, no need to provide CIQ device. The design shall decide with railway Station owner if the platforms are to be equipped with control gates (tickets access controls)

1. ACCESS CONTROL ILLUSTRATION – GARE MONTPARNASSE – PARIS - FRANCE

