White paper

Pisko® Safeguard guardrail system

Introduction

Finnish legislation and the guidance issued by occupational safety authorities emphasise that fall protection must always be provided whenever there is a risk of falling - also during maintenance, servicing and installation work.

The legislation on safety requirements for construction work applies to new construction, renovation, maintenance of buildings and other structures, demolition, civil engineering, and construction planning (for example site inspections), whether performed underground, above ground or in water.

In practice this means that whenever a building is subject to any activity comparable to construction work - such as maintenance or installation work - a fall must always be prevented, regardless of the height of the building, if there is any risk of falling.

According to legislation and recommendations, structural protection (e.g. a guardrail system) is the primary means; personal fall protection equipment is a secondary option only if structural protection is not technically possible. Especially on large roof areas, implementing personal fall protection that is technically functional, practical and does not restrict work can be difficult or expensive.

For an inexperienced user, the suitability of personal protective equipment for its intended use may be unclear, and its overall condition may be difficult to assess. It can also be difficult to evaluate the performance level of the safety rope attachment point without detailed knowledge of the solution. For example, is it a fall arrest solution, suitable for leaning work or rope access work? Rope access work requires special training, experience and expertise in the solutions offered by different manufacturers, as well as in the simultaneous use of multiple safety ropes. In the worst case, this can lead to safety equipment not being used at all in unclear situations.

Operating principle of the Pisko® Safeguard guardrail system

The Pisko® Safeguard guardrail system provides passive protection and continuous safety without the user having to take any active measures. It is intended as a permanent guardrail system for building roofs. With the guardrail system, hazardous situations on roofs can be minimised.

The guardrail system protects automatically without requiring the user to connect to an anchor or use separate personal fall protection equipment. This reduces hazardous situations caused by misuse and user errors, because the system functions correctly when it is installed correctly and its condition is monitored through regular inspections carried out by competent professionals.

Fall protection implemented with a guardrail also improves safety for occasional visitors, not only for professionals trained to use personal fall protection equipment and specialising in work supported by safety ropes. On the roof of an industrial building, occasional visitors may include maintenance personnel servicing rooftop equipment, facility management staff, factory visitors and others who do not have fall protection training. In general, even carpenters do not have training for working in suspension.

Whenever personal fall protection is used, the work must be planned in advance. The plan must particularly ensure the selection of a suitable fall protection system, the correct locations of anchor points and their attachment strength. Planning must also consider rescue of the worker. This applies also to building maintenance work, not only during the active construction phase. The Pisko® Safeguard guardrail system does not impose any limits on the number of people working on the roof at the same time, and it does not restrict movement on the roof as solutions based on safety ropes do. A sufficiently high guardrail located near the roof edge is clearly visible to the user, and it does not create a tripping hazard in the way that, for example, an inadequately designed or implemented safety wire system might.

The Pisko® Safeguard guardrail system is modular and consists of only a few main components. On low-slope roofs it can be installed directly onto the roofing membrane as a standalone system. However, especially on steeper and more demanding roofs (such as the roofs of multi-storey residential buildings in urban areas), the guardrail system is recommended to be installed in connection with roof access ways (roof walkways and roof ladders). When installed together with roof access ways - particularly on steep roofs - safety, the perception of safety and thus well-being while moving along the access ways can be enhanced by combining the Pisko® Safeguard guardrail system with the Pisko® SafeLine wire system.

Components and installation of the Pisko® Safeguard guardrail system

The Pisko® Safeguard guardrail system is a straightforward overall solution. Designers can easily add the solution - with a nominal height of 1.2 meters - to permit drawings from the ProdLib product library without having to separately consider structural joints.

Installation is carried out using type-tested methods, either directly onto the waterproofing layer (e.g. modern bituminous roofing membranes) in accordance with the recommendations of the 'Toimivat Katot' publication, or connected to Pisko® access ways with performance level Class 2. The access way used as the installation base can be either a roof walkway or a roof ladder.

The system consists primarily of a few Safeguard bottom bracket alternatives, Safeguard posts, handrails, and innovative Safeguard handrail brackets that enable fast and installer-friendly installation. A patent application has been filed for the solution. In addition, the system includes products that complement safety and usability, such as the Safeguard endstop and the Safeguard diagonal support bracket. At points where the installation line is discontinuous (such as the corners of a flat roof), the handrails are connected to each other with a Safeguard corner rod to create a continuous guardrail line when needed around the entire roof. The guardrail system can also be equipped with a Safeguard kickplate that is installed at the lower section of the Safeguard posts.

More detailed information on installation on different platforms is provided in the application-specific installation instructions.

Product testing

If a product placed on the market is subject to specific requirements related to, for example, safety, health or environmental protection, legislation may require third-party assessment. Safety products cannot be placed on the market without type testing supervised by a third, accredited party. A notified body is an organisation notified by an EU Member State to the European Commission and authorised to carry out conformity assessment tasks. The nomination of notified bodies and the notifying authority are regulated by law. Within the European Union there are several notified bodies for different tasks under different pieces of legislation. For construction products, harmonised assessment tasks in Finland are carried out for example by Eurofins Expert Services Oy, and in Sweden by RISE. Notified bodies and their assessment modules can be checked in the European Commission's NANDO database.

Most Pisko® products are tested as construction products, where the requirements for testing under the Construction Products Regulation are derived directly from the harmonised technical specifications of standards. Products have been tested continuously and regularly for years under the supervision of notified bodies. As a result of this systematic work, Pisko® products - such as ladders and roof walkways - have been type tested as systems (meaning the structure and product configuration used in testing correspond to the structure and installation method implemented on site) for numerous different platforms and product combinations. This long-term product development, type testing and certification work forms the basis for the fact that the conformity of the Pisko® Safeguard guardrail system has been comprehensively and reliably tested as a complete system when installed in connection with Pisko® access ways.

Product testing typically consists of various load tests that verify usability, as well as tests simulating severe accident scenarios. More demanding tests are considered passed when the product or device does not detach from its platform or fail in a way that would cause the user's safety rope detach from its attachment point. Products are loaded in tests both statically and dynamically.

Certification of the Pisko® Safeguard guardrail system

For products or product groups for which no harmonised standards exist, approval and certification can be carried out through national approval procedures. In Finland these include, for example, type approval, a verification certificate or factory production control. Finnish legislation concerning product approval for construction products (954/2012) also states that if a construction product has been approved for use in construction in a member state of the European Economic Area or in Turkey, the approval is considered to provide reliable information on the properties of the construction product. In other words, a national approval granted in another EU country is accepted as such for use in Finland and can be used to demonstrate that technical requirements are met. Solutions according to standard EN 13374 cover only temporary edge protection systems, and the standard cannot be used as a basis for CE marking of a permanently installed guardrail system.

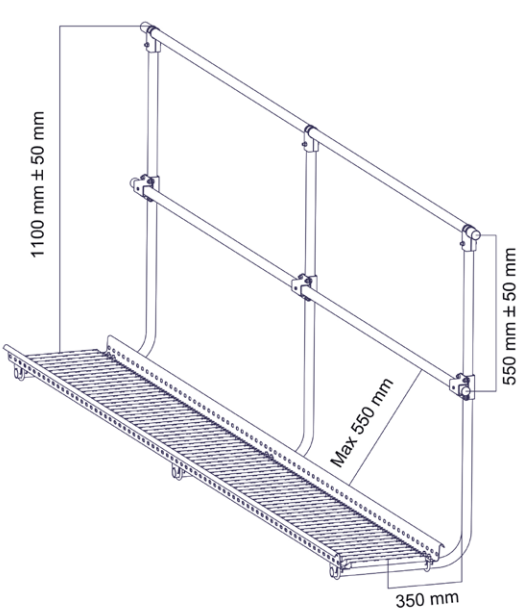
Because permanently installed systems are not within the scope of that standard, EN 13374 has not been used for the certification of the Pisko® Safeguard guardrail system. The system has been certified comprehensively, as the goal has been to create a modular, versatile and safe passive fall protection solution that can be installed on several different platforms, either in connection with a suitable Pisko® access way or as a standalone system, and that permanently improves the operational safety of the building. For this reason, the system has a P-mark, which is a certificate for a guardrail system as a construction product in accordance with Swedish national requirements and standards. The P-mark demonstrates compliance with technical requirements comprehensively, and in terms of requirements it corresponds to CE marking (the assessment of compliance is carried out by a third, accredited party). The certificate number is C900083.

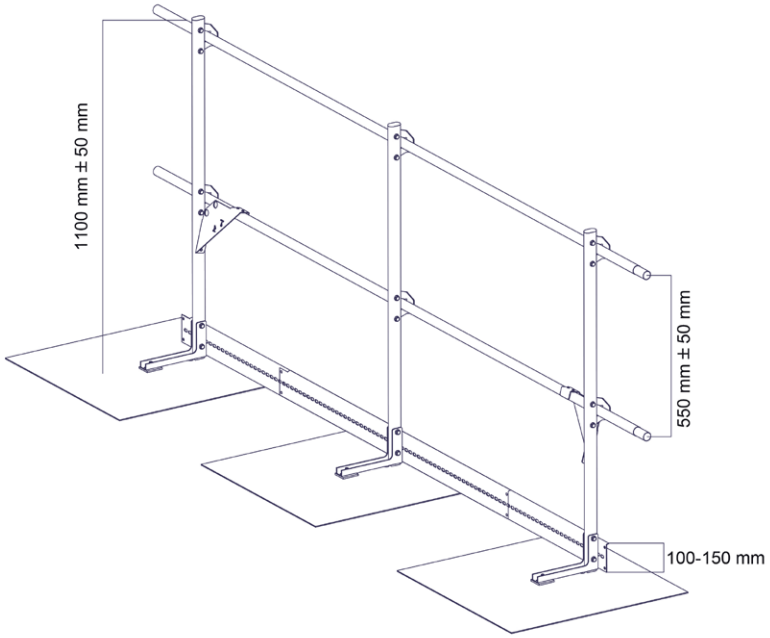
Design basis of the Pisko® Safeguard guardrail system

The Pisko® Safeguard guardrail system has been tested according to standard SS 831333:2021.

The Pisko® Safeguard guardrail system meets the following standard design requirements:

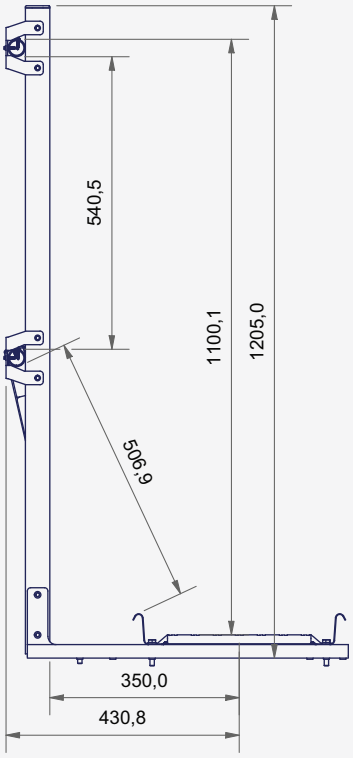
- The top rail must be positioned 1,100 mm ± 50 mm above the walking surface or roof walkway.
- The mid-rail must be positioned 500 mm ± 50 mm below the top rail.
- The size of any open gap must not exceed 550 mm down to the roof surface or walking level (see figure in the original document). If the gap exceeds 550 mm, the guardrail must be equipped at its lower edge with an additional rail or a Safeguard Kickplate.
- The guardrail may be equipped with a 100-150 mm high Safeguard Kickplate that prevents tools or loose items from falling off the roof. The distance between the Safeguard Kickplate and the roof surface may be at most 20 mm
- The guardrail may be installed 350 mm from the centreline of the roof walkway to provide more space on the access route.



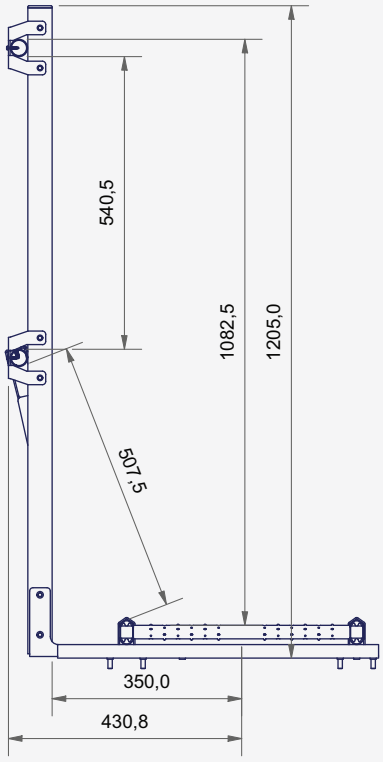


Main dimensions of the Pisko® Safeguard guardrail system

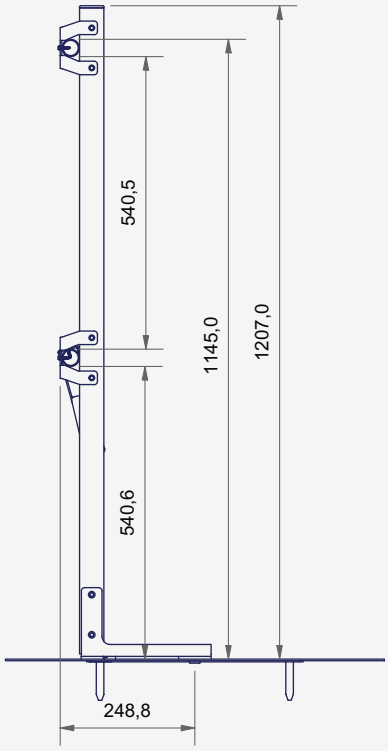
Roof walkway



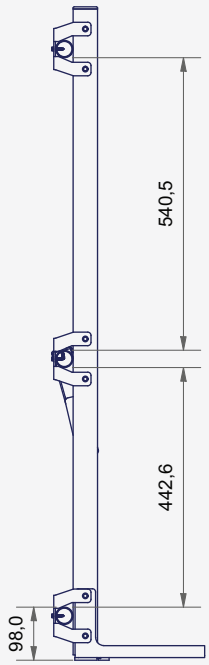
Roof ladder



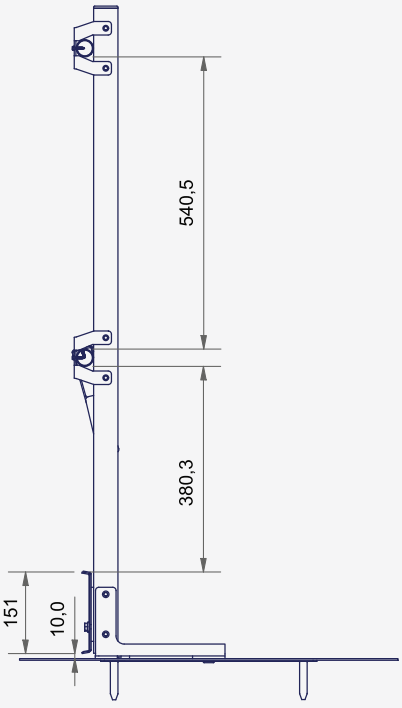
Waterproofing membrane roof



Third handrail



Kickplate



FREQUENTLY ASKED QUESTIONS

What types of buildings is the Pisko® Safeguard guardrail system recommended for?

All types of buildings where the use does not specifically require the roof edge to remain without guardrails. In particular, roof edge areas of wide-span buildings, buildings with extensive rooftop technology such as data centres, and access ways on high buildings are generally highly recommended applications for passive fall protection implemented with guardrails.

What material is the guardrail system made of, and what are the environmental impacts of the product?

The Pisko® Safeguard guardrail system is made of hot-dip galvanised steel that is also powder coated. Piristeel's EPD for roof safety products also covers the Pisko® Safeguard guardrail system (HUB-1043), providing more detailed information on the materials used, manufacturing methods and the product's environmental impacts.

What warranty is provided for the system?

A 50-year technical warranty is granted for the powder-coated steel parts of the system in accordance with Piristeel's product warranty terms.

Which colors is the Pisko® Safeguard guardrail system available in?

The guardrail system is available in all standard colours; black RR33 is a stock item.

Does the system need to be inspected or maintained?

Like all safety products, the Pisko® Safeguard guardrail system must be inspected regularly, and any necessary maintenance or repairs must be carried out based on the findings. The system itself is largely maintenance-free, but damage may be caused by harsh conditions such as heavy snow and ice loads, impacts to the system, and use (including misuse).

Regular inspections ensure continuous safety and long-term durability. Inspections can be carried out by competent parties in accordance with the Pisko® Safeguard inspection report instructions. The inspector provides the customer with a written report.

The installation site should also always have the original commissioning report, including the installer’s details and confirmation that the installation was carried out in accordance with the installation instructions.

Why has the system not been certified according to EN 13374?

The scope of EN 13374 covers temporary edge protection systems. The Pisko® Safeguard guardrail system is intended as a solution that permanently improves the safety of a building in use.

Can the Pisko® Safeguard guardrail system be used on construction sites for temporary edge protection?

At present, the Pisko® Safeguard guardrail system has not been tested according to EN 13374 and is therefore not intended as a temporary edge protection system for construction sites.

Can the Pisko® SafeGuard guardrail system be used as a hanging rack or as an aid for lifting goods?

The Pisko® SafeGuard guardrail system is not intended for use as a suspension platform or as an aid for lifting operations. It is permitted to connect to the system with a safety rope only for temporary needs, in which case it acts as a fall arrest solution for the user.

Can the Pisko® Safeguard guardrail system be used as an attachment point for a safety rope if necessary?

The guardrail system has been tested so that it can also be used as an attachment point for a safety rope, i.e. it will stop a falling user who has attached themselves to it with a safety rope equipped with a shock absorber in accordance with the requirements. However, connecting to the guardrail system with a safety rope is not the primary intended use, and personal safety equipment should be used systematically when working, for example, on a narrow roof edge area outside the guardrail line.

In the case of a Safeguard guardrail system installed on access ways, there are more appropriate solutions for attaching the safety rope to complement safety and usability. These include the Pisko® SafeLine wire system, which can be used to ensure fall protection when moving along the access ways, and the Pisko® rope fastener, which can be used to equip the roof walkway with a safety rope attachment point for work. The Pisko® horizontal rail system cannot be installed on the same roof walkway together with the Safeguard guardrail system.

Can the Pisko® Safeguard guardrail system be used as a guardrail at public events or in comparable situations?

The Pisko® Safeguard guardrail system is not intended for large crowds leaning against it simultaneously. It should therefore not be used as a guardrail at public events or, for example, in the stands of sports halls.

What requirements has the Pisko® Safeguard guardrail system been tested against?

The system has been tested according to SS 831333:2021. The drop test defined in the standard has been carried out in accordance with the requirements of the harmonised product standard EN 516, clause 7.2. This test corresponds to what the Finnish Building Code requires for the strength of safety rope attachment points.

The following product characteristics formed the basis for the test methods:

- Under load, the deflection of the guardrail may not exceed 150 mm, of which a maximum of 10 mm may be permanent deformation.
- The guardrail and its fixings must withstand a dynamic drop test in accordance with EN 516:2006, clause 7.2.

Test methods:

- The guardrail and its fixings must withstand a static point load of 0.3 kN at its highest point for three minutes both in the direction of the roof slope and transversely (in the direction of the handrail).
- The drop test must be carried out in the most unfavourable situation.

What does the P-mark mean and what is its validity in Finland?

The P-mark is a product certificate used in Sweden. It corresponds to national approval procedures used in Finland, such as a verification certificate for construction products. A P-mark is a national approval granted in another EU Member State and can be used as such to demonstrate compliance with technical requirements also in Finland. The declared technical properties can be used, for example, when evaluating guardrail resistance requirements in accordance with EN 1991-1-1.

The criteria for the P-mark have been established in Sweden for products and product groups for which no applicable harmonised EN standard exists.

Does the guardrail system meet the recommended design values for guardrails in accordance with the standard SFS-EN 1991-1-1 + AC, which deals with structural loads?

Yes, when operating in space categories comparable to Class A, B or C1. Designers should note that the primary intended use of the Pisko® Safeguard guardrail system is a guardrail system permanently installed on the roof of a building - an area where people are not intended to gather in large groups leaning against the guardrail. The solution is also not suitable for use as a balcony guardrail or similar.

The load required for certification is a 0.3 kN point load, taking into account the deflection limits presented above. As part of the certification process, the system has also been tested with drop tests, in which the system undergoes significant deformation (which protects the user from injuries) but does not fail or detach from its platform.

Piristeel Oy's tests have further shown that the guardrail system withstands the characteristic line load qk value presented in the Finnish National Annex (e.g. Class A, residential buildings) of 0.5 kN/m, multiplied by the partial factor 1.5. This corresponds to a design load qd = 0.75 kN/m at the ultimate limit state.

In addition, the guardrail system withstands without failure the minimum resistance requirement stated in an additional note of the Finnish National Annex, i.e. the horizontal load of Class E (qk = 1.0 kN/m), when the test load used is qd = 1.5 kN/m.

Ultimate limit state: 1.5 × 0.5 kN/m recommendation is met.

Ultimate limit state: Finnish National Annex additional guidance for personal safety: 1.5 × 1.0 kN/m minimum requirement is met.

Serviceability limit state: 0.3 kN point load per SS 831333:2021 - requirement is met.

Compliance with EN 1991-1-1:2025 resistance recommendations will be declared when that standard and its National Annex are taken into use in Finland.

Metallitie 4
62200 Kauhava
Finland

Tel. +358 6 433 8800
piristeel@piristeel.fi
www.piristeel.fi

Ver 1.2
18022026