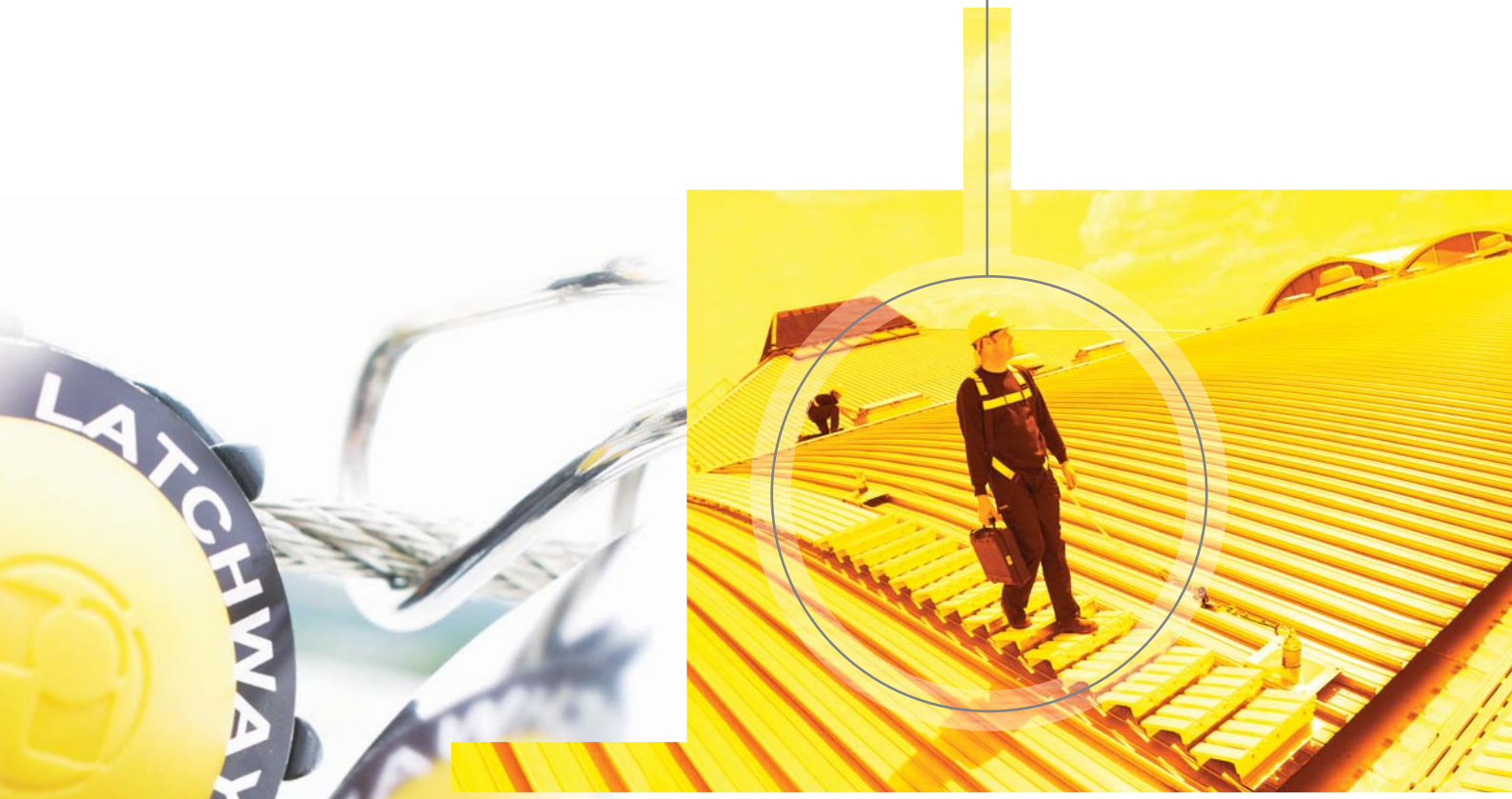
ManSafe® for Roofing

Fall protection for rooftop maintenance

Constant Force® Post
Freestanding Constant Force® Post
WalkSafe®
VersiRail



LATCHWAYS
FALL PROTECTION

Why is fall protection necessary?

Falls from height are the single biggest cause of death and one of the biggest causes of serious injury in the workplace today. For businesses whose workers need to operate quickly and effectively at height, fall protection is already a major issue—and this will become increasingly important as regulatory authorities introduce ever-stricter rules governing:

- Where height safety should be implemented.
- The systems that are acceptable for use.
- Who is responsible for ensuring worker safety.

Are you responsible?

The answer could well be 'Yes'. According to the health and safety legislation these people are 'duty-holders'—responsible for ensuring adequate fall protection and potentially liable in the event of an accident.

- Designer/Architect
- CDM Co-ordinator
- Health and Safety Manager
- Facilities Manager
- CDM Co-ordinator
- Principal Contractors/ Sub-Contractor
- Client/Building Owner

What you need to do

The official advice to duty-holders can be summarised as follows:

Avoid work at height, where possible.

When working at height is essential, ensure that workers are not exposed to unnecessary risks.

Where it is not possible to eliminate the risk of falling, **use a suitable fall protection system to minimise the consequences of a fall**.

The global leader in fall protection systems is Latchways plc.

ManSafe® for Roofing
Where is fall protection required?

Examples of the areas which require rooftop fall protection

Roof Access:
Access via ladders and roof hatches

Roof Edges:
Access required for gutter cleaning, leakage checks and access to the rest of the roof

Roof Plant:
Air conditioning units, satellite dishes and solar panels all need regular checks

Walkways:
Walkways should be accompanied by a fall protection system

Rooflights:
Fall protection required for cleaning and maintenance

All roofs require some form of access for:

General maintenance.

Structural/performance checks for warranty maintenance.

Plant access.

LATCHWAYS FALL PROTECTION

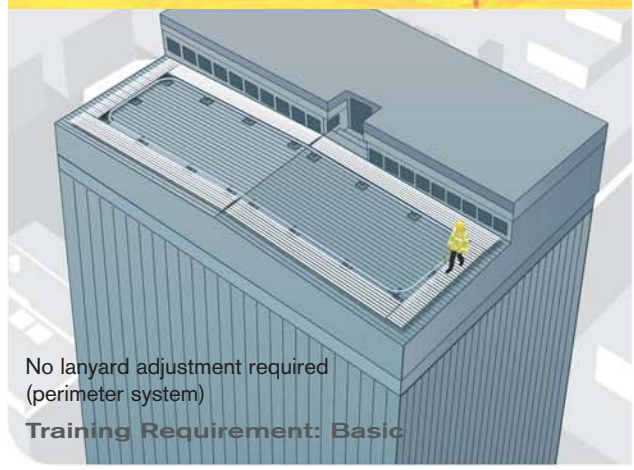
What type of fall protection system should you install?

Solution: Guardrail

Freestanding collective protection

Training Requirement: None

Solution: Fall Restraint*



No lanyard adjustment required
(perimeter system)

Training Requirement: Basic

Latchways has developed an easy-to-use assessment method to help establish what type of system is required for permanent access. There are a number of key considerations that will help decide what type of system needs to be installed and therefore minimise risk:

Experience of the worker(s) accessing the system.

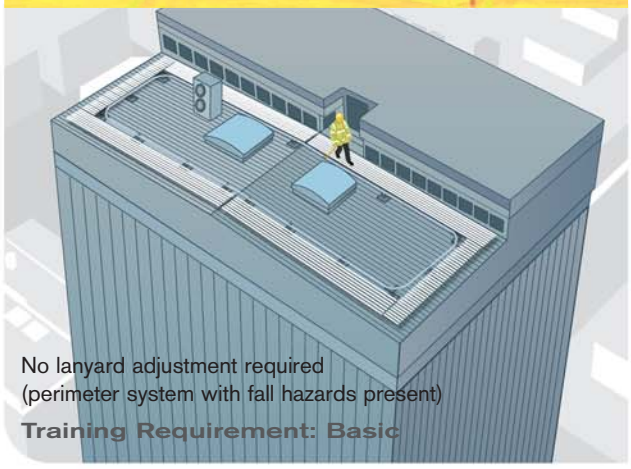
Number of worker(s) accessing the system.

Duration of the worker(s) on the system.

Frequency of use.

In most cases, unless specialist rope access is required, it is best practice to assume that the worker has only basic experience. The illustrations opposite are designed merely as a guide to the options that are available. In all cases a propriety walkway, such as WalkSafe® is recommended to accompany the fall protection system to provide a safe means of access to the place of work. WalkSafe also ensures the rooftop is protected from any possible damage caused during regular cleaning and maintenance of plant, gutters, down pipes etc. Latchways' in-house design team can further advise on the most appropriate system for your particular requirement. For advice on system design and specification, email Latchways at spec@latchways.com.

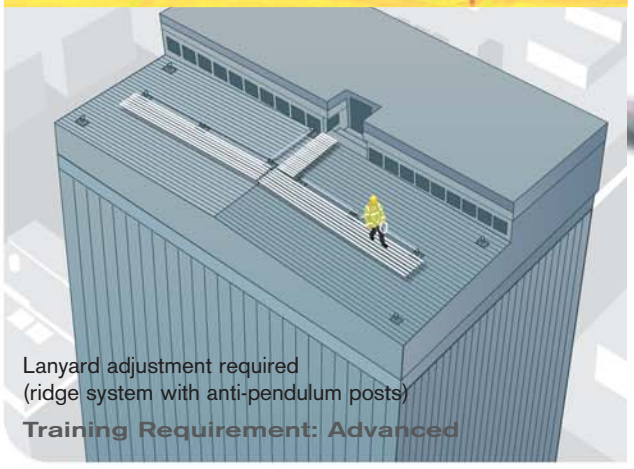
Solution: Fall Arrest**



No lanyard adjustment required
(perimeter system with fall hazards present)

Training Requirement: Basic

Solution: Fall Arrest**



Lanyard adjustment required
(ridge system with anti-pendulum posts)

Training Requirement: Advanced

*Restraint system—system is located so a worker on a fixed-length lanyard cannot reach any fall hazard.
**Arrest system—system location is restricted and fall hazards can be reached by a worker on a fixed or variable length lanyard.

In April 2005 the HSE published the Work at Height Regulations (WAHR). These regulations bring together the relevant parts of the Construction (Health, Safety and Welfare) Regulations 1996 (CHSWR), the Workplace (Health, Safety and Welfare) Regulations 1992 and the Construction (Design and Management) Regulations 2007 (CDM). These regulations all have references to working at height and are incorporated within the WAHR.

The WAHR also implement the European Community Temporary Work at Height Directive (2001/45/EC), which is the second amendment to EC Directive (1989/655/EEC) on the provision and use of work equipment.

Work at Height Regulations 2005

The key issues for rooftop maintenance are summarised as follows:

The 'duty-holder' is responsible for minimising risk utilising the methodology stipulated in the 'Hierarchy of Fall Protection'. The risk assessment and the action taken should be proportionate to the harm that could occur.

Working at height is defined as 'all work activities where there is a need to control a risk of falling a distance liable to cause personal injury'. This means that if there is a chance of a fall of any distance the duty-holder must show that everything has been done to minimise the risk.

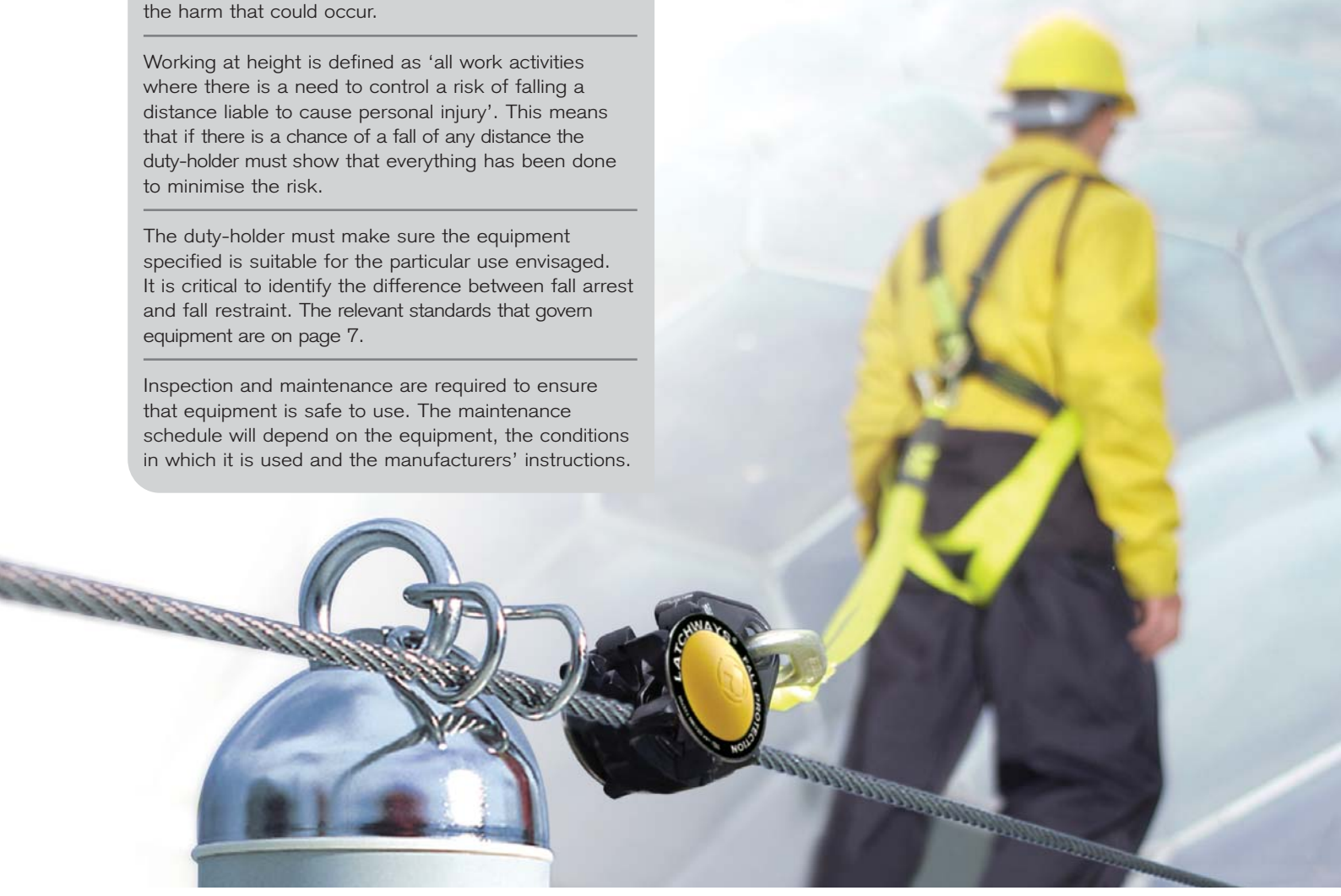
The duty-holder must make sure the equipment specified is suitable for the particular use envisaged. It is critical to identify the difference between fall arrest and fall restraint. The relevant standards that govern equipment are on page 7.

Inspection and maintenance are required to ensure that equipment is safe to use. The maintenance schedule will depend on the equipment, the conditions in which it is used and the manufacturers' instructions.

The legislation recognises that fall protection specifics are difficult to determine and hence legislate for. It allows some flexibility in interpretation and guidance but those responsible for providing adequate fall protection must be able to demonstrate that they have minimised risk, specified suitable equipment, considered the ability of the user and appreciated the conditions in which the system is likely to be used. The duty-holder must have evidence that these issues have been considered and addressed in the risk assessment.

In addition to these key pieces of legislation, the Booklet HSG 33 'Health and Safety in Roof Work' gives extensive guidance on how to work safely on roofs. It covers new buildings, repair, maintenance, cleaning work and demolition. It points to the principal problems, notably falls through fragile roofing materials and falls from unprotected roof edges and warns that many may undertake maintenance work with little or no experience of roof work or of working at height.

Latchways can advise and assist with compliance; for further information email spec@latchways.com.



LATCHWAYS FALL PROTECTION

Latchways Fall Protection: Quality Products

Latchways' primary focus is to supply engineered fall protection products for all areas of industry, construction and maintenance. Installations include stadia, retail outlets, transmission towers, industrial complexes and notable sites such as Eden Project, Pier 6 at Gatwick Airport, Hong Kong Airport and Grand Central Station in New York. Latchways has worked closely with the major roofing manufacturers to produce a full range of fall protection systems for all designs and types of roofs.

Constant Force®: Fall Protection Innovation

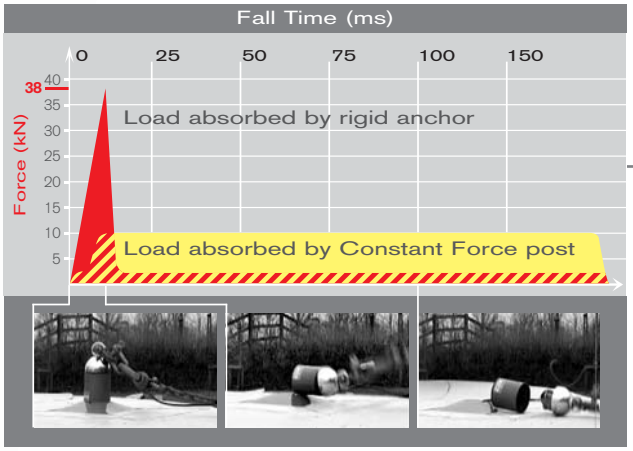
Latchways has taken the science of Constant Force and applied it to the fall protection industry providing an easy to install, reliable and cost-effective solution to rooftop safety.

The principles of fall arrest are based on effective load control. A system must be able to withstand the force of a persons' fall and absorb the energy generated. Traditionally this was achieved by attaching the system to the structure of the building with the anchor point absorbing the load. This inherently caused difficulties for designers and installers as the system location was determined by the structural elements of the building.

System installation was time consuming as fixings had to be made from above and below. Such an installation method can create issues regarding warranties, leakage and cold bridging.

Latchways' Constant Force post does not need to be fixed to the building structure therefore simplifying installation (see pages 8 & 9). The Constant Force technology allows the load generated in the event of a fall to be absorbed through the entire system, as illustrated in the graph below.

Constant Force Post performance compared against Rigid Anchor



Constant Force systems are recommended and approved for use by most roofing manufacturers. Details of how the systems fit on all major roof types can be found in Latchways' ManSafe Specifiers Manual available on request or by visiting www.latchways.com.

In addition to 'in-house' evaluation, Latchways' products are tested externally by notified independent test bodies. All systems are CE marked and hold EC Declarations of Conformity.

The key European standards are:

EN 353-1 Personal Protective Equipment (PPE) against falls from a height. Specification for guided type fall arresters on a rigid anchorage line.

EN 353-2 PPE against falls from a height. Guided type fall arresters including a flexible anchor line.

EN 341 PPE against falls from a height. Descender devices.

EN 354 PPE against falls from a height. Lanyards.

EN 355 PPE against falls from a height. Energy absorbers.

EN 358 PPE for work positioning and prevention of falls from a height. Belts for work positioning and restraint and work positioning lanyards.

EN 360 PPE against falls from a height. Retractable type fall arresters.

EN 361 PPE against falls from a height. Full body harness.

EN 362 PPE against falls from a height. Connectors.

EN 363 PPE against falls from a height. Fall arrest systems.

EN 364 PPE against falls from a height. Test methods.

EN 795 PPE against falls from a height. Anchor devices. Requirements and testing.

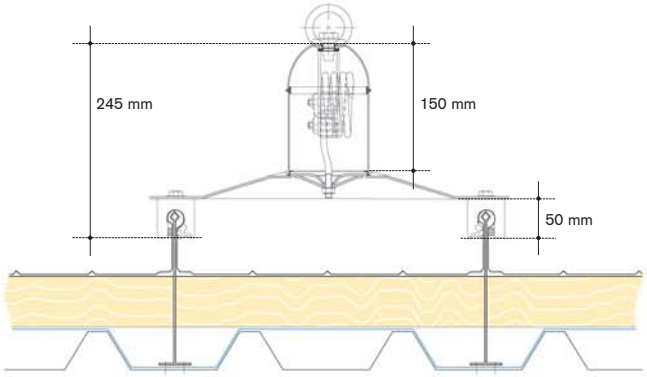
All elements of the Latchways Constant Force fall protection systems comply with the relevant standards and have the appropriate CE marking. The key standard is EN 795 which relates to the anchor devices. Developments in technology mean that the nature of the anchor device has changed. As such, Latchways conduct full roofing system tests (6 m x 6 m) to replicate the in-situ installation. This is a minimum requirement where top-fixed solutions are concerned.

Constant Force post: Fixing Details

Latchways' Constant Force systems offer a complete fall protection solution for both fall restraint and fall arrest. The simplicity of the fixings allows a quick and easy installation providing safe solutions where workers are exposed to a fall hazard. System design can be verified with Latchways' software. For more information please email spec@latchways.com.

Latchways works with all major roof manufacturers. To see how posts fix to manufacturers' individual roofing systems visit www.latchways.com or ask for a ManSafe Specifiers Manual. A variety of base plates are available to fit all roof configurations—see table.

Roof Type	Fixing Dimensions (mm)
Standing-Seam	300/305/333/400/500
Composite and Built-Up-On-Site	250/300/333/400/500
Secret-Fix	500/532
Steel Deck	210/268/300/350/459
Concrete Deck	210/268/300/350/459
Timber Deck	210/268/300/350/459

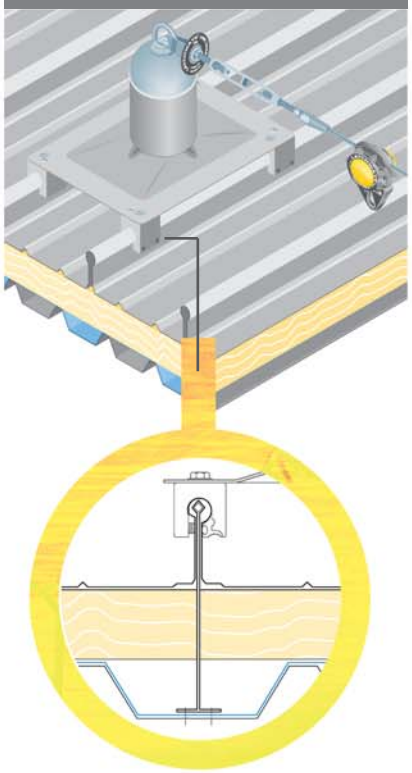


Dimensions of a Constant Force post

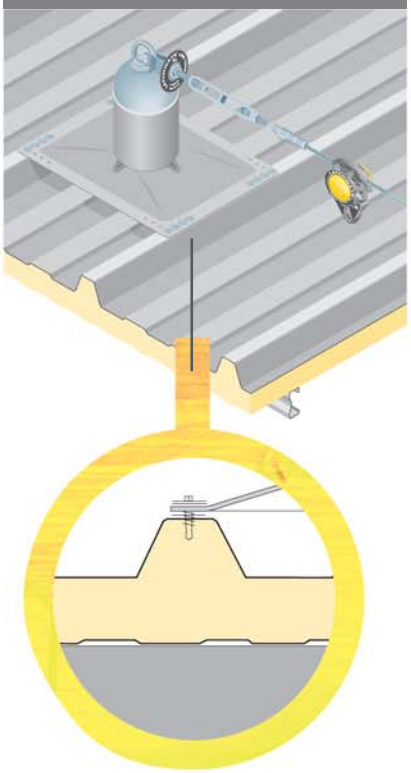
Key Advantages

- System technology limits load to 10 kN in the event of a fall
- Top-fixing ensures quick and easy installation
- Reduces cold bridging aiding compliance with Part L
- Does not invalidate roofing warranty
- System location not restricted to buildings' structural elements
- Option of powder coating posts to match roof
- Suitable for use on a roof pitch up to 15°

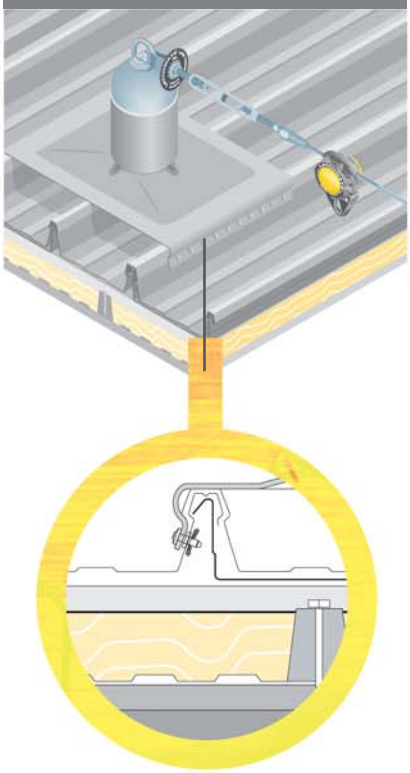
Constant Force post on Standing-Seam roofing


Fixing method: 4 split clamps

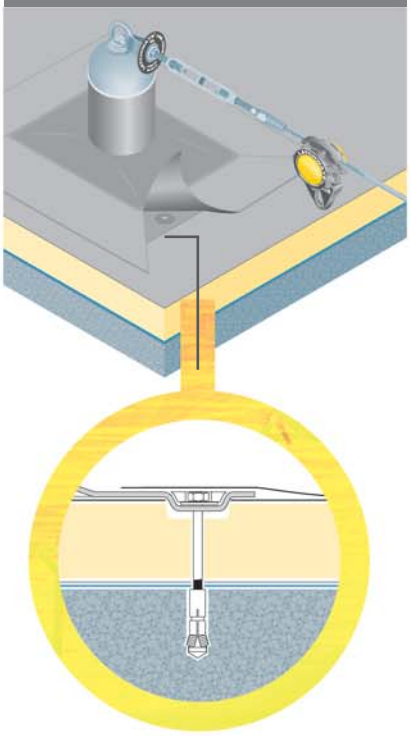
Constant Force post on Composite/Built-Up-On-Site roofing


Fixing method: 16 stitching screws

Constant Force post on Secret-Fix roofing

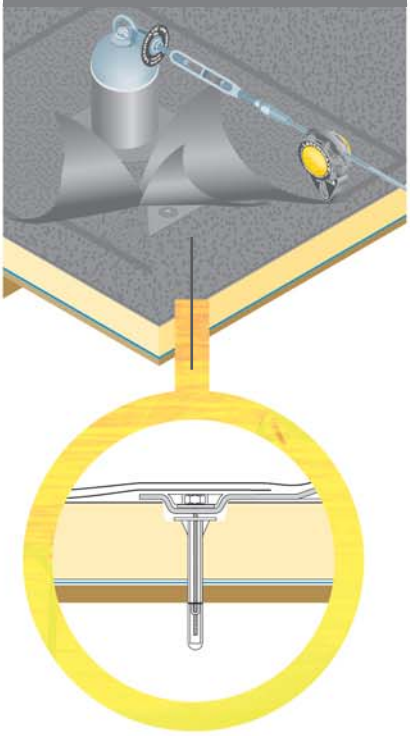

Fixing method: 20 bulb tite water seal rivets

Constant Force post on concrete deck flat roofing



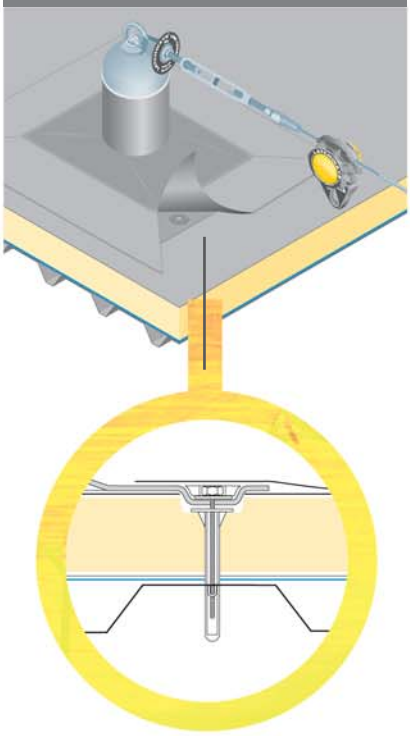
Fixing method: 4 M8 mechanical fixing anchorages

Constant Force post on timber deck flat roofing



Fixing method: 4 toggle bolts

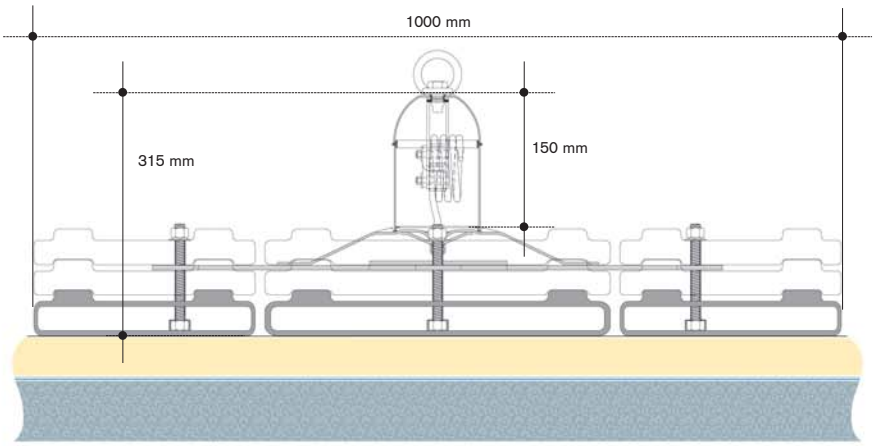
Constant Force post on steel deck flat roofing



Fixing method: 4 toggle bolts

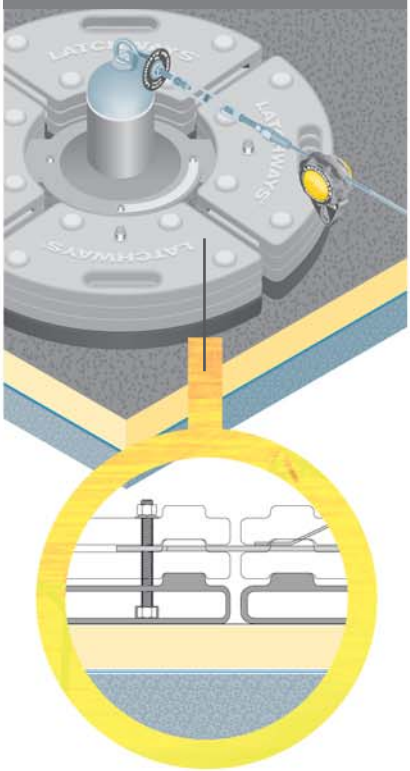
Freestanding Constant Force post

Freestanding Constant Force post is suitable for applications where roof penetration is not required or possible. It is available as a restraint or an arrest system and can be used singularly or in series, varying the number of sections to suit the application.



Dimensions of a 300 kg Freestanding Constant Force post

Freestanding Constant Force post on concrete deck flat roofing

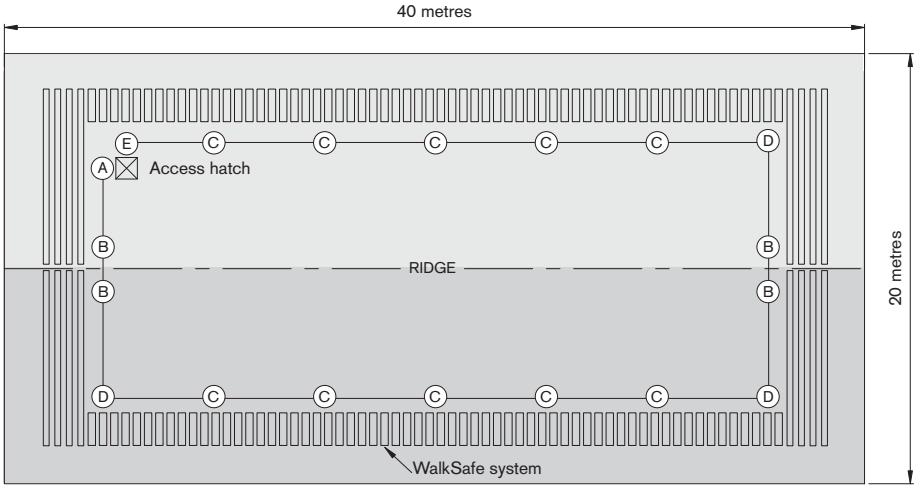


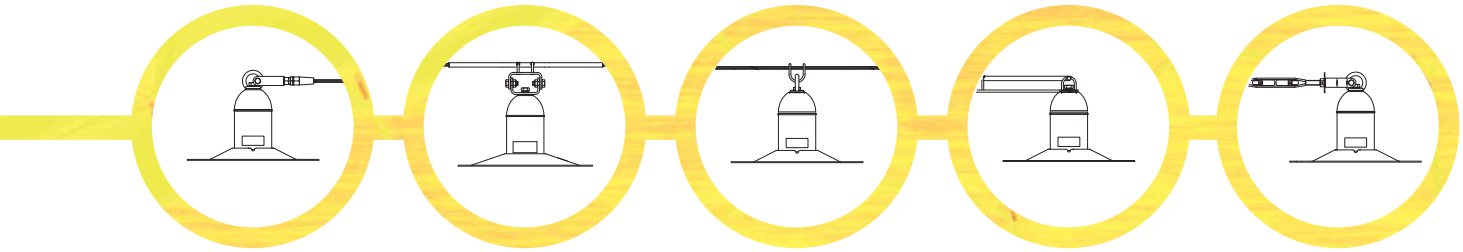
Consists of weighted segments

LATCHWAYS FALL PROTECTION

Constant Force®: System Design

A typical roof layout for a perimeter system is illustrated identifying the different system components. Posts must not be spaced more than 10 m apart. Designers should try to ensure that access to all areas is achieved without the requirement for PPE (Personal Protective Equipment) adjustment. Latchways provides a bespoke system design service for your project requirements. Email: spec@latchways.com for more information.





A. End Anchor | B. Variable Anchor | C. Intermediate Anchor | D. Corner Anchor | E. End Anchor

System Components

The following components complete the system allowing hands-free operation. Latchways' components are manufactured in marine-grade stainless steel and are individually numbered to allow complete traceability. Inspection and maintenance are required annually.

Transfasteners

The user, wearing a full body harness and energy-absorbing lanyard, is continuously attached to the system with a Transfastener™, which rotates allowing it to pass through the intermediate cable supports. For systems on inclines over 15° a ClimbLatch device is required instead of the Transfastener.

Turnbuckle assembly

The turnbuckle assembly provides a cable termination and method of tensioning the system. The integral indicator disc will spin when the correct tension is reached.

Swage & Clevis

The swage and clevis unit provides the method of terminating the cable at the opposite end of the system to the turnbuckle assembly.

90° Corner bracket

This one-piece corner bracket attached to an intermediate post provides an angle change of 90° within the system.

Variable bracket

This bracket attaches to an intermediate post and provides an angle change of between 0 and 80° both in the horizontal and the vertical plane.

D Ring & Hanger

The D ring and hanger form an intermediate cable support. The cable is threaded through the hanger allowing the Transfastener to travel the length of the system without disconnecting.

ManSafe® for Roofing
The WalkSafe® system

In nearly all instances it is impractical to prevent roof access, therefore the ideal solution is to create a level, anti-slip surface with all fall hazards protected against. WalkSafe provides a demarcation route, guiding a workers' movement in areas where there are potential fall hazards. Manufactured from recycled PVCu, WalkSafe has an anti-slip surface and is attached to the rooftop.

In potential highly trafficked areas of roofing, where regular access may be required for maintenance regimes, plant inspection, air quality monitoring, rooflight cleaning, etc, WalkSafe distributes the load evenly on the roof and thus reduces wear and tear on the roofing system itself.

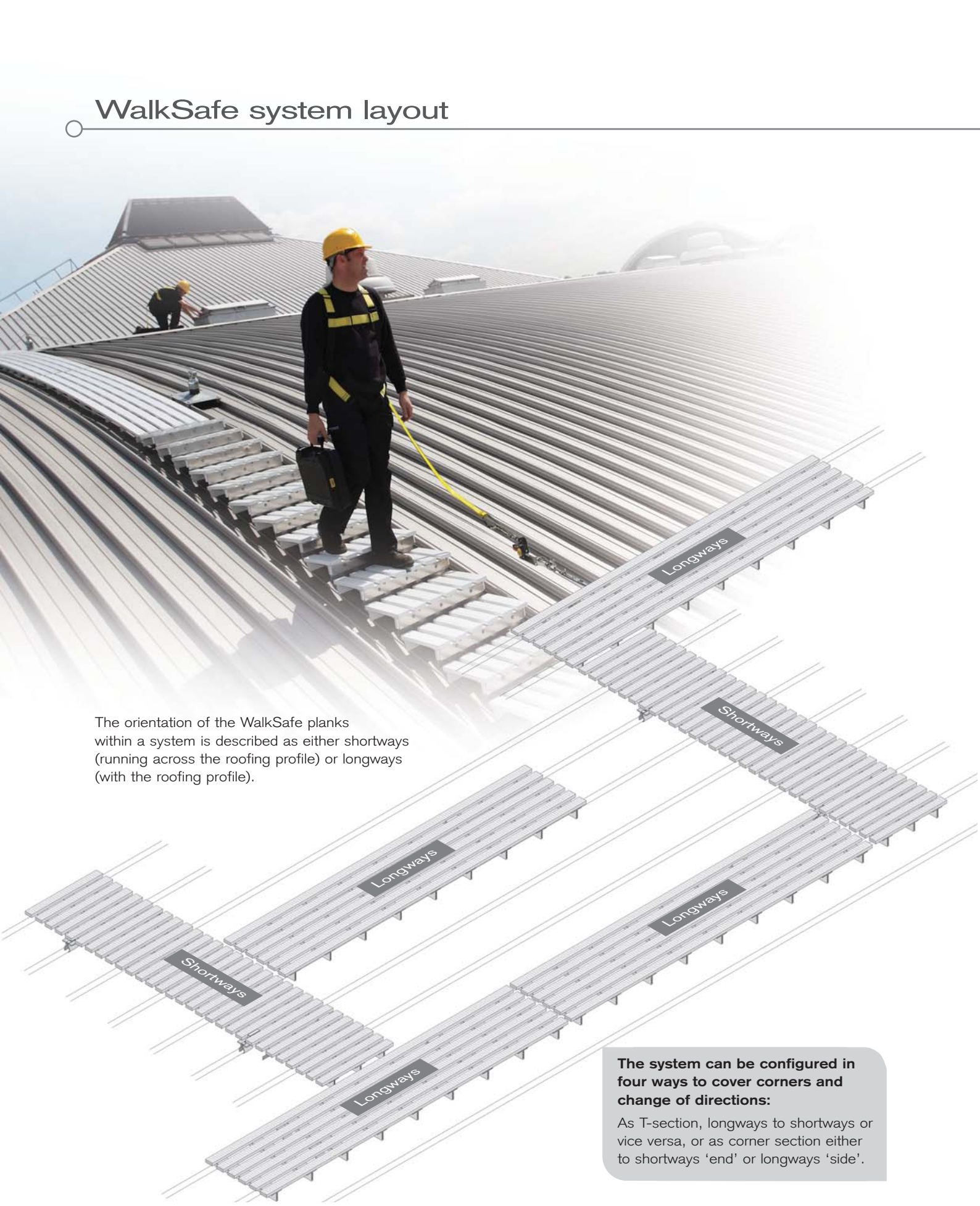
WalkSafe is designed to work on all major roof systems: standing-seam, composite, built-up-on-site, secret-fix and single-ply membrane. Bespoke WalkSafe solutions for cementitious, slate and bituminous roofing are available upon request.

Key Advantages

- Lifespan in excess of 25 years (BBA Certified)
- BBA Certified for slip resistance
- Manufactured from re-chipped window profiles and can be re-cycled
- Lightweight construction
- Designed for use on all major roofing systems
- Manufactured in the UK
- Fire resistance—Class 1Y against B476 fire resistance test
- Undergone full ACRM Fragility of Roofing Assemblies testing

LATCHWAYS FALL PROTECTION

WalkSafe system layout



The orientation of the WalkSafe planks within a system is described as either shortways (running across the roofing profile) or longways (with the roofing profile).

The system can be configured in four ways to cover corners and change of directions:

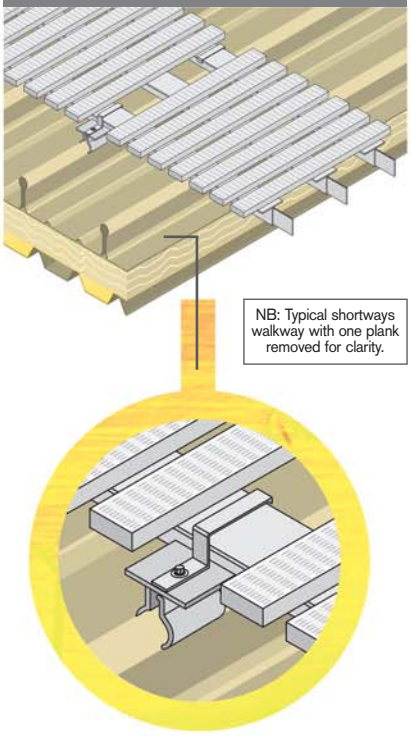
As T-section, longways to shortways or vice versa, or as corner section either to shortways ‘end’ or longways ‘side’.

Fixing information

The simplicity of the WalkSafe system allows a quick and easy installation.

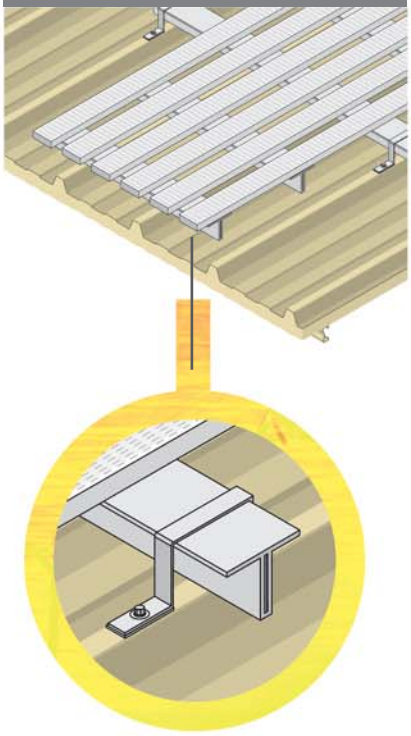
The 3 metre long panels only require top fixing to the roofing system. In most cases the fixings are non-penetrative.

Shortways system on standing-seam roofing



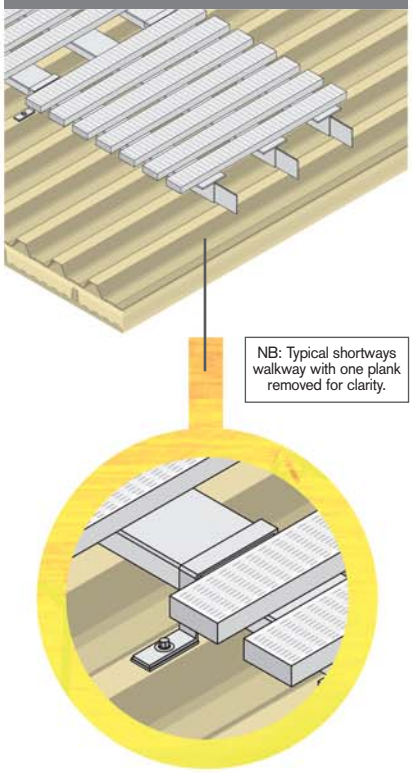
Fixing method: Standing-seam clamps

Longways system on composite roofing



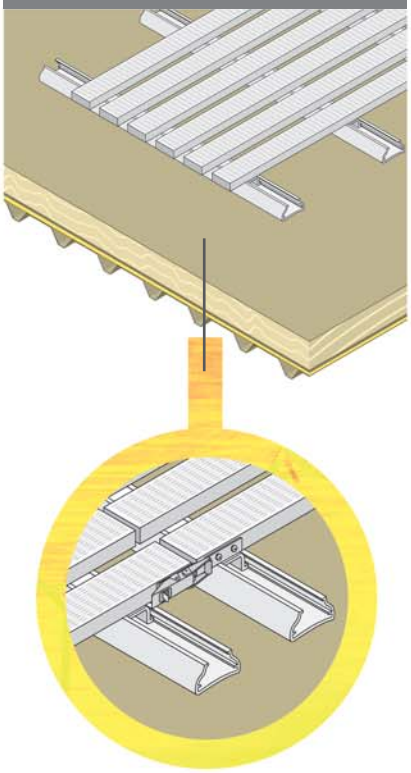
Fixing method: Retaining brackets

Shortways system on built-up-on-site roofing



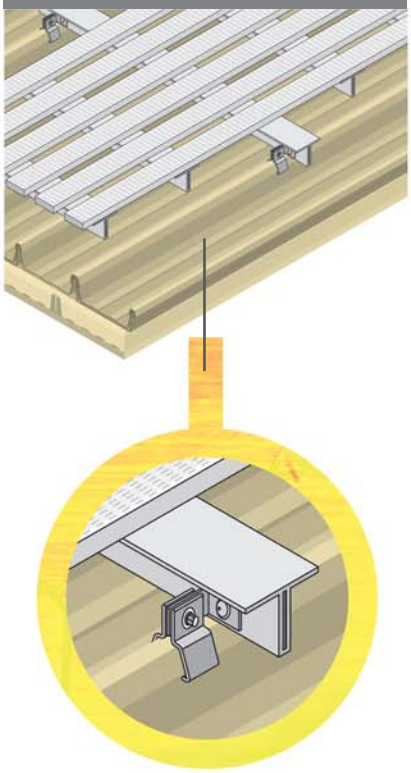
Fixing method: Retaining brackets

Longways system on single-ply membrane roofing



Fixing method: Self weighted—panels are joined with toggle clamp

Longways system on secret-fix roofing



Fixing method: Secret-fix clamps

WalkSafe system on pitched roof

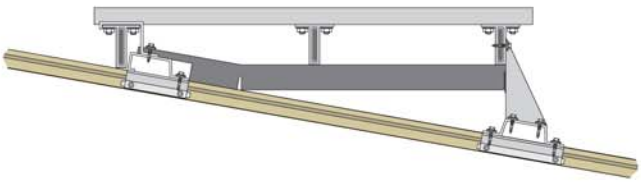
WalkSafe's design flexibility allows it to be used as levelled walkways allowing safe access to all parts of the roof on slopes up to 15°, or as steps on steeper gradients.

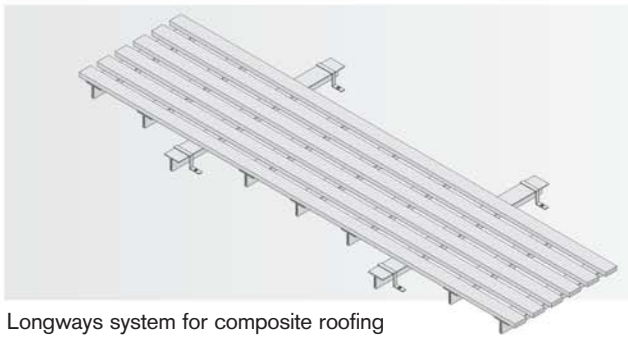
Where a level walkway is required it is key that the correct roof angle is identified as the levelling brackets are purpose-built for each job.

Traversing WalkSafe systems utilise different components to the stepped systems, therefore careful consideration must be given when detailing those areas which require access.

Steps on standing-seam

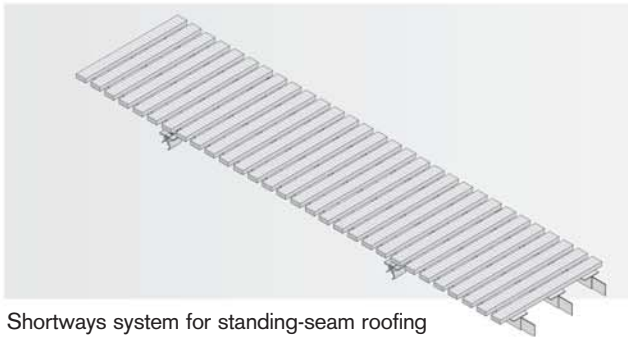
Traversing secret-fix



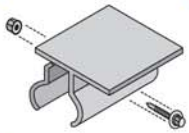


Longways system for composite roofing

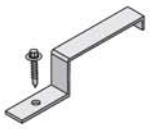
Retaining bracket



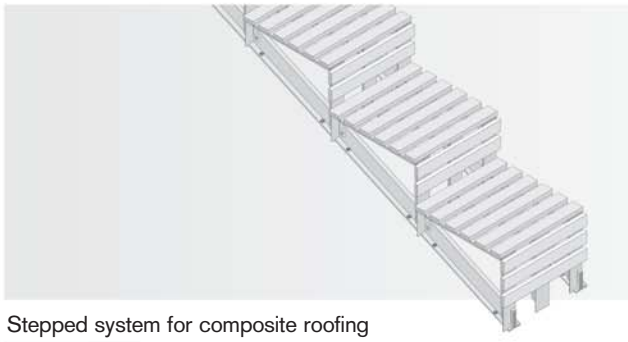
Shortways system for standing-seam roofing



Standing-seam clamp

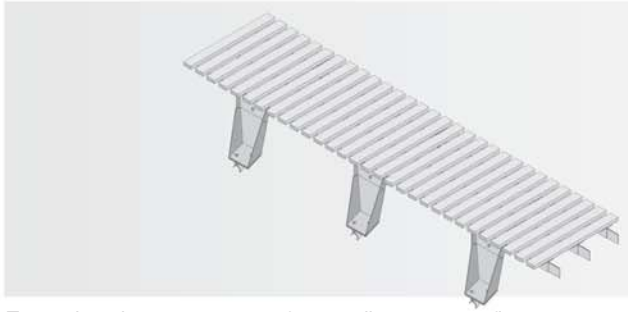


Retaining bracket

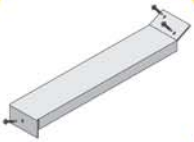


Stepped system for composite roofing

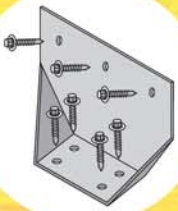
Self-tapping screw



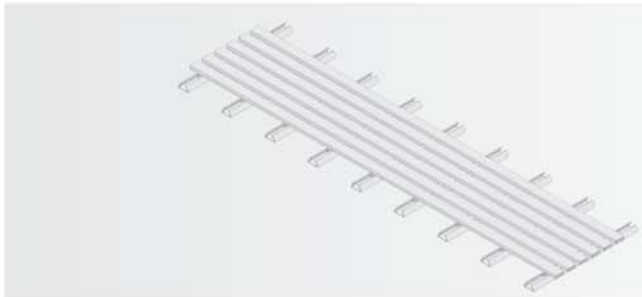
Traversing shortways system for standing-seam roofing



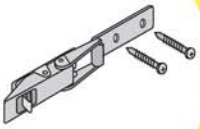
Support rail



Retaining bracket



Longways system for single-ply membrane roofing



Toggle clamp

LATCHWAYS FALL PROTECTION

Collective protection: VersiRail

Where you need to restrict exposure to the hazard, the VersiRail range offers an aesthetically pleasing collective protection solution for flat surfaces up to a 10° slope. VersiRail comes as either a freestanding option where there is no need to drill or penetrate the roof, or as a fixed option which can be permanently attached to the roof.

Both freestanding and fixed solutions are available in three style choices; straight, curved or inclined and three finishes; natural, polished or powder coated to a RAL colour.

Freestanding VersiRail can also be supplied in a folding option to lie flat on the roof when the system is not in use.

A guardrail system should be designed to always provide a minimum edge protection height of 1100 mm. The fixed VersiRail system has upright supports that are available in various heights (from 300 – 1100 mm) to accommodate different parapet heights. For added safety VersiRail is supplied with kneerails as standard. Additional kneerails can be provided to meet individual requirements.

Key Advantages

- Durable aluminium, corrosion-resistant construction
- Lightweight—quick and easy installation
- 30% lighter than steel alternative
- Fixed or freestanding (including folding) options
- Designer looks—three finishes available
- Adaptable, modular easy-fix system
- Fully weatherproof
- Tested and certified in accordance to EN 13374 and EN 14122-3
- No need for annual inspection
- Versatile—can be designed for any flat roof plan
- Available in three styles—straight, curved, inclined
- Freestanding option—no need to penetrate the roof
- Fixed option—a range of different heights to meet your needs (300, 500, 700, 900, 1000 and 1100 mm)

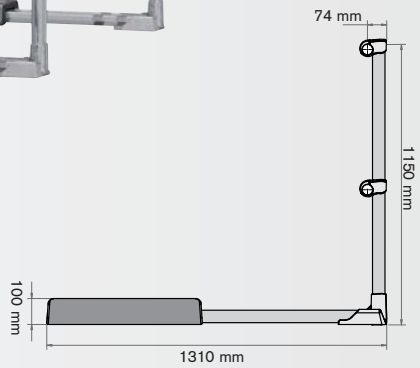
VersiRail: Freestanding Upright

VersiRail: Fixed Upright

Straight Upright

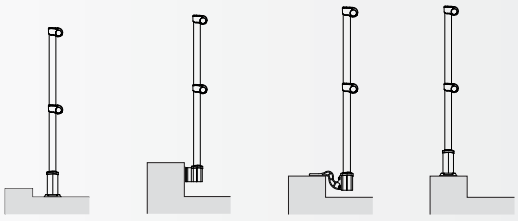
This simple design fits in perfectly with the clean lines and contours of a building.

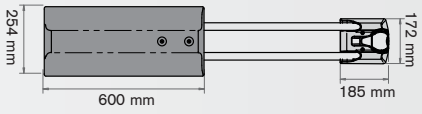
The straight upright system is particularly suitable for protection at access points and demarking walkways.



Straight Upright system with:

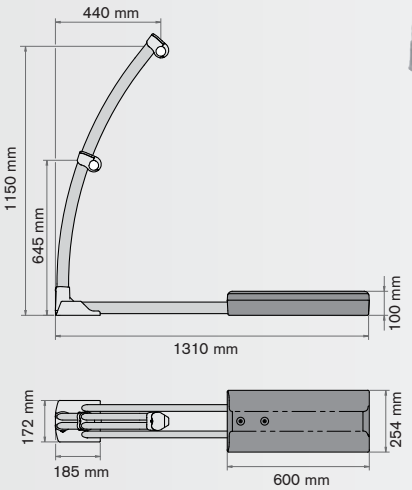
1) Slab mounting plate
2) Wall mounting plate
3) Z-type mounting plate
4) Parapet mounting plate





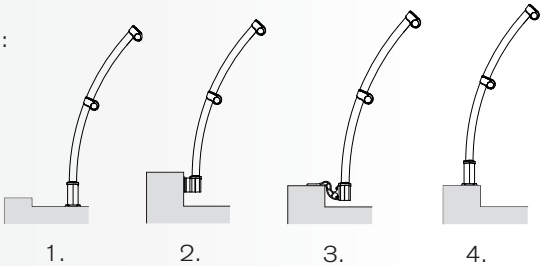
Curved Upright

Whilst providing the primary function of collective protection, the curved upright system compliments the design of a building. This solution also keeps people further from the roof edge, providing a greater level of safety.



Curved Upright system with:

1) Slab mounting plate
2) Wall mounting plate
3) Z-type mounting plate
4) Parapet mounting plate

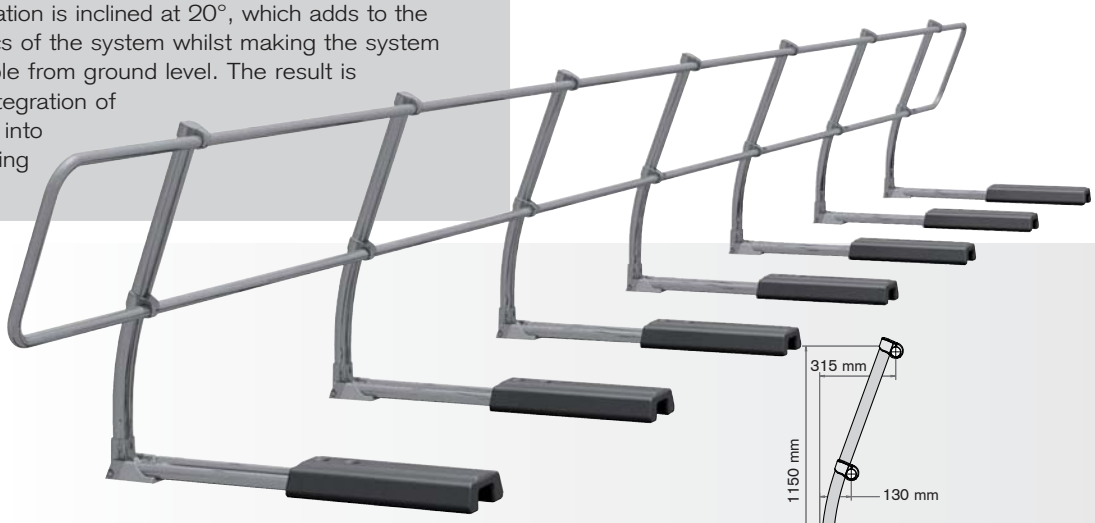


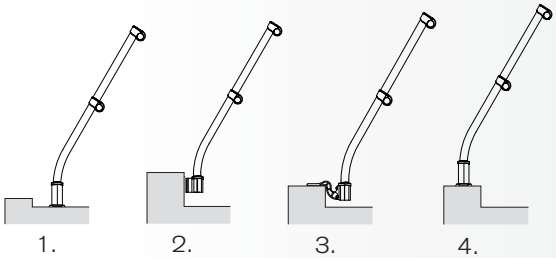
LATCHWAYS FALL PROTECTION

VersiRail: System options

Inclined Upright

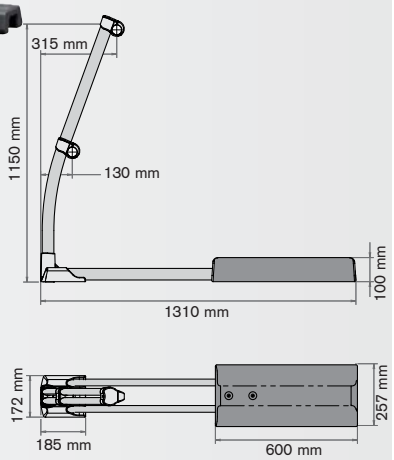
This variation is inclined at 20°, which adds to the aesthetics of the system whilst making the system less visible from ground level. The result is better integration of VersiRail into the building design.





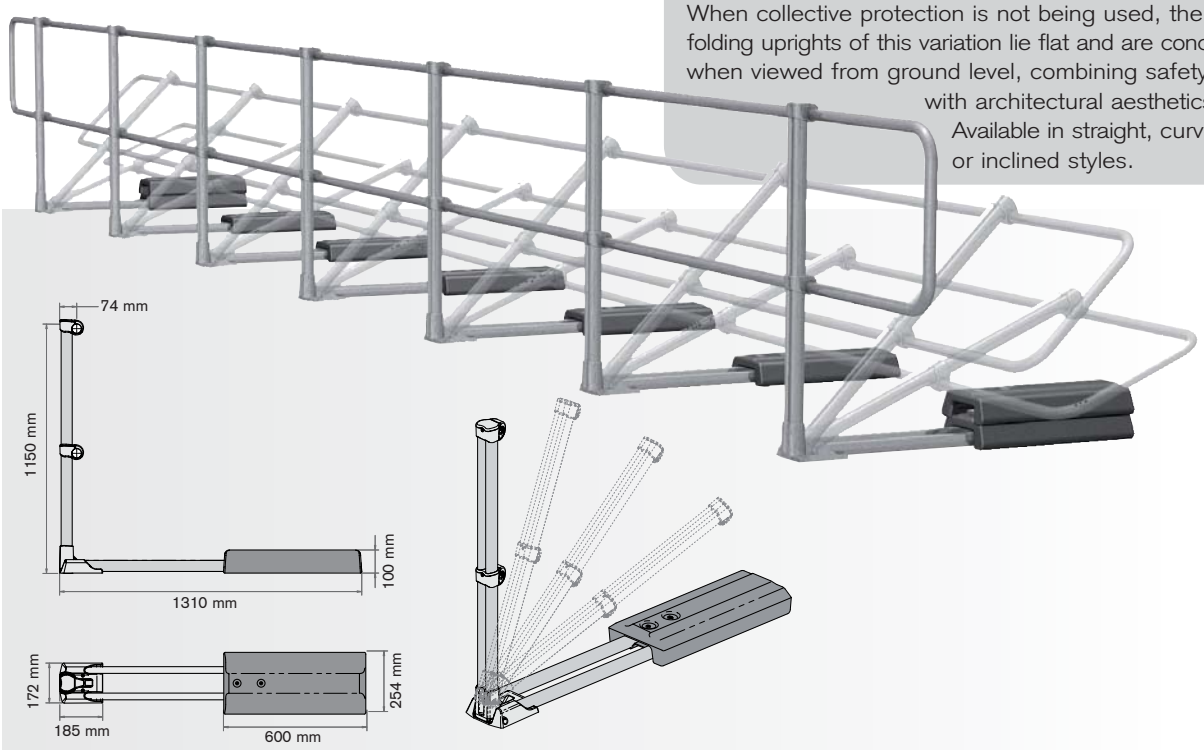
Inclined Upright system with:

1) Slab mounting plate
2) Wall mounting plate
3) Z-type mounting plate
4) Parapet mounting plate



Freestanding Folding

When collective protection is not being used, the folding uprights of this variation lie flat and are concealed when viewed from ground level, combining safety with architectural aesthetics. Available in straight, curved or inclined styles.

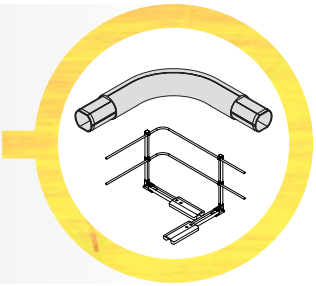


Ancillary items

VersiRail is exceptionally flexible in its application through modular easy-fix components allowing a wide range of configurations.

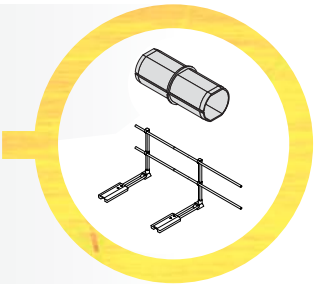
Corner Sections

Where a change in system direction is required a standard 90° corner section can be supplied, or specific corner sections of between 45° to 175° can be made to order.



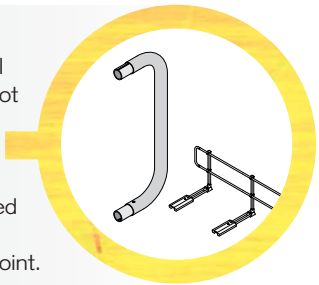
Connecting elements

T-Junctions, 45-45 corner sections and junction parts are all available to accommodate all system layouts.



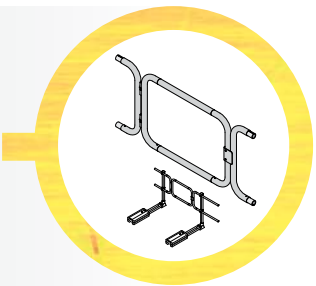
Closure bends

In situations where VersiRail needs to terminate and cannot be attached directly to a structural element, a closure bend can be specified. This same part can be incorporated into a length of system to designate a safe entry/exit point.



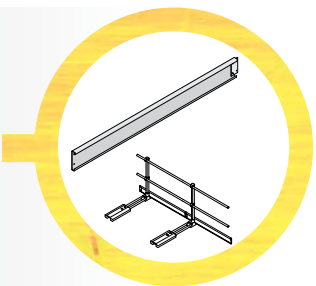
Access gate

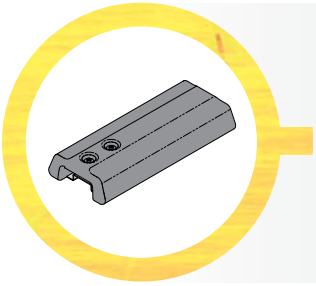
Where VersiRail prevents access to a fall hazard such as a rooflight or trap door, but access may be needed for maintenance, the access gate can provide trained personnel controlled access to these areas.



Toeboard

On rooftops or surfaces where there is no parapet at the fall edge (or a parapet of less than 100 mm high) a toeboard can be affixed to the base of the VersiRail.



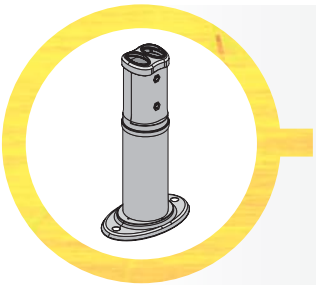


Additional counterweights

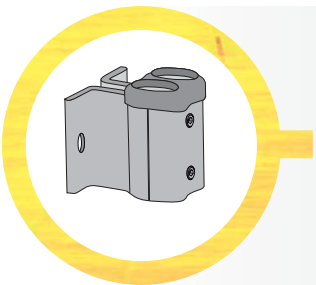
Where a closure bend, corner or specifc access point occurs within a system, additional weights may be required to increase stability.

Fixing options

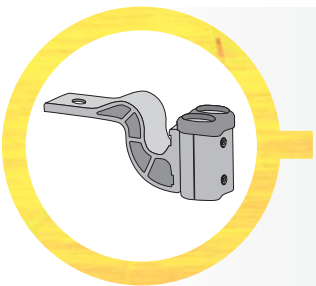
There are a number of brackets available for fixing on or to parapet walls using either M10 or M12 bolts. These fixings should also be chemically sealed where possible. It is essential to check the suitability of material that the fixed VersiRail is to be installed on.



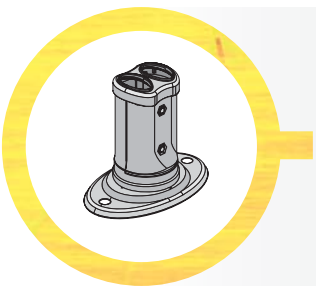
Slab mounting plate (200, 250 or 300 mm high)



Wall mounting plate (open option available)



Z-type mounting plate



Parapet mounting plate

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