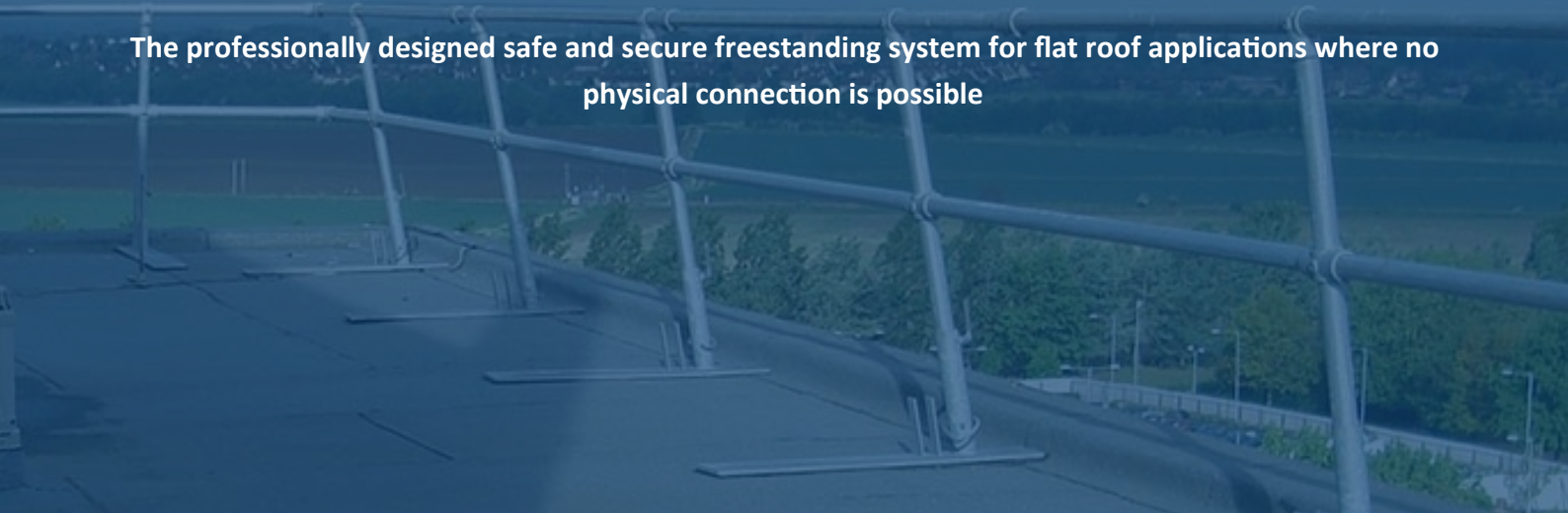




# SHORGUARD SG4 FLAT ROOF GUARDRAIL SYSTEM

The professionally designed safe and secure freestanding system for flat roof applications where no physical connection is possible



*Previous winner of the ROSPA Safety Award for Outstanding Achievement in Occupational Risk Improvement*



# SHORGUARD SG4 FLAT ROOF GUARDRAIL SYSTEM

Manufactured at our site in Aldridge, West Midlands, the SG4s unique patented lifting shoe allows freedom to work under the post without having to remove any part of the guardrail system, thereby maintaining safety at all times. This becomes even more beneficial in allowing future repairs and re-roofing if necessary without dismantling the guardrail.

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# SHORGUARD SG4 GUARDRAIL SYSTEM

## SAFE SYSTEMS OF WORK

All edge protection activities, in common with most other construction activities, should be undertaken in accordance with a safe system of work. A safe system of work is a formal procedure that results from a systematic examination of a task to identify all of the hazards and assess the consequent risks. It is a means of ensuring that wherever possible hazards are eliminated or otherwise minimised by the application of appropriate control measures.

It has been estimated that at least a quarter of all accidents at work involve failures in systems of work. Therefore it is essential that the entire process of edge protection erection and dismantling, including all peripheral activities such as storage and material handling, is covered by a comprehensive system of work.

### Use of Site Facilities / Main Client Duties

In order to safely install edge protection systems there are a number of areas that installers will benefit from the support and co-operation of the main contractor. It is in these areas that there is a need to clearly communicate the aspects of site activity that will aid the safe, speedy installation and removal of such systems.

Points for consideration are:

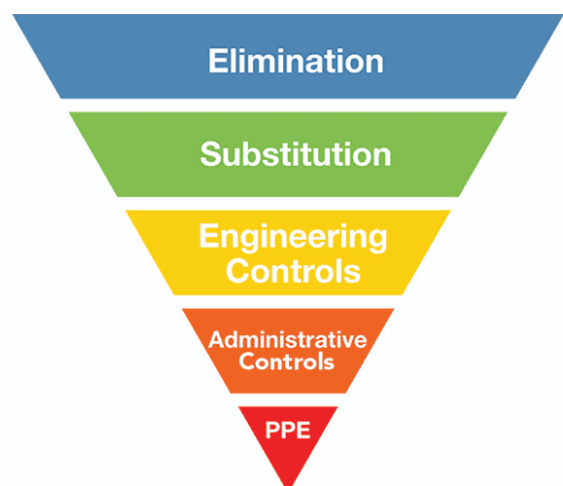
- Involvement with the design team to minimise the need for special components to overcome building obstructions. Facilitate pre-drilling of steelwork for ground based assembly
- Formation of well compacted surfaces and roadways
- Operators of MEWPs to be suitable trained and familiar with the equipment they are to be using
- Co-ordination of crane lifts
- Exclusion zones to be established during installation
- Weekly inspection regime
- No interference with installed components, except by suitably trained and nominated persons
- Access to building frame to facilitate dismantling, which may require scaffolding, mobile towers or MEWPs
- Storage during stage by stage dismantling to avoid loss of or damage to equipment

### Risk Assessments

In the development of safe systems of work, the decision process should be led by hazard identification and the assessment of associated risks which, if they cannot be eliminated, must then be effectively controlled.

Significant hazards relating to edge protection include:

- Falls from height
- Falling materials
- Manual handling
- Inadequate working space
- Inadequate access to height
- Lifting and lowering of loads
- Plant and machinery operator competence
- Structural integrity
- Ground conditions
- Access methods





# SHORGUARD SG4 GUARDRAIL SYSTEM

## GENERAL INFORMATION

- Always check general condition of the product prior to use
- The Shorguard system is NOT tested or intended to withstand impact by any vehicle, to support or provide control of the public or for the containment of bulk materials

### Always Plan Your Works

- Take note of location, and proximity to permanent and temporary hazard structures
- Take note of dimensions, layout and access areas
- Always identify both the fall hazard for the installer and the falling materials hazard for persons and property below
- These identified hazards should also be considered when dismantling the system



### Inspection

- All installed temporary systems should be checked at least once every 7 days by a competent person to ensure it's continued integrity and that there are no signs of potential failing
- Please ensure any defective product identified during inspection is replaced immediately
- We recommend that these checks are recorded in a site log



### Storage

- All components should be stored in a manner that limits any detrimental environmental effect due to weather or corrosive substances



### Traceability

- All Shorguard products are fully traceable with unique identification code

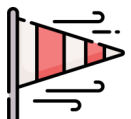


### ENVIRONMENTAL FACTORS

#### Wind

The normal wind velocity pressure within BS EN 13374 is 0.6N/m<sup>2</sup>, which covers most wind conditions in Europe. However, each application should be considered on its own merits and advice should be sought from the supplier on the appropriate factor to apply. Variations will include the physical location, the height of the structure and the duration that the edge protection will stay in place.

BS EN 13374 assumes a wind velocity based on 40m height and an exposure of 6 months, and represents a wind speed of approximately 32m/s.



#### Snow

The effects of snow on certain edge protection products should be considered as potentially adding both static and dynamic loadings. Where there is a build up of snow, the use of barriers or Class C netting may capture a large drift of snow if in an exposed location. The impact of high winds on such applications, particularly where it is an inclined application, may impose unexpected forces which should be identified as a potential design issue along with the wind.



In addition, there is a general warning about avoiding working on surfaces that may become icy, as there is risk of slips and falls, plus the more worrying effect of a sudden impact onto the protection in the event of a loss of footing.

*Products can be adversely impacted by significant wind speeds or more onerous conditions, and should this be the case then any necessary remedial actions must be taken, i.e. not leaving the toeboard in place overnight or when the site is inoperative.*

# SHORGUARD SG4 GUARDRAIL SYSTEM

The Shorguard SG4 System design reduces the need for external access scaffold during roof maintenance or refurbishment, thereby avoiding additional labour, materials and handling costs.

## KEY BENEFITS

- Only four basic components - Base Shoe, Post, Scaffold Tube and Fittings
- Suitable for permanent and/or temporary installations
- Patented lifting shoe to allow roof surfaces to be re-dressed without the need to dismantle the guardrail
- Angled configuration for aesthetically pleasing and stable application
- Accommodation of toe boards as and when required
- Designed to minimise trip hazards, so no need for counterweights or coverstrips
- Radius work is possible without bending the tube
- Fully galvanised
- Simple, safe, secure and maintenance free



The system can be designed to accommodate various roof fixtures such as air conditioning vents



Variations to roof levels and pitches can be accommodated



SG4 can be designed and configured to guard roof lights



Full edge protection maintained during refurbishment and repair work



The galvanised system is ideal for use in aggressive and marine environments



Sole access points can be formed within the system



# SHORGUARD SG4 GUARDRAIL SYSTEM

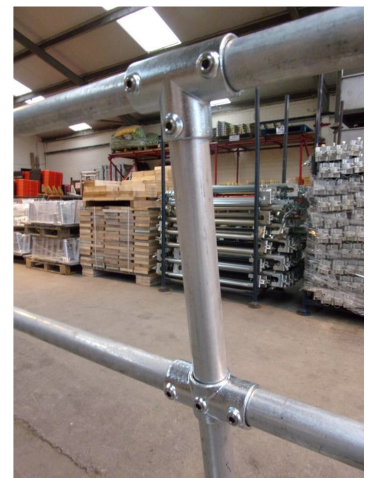
## POST TYPES

It is essential with any guardrail system to check the loading to the roof structure and membrane. Shorguard SG4 offers three types of post to guardrail connection, giving architects/specifiers a choice depending on aesthetic requirements.

### PIPE CLAMP CROSSOVER TYPE



### PIPE CLAMP IN-LINE TYPE



### HALF COUPLER TYPE - generally used for temporary installations



# SHORGUARD SG4 GUARDRAIL SYSTEM

## INSTALLATION GUIDANCE

The Shorguard system is typically used in flat roof applications, or where the inclination is no greater than 10 degrees, and there is reluctance to drill into the fabric of the roof. The system can also be used to protect voids, lift shafts and stairwells where it may be more difficult to support from elements of the building structure. Where roofing membranes are being laid, facilities may exist for adapting systems to achieve clear unobstructed areas.

### INSTALLATION GUIDANCE

When working at the edge, the operative must wear a suitable safety harness which has been inspected and in turn should be anchored to a suitable point in the structure in accordance with the safe use of the restraining system.

The amount of material required should be estimated and a plan produced for the position of the guardrail, together with any ballast positions and point loads on the roof should be considered before transporting the material onto it.

At least two people will be required to build the Shorguard system.

Once on the roof surface, the material should be laid out in approximately the right position, away from the edge. The components should be connected together and moved to the distance from the edge specified by the supplier - minimum of 500mm where no upstand is present. Once in place, the toeboards should be attached.



### DISMANTLING OF SYSTEM

#### Sequence of Work

- Ensure adequate knowledge of the system has been gained prior to any dismantling operations and implement controls appropriate with the Work At Height legislation
- Edge protection systems must not be removed prior to installation of permanent means of protection, and without the explicit permission of the main contractor
- Prior to any manual handling activity, consideration should be given to identifying each component weight
- Early consideration should be given to the possible restricted access for plant and machinery necessary for the dismantling operation
- Ground conditions should be made safe and suitable for any machinery to operate
- The dismantling procedures and sequence should be in line with the supplier's recommendations
- The intention should be stated e.g. the purpose will be to dismantle the temporary guardrail at the eaves position and guardrail at the gable position of the steel framed structure
- The grid line start point is to be determined on site prior to dismantling

#### Movement of Edge Protection Equipment

- When manually handling tubes, operatives are to be aware of other operatives working around the site and equally when manoeuvring MEWP's with tubes loaded they are also to be aware of any operatives that may move into the erection / dismantling area and will stop work immediately until the area is cleared
- Ensure edge protection components are neatly and safely stored in readiness for site removal

# SHORGUARD SG4 GUARDRAIL SYSTEM

## USER GUIDANCE NOTES

### PERMANENT AND TEMPORARY INSTALLATIONS

Shorguard guardrail systems are designed to provide a safe and secure edge protection and must be installed following the procedures and guidance stated. Trademagic Limited cannot be held responsible for any accidents arising as the result of incorrect installation.

These notes should be read in conjunction with the illustrations at the base of this page.

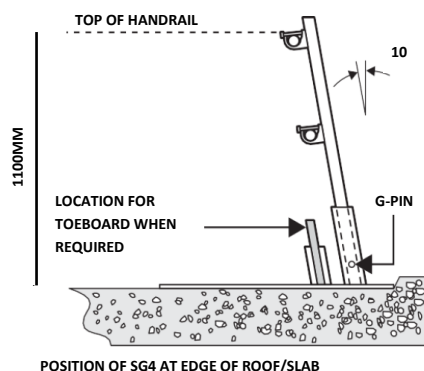
### ERECTING THE SG4 GUARDRAIL SYSTEM

1. Position the SG4 shoes at 2.00 metre centres with the captive (G) pin fully inserted into the post sleeve.
2. Insert the guardrail posts to sit on the pin.
3. Connect the guardrail tubes into the middle fitting on the posts; join the tubes with sleeves and secure returns with elbows; tighten and repeat locating the top rail.
4. Finally tighten the locking handle onto the guardrail post.
5. Position the interface pad under the base shoe and counter-weight as necessary.
6. Fit toe boards if required. Note these should only be used for temporary works.
7. By working in this manner the operatives can erect the system in sections back from the edge of the roof and then move it into position. This keeps the erectors always behind the guardrail or back safe from an exposed edge.
8. If the above is not possible then the erector must be harnessed to a secure structure or tested harness point.

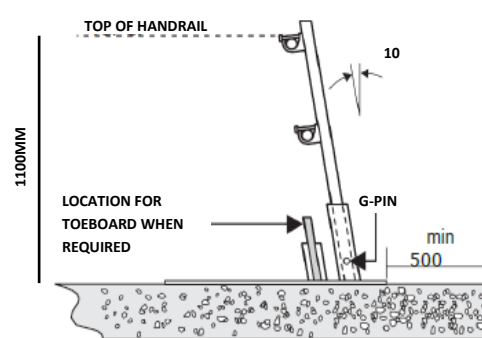
### FUNCTION OF THE LIFTING SHOE

1. When it is necessary to resurface roof areas or small repairs are required, it is essential to follow this procedure. Installers must repeat the procedure ONE shoe at a time over the required area.
2. Slacken the locking handle from the guardrail post.
3. Remove the captive (G) pin from the post sleeve.
4. Lift the shoe up the guardrail post and turn 90 degrees under the lower rail and lock.
5. Redressing can now be done without the need to remove any of the guardrail system and operatives always have 100% edge protection.
6. Once the area is complete, lower the shoe to the original position and replace the (G) pin into the post sleeve and tighten the locking handle.
7. These operations can then be repeated.

**Note: The (G) pin is the most important part of the system. This enables the shoe to lift and erectors must be fully conversant with these guide notes.**



POSITION OF SG4 AT EDGE OF ROOF/SLAB



POSITION OF SG4 WHERE NO UPSTAND IS PRESENT

**Notes: Where edge protection is required, never erect just a straight run leaving a free end. Always try and form a physical connection to a structure.**



# SHORGUARD SG4 GUARDRAIL SYSTEM

## USEFUL NOTES WHEN CALCULATING AND LAYING OUT

- SG4 units must be placed in such a way as to not exceed 2.00m centres.
- At all corners, SG4 units must be placed in such a way as to be within 1.00m of the corner.
- All SG4 shoes must be placed on a complete interface pad to suit the roof membrane ensuring (50mm larger all round) if there is a risk of the galvanised steel causing a reaction to the roof membrane.
- All SG4 structures - posts and horizontal rails - must be constructed of galvanised scaffold tube (48.3mm OD) due to the weight difference - aluminium tube is not to be used.
- Wherever practically possible, the guardrail should be fixed to brickwork or steelwork.
- On the end of an open straight run, either a stop end shoe is required, or a 2.00m return consisting of two SG4 units.
- All locking pins and captive pins must be in place and secured.
- Toe boards can be fitted using standard scaffold boards, but please take into consideration weather conditions when the site is inoperative, as these can be adversely impacted by significant wind speeds.
- All pipe clamps on a permanent structure must be fitted with sherardised grub screws, and all the grub screws must be on the underside of the fitting where possible.
- Where corners are involved, the bottom rail is always 100mm longer than the top rail due to the pitch of the post.
- Before working out the tube requirements, always take into account the system of access to the roof area for the equipment - crane or manhandling - as this will determine the lengths of tube to be supplied. A crane lift or a manual lift onto a low level roof would normally allow longer lengths and less fittings, whereas with a manual lift through a building, either via stairwells or lifts, the tube would need to be short enough to negotiate the route. In this instance using shorter lengths of tube would require more fittings to be used than the longer lengths would.
- Do not presume that the roof is flat, always check whether it is flat, apex or pitched with a maximum of 10 degrees incline.
- The guardrail must be erected strictly in line with the 'SG4 User Guidance Notes'.



*\*Varying examples of completed Shorguard SG4 Edge Protections*

# SHORGUARD SG4 GUARDRAIL SYSTEM

## TECHINCAL INFORMATION

### TESTING STANDARDS

Trademagic Ltd contracted Lucideon Limited to test their Shorguard Temporary Edge Protection Systems in accordance with the tests outlined for Class A as defined within BS EN 13374:2013 +A1:2018 Incorporating Corrigendum January 2019.

Class A is defined as a protection, which provides protection to flat surfaces and slopes generally up to 10° and resistance to static loads only, based on the requirements to:

- Support a person leaning on the edge protection or provide a handhold when walking besides it.
- Collectively stop a person who is walking or falling towards the protection.

Class A systems, for flat and sloping surfaces up to 10° must resist a horizontal force of 0.3kN anywhere on the top of the Guardrail arrangement, whilst maintaining elastic deflection within 55mm. They must also accept a vertical force of 1.25kN applied as an accidental loading. Type A systems may take their support from clamping, drilled anchors, counterweighted methods, or compression (friction) posts.

Edge protection systems have some basic requirements, which should be met prior to any structural testing: -

- Principal guardrail should be at least 1000 mm from the floor level at any point and shall be continuous with any horizontal gaps less than 120 mm.
- The upper edge of the toe board shall be at least 150 mm from the working surface.
- The toe board shall have a gap of less than 20 mm between the bottom of the toe board and the working surface.
- The inclination of the edge protection system shall not deviate from the vertical by more than 15° inwards or outwards.
- For Class A there should be no gap between guardrails or any part of the system allowing a 470 mm spherical object to pass through.



The Shorguard SG4 System has been tested against a wide variety of surfaces, including Concrete, PVC, and Roofing Felt.

Trademagic's Shorguard System is designed, manufactured and tested to the following BS EN Standards:

- Class A temporary edge protection systems in accordance with BS EN 13374:2013+A1:2018, incorporating corrigendum January 2019
- Wind loading calculations to BS EN 1991-1-7:2006+A1:2014
- Galvanised to EN ISO 1461
- Zinc Plated to BS EN 12329:2000

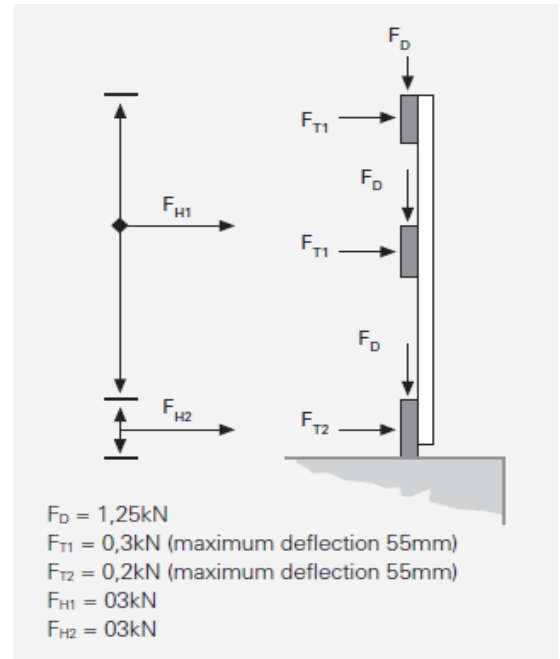
# SHORGUARD SG4 GUARDRAIL SYSTEM

## TECHINCAL INFORMATION

### LOADING REQUIREMENTS FOR CLASS A SYSTEMS FROM BS EN 13374:2013

#### Loads perpendicular, horizontal and vertical, to the system

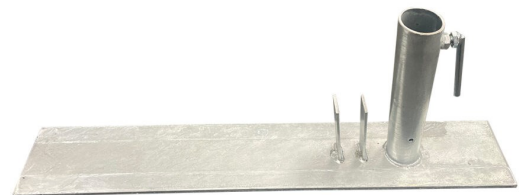
- FD Load FD shall act downwards within an angle of +/- 100 to the face of the edge protection system, anywhere along the top edge of the guardrails and toeboards
- FT1 Force applied to meet deflection requirement (applied to guardrails and posts perpendicular to the edge protection system in the outward direction and downwards parallel to the edge protection system)
- FT2 Force applied to meet deflection requirements (applied to toeboards)
- FH1 Ultimate Limit State point load force applied to meet strength requirements, and shall act perpendicular to the edge protection system in the outward direction
- FH2 Ultimate Limit State point load force applied to toeboard



### MATERIAL SPECIFICATIONS

#### Base Shoe

- 900 x 150 x 12mm plate in accordance with S275 grade
- 60.3 x 3mm tube at 320mm length (mitred at 10 degrees) in accordance with S235 grade
- 150 x 40 x 5mm flat plate in accordance with S275 grade
- 100 x 10mm handle bar in accordance with S275 grade
- Hex Nut and Bolt in accordance with 8.8 grade
- Galvanised to EN ISO 1461 with minimum thickness of 65-85 microns
- Overall Weight : 14.80kg



#### Half Coupler Post

- 48.3 x 3.2mm at 1060mm length in accordance with S235 grade
- Half Coupler fitting in accordance with EN74 standards
- Zinc Plated to BS EN 12329:2000 with minimum thickness of 5-8 microns
- Overall Weight : 4.80kg



*Life span of products ranges from 7-25 years dependent on the environmental conditions*





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