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BIBO®

FALL ARREST SYSTEMS FOR FLAT ROOFS
Working at height in complete safety



ZOONTJENS

on top of it

BIBO® Fall Arrest Systems

Assured methods for working safely at height

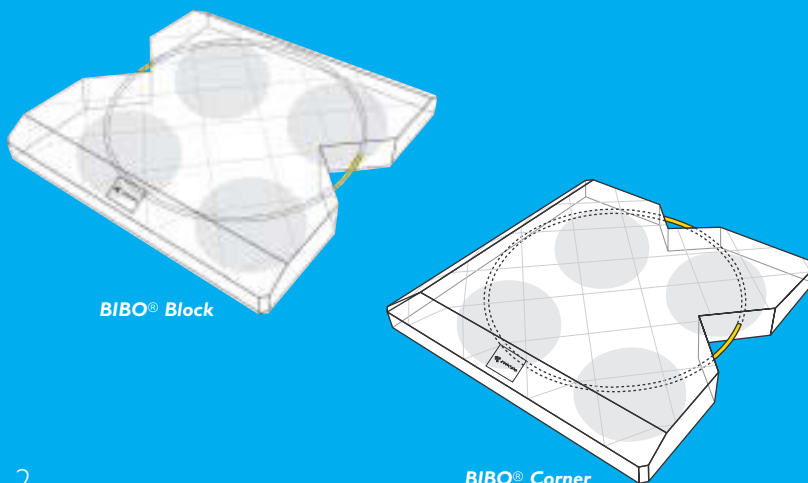
The Work at Height Regulations 2005 have been made for the purpose of eliminating or reducing the risk of falling when people work at height.

The Regulations require detailed risk assessments (undertaken in accordance with the Management of Health and Safety at Work Regulations) to determine the extent of safety measures that will prevent falls and personal injuries occurring where working at height cannot be avoided. Those held accountable for ensuring that these measures are provided include employers, the self-employed, and owners of buildings who commission works at height.

As a consequence, the Regulations make it easier for legal action to be taken against those disregarding the risks associated with working at height.

The increased frequency of maintenance and inspection work to roofs and to facilities such as chimneys, satellite dishes, solar collectors, mobile telephony masts and air conditioning systems has led to increased incidents of injury and death. This is reflected in a brief guide to The Work at Height Regulations published by the Health and Safety Executive that states “In 2003/04, falls from height accounted for 67 fatal accidents at work and nearly 4000 major injuries. They remain the single biggest cause of workplace deaths and one of the main causes of major injury.”

*The Zoontjens BIBO® Fall Arrest Systems comply with the specification for **personal protection measures** set out in the Work at Height Regulations.*



BIBO® Block

BIBO® Corner

FALL ARREST SYSTEMS

There are two fall arrest systems, BIBO® Lifeline and BIBO® Anchor. They enable full and safe access to flat roofs, suitable for any maintenance or inspection regime. In both systems, maintenance and inspection personnel wear safety harness belts fitted with lanyards with rope adjuster, or self-retracting line.

BIBO® Lifeline consists of a lifeline attached between two BIBO® Blocks/Corners. A lanyard is then attached to the lifeline.

BIBO® Anchor consists of the lanyard attached directly to a single BIBO® Block/Corner.

BIBO® Block, the main common component of the two fall arrest systems, is a concrete slab 900 x 900 x 105mm with an embedded 800mm diameter ring of 12mm diameter grade 316 stainless steel forming the anchor attachment points where they are exposed at the block edges.

The BIBO® Block and BIBO® Corner both weigh 192 kg that provides the essential dead weight anchorage for the **BIBO® Anchor** system. Four circular rubber support pads with a bituminous surface layer are provided on the underside of the BIBO® Block/Corner.

A backing film is removed from the base of each support pad to expose the bitumen surface layer. For Class A installations this layer is melted. For Class E installations, the layer is simply left as an adhesive fixing.

BIBO® Corner is similar to the BIBO® Block but designed specifically for use at the corners of buildings or walkway routes.

The BIBO® Block and BIBO® Corner are designed for use with bitumen, EPDM and ECB roofing systems.

There are also BIBO® Blocks/Corners for use on PVC roofing systems. These Blocks and Corners are similar to the standard BIBO® Blocks/Corners but without a bitumen surface layer. They are bonded to the PVC roof surface with 2K-PUR adhesive.

Special versions are also being developed by Zoontjens for other plastic roofing materials as well as for inverted asphalt roofs.



BIBO® Lifeline

BIBO® Anchor



A major advantage of the BIBO® Lifeline and BIBO® Anchor fall arrest systems is that the roof waterproofing membrane remains intact during installation, thereby avoiding the possibility of unnecessary leaks and additional maintenance. Less roof maintenance means less exposure to risk and therefore increased safety at work.

To ensure the conditions of the Work at Height Regulations for personal protection measures are met, BIBO® Block has been rigorously tested by SATRA Quality Assurance Ltd to safety standard BS EN 795: *Protection against falls from a height: Anchor devices*. When tested for use on a modified bitumen roof surface, it was found that:

- The BIBO® Block met the requirements for a Class A (structural anchors designed to be secured to horizontal surfaces).
- The BIBO® Block met the requirements for a Class E (deadweight anchors for use on horizontal surfaces).

Choosing either the BIBO® Lifeline system or BIBO® Anchor system will depend on the frequency, complexity and extent of access required.

The BIBO® Lifeline system, arranged in the most appropriate configuration, would be suitable where regular maintenance is to be carried out.

The BIBO® Anchor system, incorporating the single BIBO® Block located at strategic points, will make an excellent basic safety provision where infrequent or limited maintenance is to be carried out on a simple roof without obstacles impeding access.

The BIBO® Blocks/Corners will last for at least the lifetime of the building on which they are used. Following renovation or maintenance work, they can be re-used.

BIBO® Fall Arrest Systems

System benefits, components and technical data

SYSTEM BENEFITS

- BIBO® Block (the main common component of the BIBO® Lifeline and BIBO® Anchor fall arrest systems) meets the requirements of safety standard BS EN 795: *Protection against falls from a height: Anchor devices.*
- Both system designs incorporate large operational factors of safety.
- The systems are supplied with all necessary complementary, personal safety equipment, offering full safety performance.
- The BIBO® system components can be configured to meet most fall arrest safety requirements on either new or existing roofs.
- **Subject to suitability of roof substructure, the BIBO® Block and BIBO® Corner components do not require intensive labour to fix and can be installed rapidly and easily on virtually all flat roof cover systems, without the need for fixings that penetrate the roof covering.**
- As there is no need for penetrative mechanical fixings, the systems can be installed quietly without disturbing the occupants of the building.
- BIBO® Lifeline and BIBO® Anchor systems will last for at least the lifetime of the building. Following renovation, the BIBO® Blocks and BIBO® Corners can be re-used.
- The BIBO® Blocks and BIBO® Corners are resistant to vandalism due to dead weight and fixing method.
- The BIBO® Blocks and BIBO® Corners can also serve as anchors for roof-mounted structures such as aerials, air conditioners, solar panels and solar collectors.

SYSTEM COMPONENTS

Safety and convenience are notable features incorporated into each of the components listed below that make up the systems.

BIBO® Blocks and BIBO® Corners

These provide the anchorage for both systems. They are also coloured bright yellow to serve as conspicuous safety reference points.

Safety Lanyard

This secures the user to either a single BIBO® Block/Corner or to the lifeline.

Lifeline

This is attached between two BIBO® Blocks/Corners and allows more unrestricted movement, but in complete safety.

Safety Harness

This spreads the load applied to the user's body when working at the perimeter of the 'safe zone'.

Self-retracting Line

This self-retracting device secures the user to an anchor point while restricting the length of the line.

BIBO® Dreen® Slabs/BIBO® Concrete Slabs

These are located between BIBO® Blocks/Corners, and serve as walkways and safe zone perimeter indicators.

BIBO® Fence

The BIBO® Fence, fitted to BIBO® Blocks, is a safety railing that marks the 'safe access zone' on a roof, and is considered as a **collective** protection measure as defined in the Work at Height Regulations 2005.

BIBO® Ladder Support Base

This is a modified BIBO® Block incorporating a channel in which the foot of a ladder is located to prevent slipping.

BIBO® Signage

This is a yellow reflecting aluminium sign, 310 x 180 x 1mm, fixed on the façade of a building to indicate the location of a BIBO® fall arrest system.

BIBO® Cabinet

This is a slim-line, 1000 x 600 x 200mm, wall-mounted locker for storing harnesses, lanyards, lifelines and helmets.



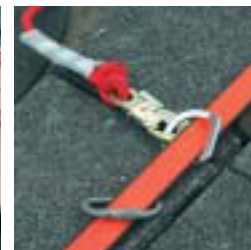
BIBO® Block



Lanyard with self-retracting line



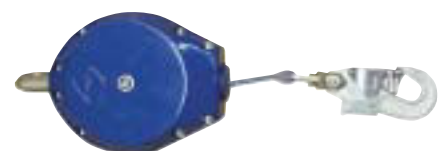
Lifeline



Lifeline with lanyard



Safety harness



Self-retracting line



BIBO® Dreen® Slabs



BIBO® Ladder Support Base

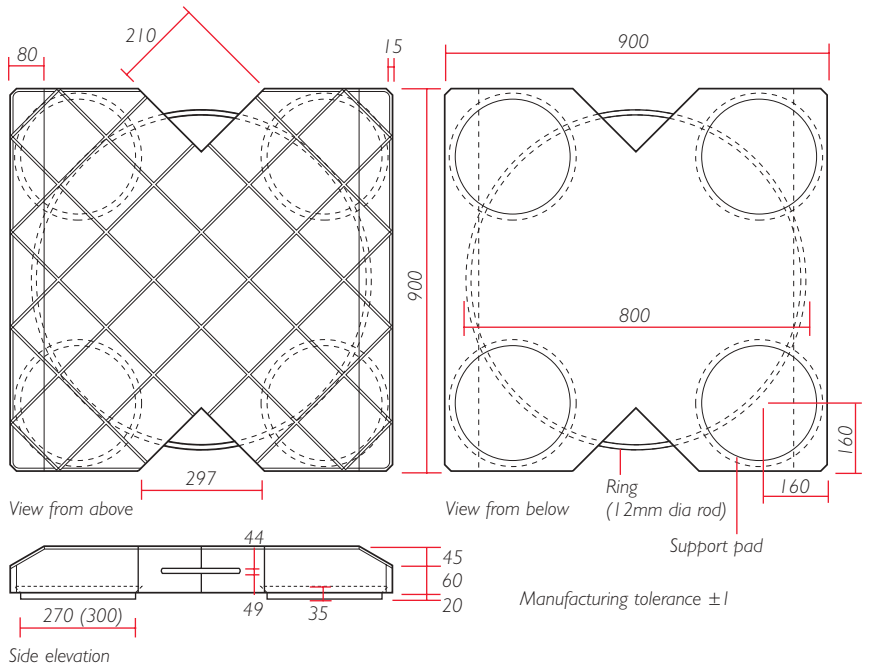


BIBO® Signage



BIBO® Cabinet

TECHNICAL DATA



BIBO® BLOCK DETAILED DIMENSIONS (mm)

SPECIFICATION DATA FOR CONCRETE COMPONENTS

BIBO® Block/BIBO® Corner		
Slab		
Dimensions (mm)	900 x 900 x 105	
Material	Traditional concrete B-45	
Colour	Yellow	
Surface treatment	Incised diamond pattern	
Weight (kg)	Approx. 192	
Ring		
Dimensions (mm)	800 dia x 12 dia	
Materials	Stainless steel 316	
Slab support pads		
Dimensions (mm)	270 dia x 35 (20 effective)	
Materials	Vulcanised rubber granulate with modified bitumen substrate	
Drainage clearance		
(mm)	Minimum 20 below slab	
BIBO® Dreen® Slab		BIBO® Concrete Slab
Slab		
Dimensions (mm)	500 x 500 x 60	500 x 500 x 60
Colour	Various colours and textures	Grey standard
Weight (kg)	Approx. 27.5	Approx. 34

BIBO® Fall Arrest Systems

Safe practice, installation, using the systems

SAFE PRACTICE

The Work at Height Regulations require that a risk evaluation is undertaken to determine the extent of safety measures that will prevent falls and personal injuries occurring where working at height cannot be avoided.

The roof on which the BIBO® Blocks/Corners are to be installed must also be strong enough to support the extra weight of the Blocks. If there is any doubt, a structural engineer should determine the strength of the roof. As a rule, roofs with ballast layers satisfy this requirement.

Other roofing requirements include:

- The roofing has to contain polyester or polyester/glass composite reinforcement.
- The roofing must cover a surface of at least 15m² to offer sufficient resistance to anticipated applied forces.
- The roofing must be anchored either by ballast, mechanical fixings or bonding.
- For mechanically fixed systems, the minimum number of fixings is 4 per m².
- For ballasted systems, the minimum ballast is 65 kg/m².

The configuration of the BIBO® fall arrest system depends on the roof on which it is installed.

For Class E installations, the BIBO® Blocks/Corners must not be used as a fall arrest system at temperatures below 0°C, and the minimum distance to the roof edge must be 2.5m.

For Class A installations, these restrictions are not applicable.

INSTALLATION

When installing a BIBO® Block/Corner, the backing film covering each bituminous adhesive support pad on the underside of a BIBO® Block **must** be removed.

To ensure good bonding of the BIBO® Blocks, it is important that the roof surface is dry and free from dust and dirt.

There are two methods for lifting the BIBO® Blocks/Corners into position – by crane or manual trolley device.

BIBO® Block installation procedures for various roof membranes are set out below.

Guidance is also given for installing the BIBO® Fence.

CLASS A INSTALLATIONS

For Bitumen roofs with plain finish (below)

- Brush roof surface with a steel wire brush and water.
 - Dry the surface.
- 1 Remove backing film from the BIBO® Block bituminous adhesive pads.
 - 2 Heat the roof surface with a small blow torch until the bitumen starts to glisten.
 - 3 Heat the adhesive pads with a small blow torch until the bitumen starts to glisten.
- Place the BIBO® Block in the hot bitumen.



Preparation of a BIBO® Block and a plain bitumen roof surface.



Lifting BIBO® Blocks/Corners into position by crane.



Preparation of a BIBO® Block and a PVC roof surface.

For Bitumen roofs with mineralised finish

- Brush roof surface with a steel wire brush and water until most of the mineral chippings have been removed.
- Dry the surface.
- Prepare and place the BIBO® Block as for bitumen roofs with plain finish.

For Bitumen roofs with gravel finish

- Remove **all** gravel with a steel wire brush and water.
- Dry the surface.
- Prepare roof surface and prepare and place the BIBO® Block as for bitumen roofs with plain finish.

For EPDM roofs

- Clean and dry roof surface.
- Knead the 2K-PUR adhesive.
- Apply 2K-PUR adhesive with a brush onto the rubber supports of the blocks.
- Place the BIBO® Block/Corner on the roof surface.

For PVC roofs (below)

- 1 Clean and dry roof surface with a PVC cleaner.
 - 2 Knead the 2K-PUR adhesive.
 - 3 Apply 2K-PUR adhesive with a brush onto the rubber supports of the blocks.
- Place the BIBO® Block/Corner on the roof surface.

INSTALLATION (CONT)

CLASS E INSTALLATIONS

The procedures are as for Class A installations except that once the backing film is removed from the BIBO® Block/Corner bituminous adhesive pads, the Blocks are placed directly on the roof surface without torching.

In addition:

- The BIBO® Blocks/Corners must never be installed at temperatures below 5°C.
- The roof surface should be dry before installing the BIBO® Blocks/Corners.

It is also important to note:

- Although the bituminous layer is not bonded by means of heat applied with a blow torch, the BIBO® Block/Corner will eventually bond to the roof surface because of UV-radiation and the subsequent generation of heat.
- For PVC roofs, only Class A installations must be used.

BIBO® FENCE INSTALLATION

BIBO® Fence is fitted onto BIBO® Blocks/Corners and can be located away from or close to the roof edge. For Class E installations, the backing film is left on the bituminous adhesive support pads below the BIBO® Blocks.

However it is important to note that if the backing film is not removed from the bituminous adhesive support pads, the Blocks **cannot** be used as anchor points. A clear sign must therefore be fitted to the BIBO® Fence to indicate this condition.



BIBO® Fence installation showing methods of handrail and ladder supports at roof edge.

USING THE SYSTEMS

A harness with a rope adjuster and lanyard must be used with the BIBO® Lifeline and BIBO® Anchor systems.

However, a fall arrester can only be used if the distance to the roof edge plus height of the building is more than 6 metres, due to the expansion of the fall arrester when subjected to a load.

When carrying out work on a roof, the length of the lanyard must be adjusted so that it will prevent the user from crossing over the roof edge.

BIBO® LIFELINE SYSTEM

This system employs a mobile lifeline attached to two BIBO® Blocks/Corners. The lanyard is in turn attached to the lifeline enabling the user to move smoothly between the two BIBO® Blocks/Corners.

The maximum distance between two Blocks using a lifeline is 20 metres, depending on building height and distance of a Block from roof edge.

One or two users may be attached to the lifeline at any one time.



A typical, completed BIBO® Lifeline installation. Once the work is finished, the lifeline is detached from the BIBO® Blocks/Corners and stored away with safety harnesses, lanyards, etc.

BIBO® ANCHOR SYSTEM

Only one person is secured to a single BIBO® Block/Corner by means of the lanyard when working in an 'unsafe zone', ie, the space between the Block and the roof edge.

After carrying out the work, the person returns to the 'safe zone', removes the lanyard from the Block and goes to the next Block to which the lanyard is secured, and so on along the roof surface.

To avoid generating an unacceptably large pendulum movement when the system is in use, the recommended maximum adjustment in the working length of the lanyard should be limited to 1.00 metre. There is a clear relationship between the spacing of the BIBO® Blocks/Corners and their distance from the roof edge, and is shown in the table below.

Distance to roof edge (m)	BIBO® Blocks Max c/c distance (m)
2.0*	4.5
2.5	4.9
3.0	5.3
3.5	5.7
4.0	6.0
4.5	6.3
5.0	6.6
5.5	6.9
6.0	7.2
6.5	7.5

Note:

*Applies only to BIBO® Block Class A installations. For Class E installations, the distance to the roof edge must be at least 2.5m.



OTHER PRODUCTS

PARDAK® SYSTEMS

Paving systems for flat roofs and decks subject to vehicular traffic. Pardak® 60 is designed for smaller roofs with limited traffic, while Pardak® 90 is ideal for larger scale applications with high traffic use such as shopping centres supermarkets, public buildings, etc.



DREEN® SLAB SYSTEM

An easy-to-install, visually sophisticated and attractive paving system that can transform flat roofs from wasted space into useful pedestrian areas. Dreen® Slab also combines trouble-free rainwater disposal with great strength and structural stability.



ZOONTJENS

on top of it

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