

N25 Permanent access and safety equipment

210 GUIDED TYPE FALL ARREST SYSTEM

July 2019

Roof Angel Horizontal Lifeline Specifications

The following information is designed to be used in the specification of the Roof Angel Horizontal Lifeline System within an architectural design.

Full technical and installation details are available at www.bettersafeinternational.com.

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General description

Product: Roof Angel Horizontal Lifeline System for use

Manufacturer: Bettersafe International BV

Netherlands: Azewijnseweg 12 SF: 4214 KC Vuren

UK: Riverside, Mountbatten Way, Congleton, CW12 1DY

Roof Angel is a Guided type fall arrest system using a cable attached to absorbing anchor posts. Provides individual protection, requiring direct action by each user to ensure they are protected. Roof Angel is tested to EN795:2012, BS 8610 and CEN TS 16415:2013.

Must be used with personal protective equipment (PPE), e.g. full body harness to EN 361, energy absorber to EN 355, and lanyard (of correct length) to EN 354. PPE procurement is normally the responsibility of the building owner/ user.

The level of user competency required to safely use different categories of system varies:

- Perimeter system:
 - Fall restraint; no PPE adjustment necessary;
 - Basic user training required.

- Perimeter system with fall hazards in addition to roof edge (weak rooflights, vents, etc):
 - Fall arrest; no PPE adjustment necessary;
 - Basic user training required.

- Ridge system:
 - Fall arrest; PPE adjustment necessary;
 - Advanced user training required.
 - Not advised for roof pitch greater than 25°.

Note that perimeter systems generally do not give blanket coverage of a roof. If this is required, and a ridge system is deemed impractical/unsuitable, then a series of interconnected systems must be installed, covering the full width of the roof.

Components are designed for compatibility with most roofing systems;

- Standing Seam Roofing Systems
- Composite Roofing Systems
- Composite Panels
- Built Up Roofing Systems
- Secret Fix Roofing Systems
- Polymeric Single Ply Membrane Roofing Systems
- Bituminous Membrane Roofing Systems
- Concrete and Masonry Roofing Systems
- Wall Mounted to Steel Structure
- Wall Mounted to Concrete and Masonry

System Overview

Anchorage device:

- Roof Angel is designed for mechanical attachment to
 - the top skin of the profile using
 - 12 qty 8mm Rivets per post,
 - 4 qty toggle bolts per post,
 - 4 qty Standing Seam Clamps per post,
 - directly to the concrete decking using
 - chemical anchors
 - mechanical anchors.

Overall system length:

- To comprise the roof perimeter and single runs to allow access to gutters, roof light cleaning and roof inspection.
- Maximum System Length 200m

Intermediate support spacing:

- As designed by the Bettersafe International approved installer to meet the requirements of the Roof Angel design software.
- Maximum 15m
- Minimum 2m

Accessories/ Other requirements:

- As required to complete installation.

Installation:

- To BS 7883 by the system manufacturer or a contractor approved by the system manufacturer.

Structural anchors:

- Type recommended by the system manufacturer to suit the structure/ fabric into which they will be fixed.

Detailed Product guidance

Roof Angel is a system manufactured from a range of components. The selection of components is determined by reviewing the layout and installation requirements dictated by the building design and roofing type.

- RA-1001-EC to RA-1003A-EC Roof Angel Absorbing End and Corner Post
 - Polyurethane and Stainless-Steel Absorption Module
 - Aluminium Dome & base plates, either plain or coated for roof adhesion (PVC / TPO)
 - RA-1001-EC PVC Coated Base Toggle Fix
 - RA-1002-EC TPO Coated Base Toggle Fix
 - RA-1003-EC Plain Base Rivet or Clamp Fix
 - RA-1003A-EC Plain Base Toggle Fix
 - Each post carries a unique serial number to ensure traceability.

- RA-1001-IN to RA-1003A-IN Roof Angel Absorbing Intermediate Post
 - Low Mass Polyurethane and Stainless-Steel Absorption Module
 - RA-1001-IN PVC Coated Base Toggle Fix
 - RA-1002-IN TPO Coated Base Toggle Fix
 - RA-1003-IN Plain Base Rivet or Clamp Fix
 - RA-1003A-IN Plain Base Toggle Fix
 - Aluminium Dome & base plates, either plain or coated for roof adhesion (PVC / TPO)
 - Each post carries a unique serial number to ensure traceability.

- RA-1005 to RA-1006 Roof Angel Rigid Post
 - Stainless-Steel 304 Rigid Post
 - RA-1005 450mm Rigid Post Mechanical or Chemical Fix
 - RA-1006 500mm Rigid Post Mechanical or Chemical Fix

- RA-1027 to RA-1043 Roof Angel Green Roof Rigid Post
 - Stainless-Steel 304 Rigid Post
 - To be used with the RA-1016 End/Corner Module or RA-1017 Intermediate Roof Angel Module and RA-2017 Weather Cap.
 - RA-1027 100mm Rigid Post Mechanical or Chemical Fix
 - RA-1028 125mm Rigid Post Mechanical or Chemical Fix
 - RA-1029 150mm Rigid Post Mechanical or Chemical Fix
 - RA-1030 175mm Rigid Post Mechanical or Chemical Fix
 - RA-1031 200mm Rigid Post Mechanical or Chemical Fix
 - RA-1032 225mm Rigid Post Mechanical or Chemical Fix
 - RA-1033 250mm Rigid Post Mechanical or Chemical Fix

Detailed Product guidance (cont...)

- RA-1034 275mm Rigid Post Mechanical or Chemical Fix
 - RA-1035 300mm Rigid Post Mechanical or Chemical Fix
 - RA-1036 325mm Rigid Post Mechanical or Chemical Fix
 - RA-1037 350mm Rigid Post Mechanical or Chemical Fix
 - RA-1038 375mm Rigid Post Mechanical or Chemical Fix
 - RA-1039 400mm Rigid Post Mechanical or Chemical Fix
 - RA-1040 425mm Rigid Post Mechanical or Chemical Fix
 - RA-1041 450mm Rigid Post Mechanical or Chemical Fix
 - RA-1042 475mm Rigid Post Mechanical or Chemical Fix
 - RA-1043 500mm Rigid Post Mechanical or Chemical Fix
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- RA-2007 Anchorage Cable
 - 7 x 7 Stainless-Steel cable

 - RA-2001 & RA-2002: Turnbuckle and clevis assemblies:
 - Provide methods of terminating cable at ends of system.
 - Turnbuckle incorporates a tension indicator, which spins freely when the system is correctly tensioned.
 - Manufactured from Stainless-Steel

 - RA-3001 Shuttle
 - Connects system user to anchorage cable.
 - Passes over intermediate cable supports without need to detach and re-attach, allowing smooth, hands-free operation.
 - Manufactured from Stainless-Steel

 - RA-2003 Intermediate Support Bracket
 - Attaches to Roof Angel Absorbing Intermediate Post to form intermediate cable support.
 - Manufactured from Stainless-Steel

 - RA-2008 90° Corner bracket
 - One-piece bracket; attaches to Roof Angel Absorbing End and Corner post to provide change of direction.
 - Complete with offset to align posts correctly on all installations.
 - Manufactured from Stainless-Steel

 - RA-2004 Variable bracket:
 - Attaches to Roof Angel Absorbing Intermediate Post to provide angle change in horizontal or vertical plane.
 - Manufactured from Stainless-Steel

Design/ Performance Requirements

420 Wind Loading

- General:
 - Design the access/ safety system to withstand specified wind loads with equipment in position of maximum exposure and in parked position.
- Wind loads:
 - As advised by Structural Engineer.

430 Safety

- General:
 - The equipment as installed must have no irregularities/ projections capable of inflicting personal injury.
- Finished surfaces and edges of all accessible parts:
 - Regular and smooth.

440 Design Life/ Maintenance Programme

- Design life of access/ safety system:
 - Details available on request
 - Warranty from 15 to 25 years
 - Design life 25 years
- Schedule for maintenance and for replacement of components: Submit.

460 Assessment/ Testing of Fixing Points for Anchor Devices

- Design and installation of fixings in steelwork or timber:
 - Verified by calculation to be capable of sustaining the relevant static and dynamic test forces recorded from BS EN 795:2012 and CEN TS 16415:2013.
- Fixings in other materials:
 - Verify suitability by carrying out a test in a sample of the material.
 - Testing has been completed on the majority of roofing types – details available from Bettersafe International Technical Department.
 - The sample must be capable of sustaining the relevant static and dynamic test forces specified in BS EN 795,
 - Thereafter, each structural anchor installed in that material must be subjected to an axial pull out force of 6kN to confirm the soundness of the fixing in accordance with BS 7883.
 - The structural anchor must sustain the force for a minimum of 15 seconds.

Fabrication, Assembly and Installation

510 Fabrication and Assembly Generally

- Machine cutting, drilling and assembly:
 - Carry out as much as possible in the workshop. Obtain approval for any reassembly on site.

520 Protection

- General:
 - Do not deliver to site any components or assemblies that cannot be installed immediately or unloaded into a suitable well protected storage area.

530 Suitability of Structure / Fabric

- Visual and geometric survey of supporting structure and fabric:
 - Carry out before commencing installation of access/ safety system. Report immediately if structure/ fabric will not allow required accuracy/ security of erection/ fixing.

540 Mechanical Fixings

- Materials:
 - Unless otherwise recommended by equipment manufacturer:
- Connecting bolts and other fixings fully accessible for inspection:
 - A4 Stainless Steel unless otherwise specified or supplied by the manufacturer
- Cast-in anchors and other fixings not accessible for routine inspection:
 - Austenitic stainless steel, grade 1.4401 (316) to BS EN 10088-1.

550 Fasteners, Inserts and Bolts for Building In

- Supplier:
 - Equipment manufacturer/ supplier.

820 Operating Instructions

- Equipment and accessories:
 - Where appropriate, mark in such a way that it is possible to identify the correct mode of operation for their safe use.

830 Operating and Maintenance Manual

- General:
 - Provide, for inclusion in the Building Manual, printed instructions and recommended procedures to be established by the Employer for operating and routinely maintaining the equipment.
 - Provide diagrams where appropriate.

Fabrication, Assembly and Installation (cont...)

830 Operating and Maintenance Manual (cont...)

- Content:
 - Instructions for assembling/ erecting equipment for use.
 - Comprehensive operating instructions, including safety and emergency procedures, for all motions including upward, downward and lateral travel, and slew.
 - Servicing and planned maintenance procedures, including assembly instructions where maintenance necessitates dismantling of machinery parts.
 - List of replacement parts, with references.
 - Recommended procedures for testing equipment.