	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/001 Revision 00
Pages: 1 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Connectors Description: Metallic connectors used to connect PPE to anchor points and harness attachment points		

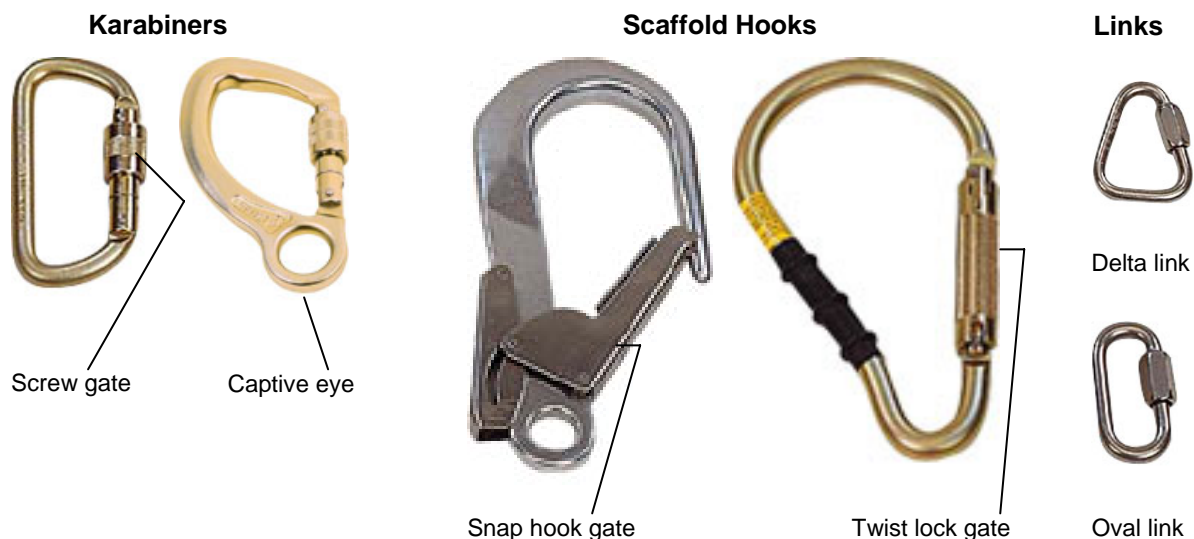
Types of Devices:

The main types of devices on the market are standard karabiners; large scaffold hooks (generally used for attaching around scaffold type poles) and small links (normally used for connecting PPE component parts together, for example an energy absorber element to a lanyard). Connectors are generally plated steel, stainless steel or aluminium.

Connectors come in all shapes and sizes with many additional features. All connectors used for PPE have self-closing gates. There are 3 main types of gate; 'screw gate', where the barrel is manually screwed to lock and unlock the gate, 'twist-lock', where the barrel is manually twisted to unlock, but locks automatically when released and 'snap hook' where the gate is manually unlocked, but locks automatically when released. Twist lock connectors and snap hook connectors are normally equipped with a double acting feature where two deliberate actions are necessary to unlock and open the hook. The type of gate/lock is often the deciding factor when selecting a gate. For instance, if frequent connecting and disconnecting is involved then twist lock or snap hooks may be more appropriate and convenient, where they can be locked and unlocked more quickly than the screw gate type.

Some connectors also feature a captive eye which houses the lanyard termination. This allows the lanyard to be retained in the correct position during use and during a fall and ensures the direction of loading is always through the connector's primary longitudinal axis. It also prevents the lanyard escaping from the connector.

Examples of models and features:



Mandatory Conformity Requirements:
 Tested and CE approved to BSEN362:2004

Additional Requirements:
 May be necessary to consult manufacturer on compatibility between PPE items and anchor points



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/001
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Connectors

Description:

Metallic connectors used to connect PPE to anchor points and harness attachment points

Common Issues:

- Compatibility with other PPE – often sold separately to PPE therefore it is essential that the connector is compatible with the PPE and or anchor point. In particular is the correct fit and shape. If attached to an anchor point the connector should hang freely to ensure loading is applied through the primary longitudinal axis. The connector should not be subjected to sideward loading or bending or configured in any manner that may open the gate during normal use or in the event of a fall.
- Can be confused with sports PPE connectors, which are EC type tested and CE marked to a different EN standard with less rating



PPE PROCUREMENT GUIDANCE SHEETS

(Work at Height)

INDEX SHEET


Introduction

These guidance sheets have been prepared to assist BWEA members in the procurement of PPE used to provide fall protection during work at height. EN standards and CE marks provide only a basic level of safety and often additional testing and provisions are necessary to ensure that the PPE is fit for the intended purpose and satisfies the essential health & safety requirements of the PPE Directive 89/686/EC. Test standards are frequently inadequate as a standalone measure to comprehensively assess the safety of PPE. This is due to a number of reasons, including product innovation, manufacturer claims above and beyond EC type testing (e.g. heavier user weights, additional users) and learning gained from research, accidents and fatalities (e.g. shortfall in EN353-1 test standard to address fall postures). Although EN test standards are in time updated to reflect current knowledge and experiences, this can be an extremely lengthy process. In addition, once EN standards have been revised, there is no mechanism to enforce current products on the market to be upgraded to the latest state-of-the-art EN standard requirements.

The following sheets incorporate the latest EN test standards and other additional requirements. This includes VG11 sheets (supplementary test sheets introduced by VG11, the European technical group of notified bodies responsible for EC type testing and CE approval of fall protection PPE), UK policy (HSE, British standards groups) and industry practice.

Sheet Number	Title
• BWEA/PPE 000	General Procurement and Selection
• BWEA/PPE 001	Connectors
• BWEA/PPE 002	Fall Arrest (FA) Lanyards (single and twin leg)
• BWEA/PPE 003	Work Positioning (WP) Lanyards
• BWEA/PPE 004	Fall Arrest Harnesses
• BWEA/PPE 005	Work Positioning Belts/Harnesses
• BWEA/PPE 006	Sit Harnesses
• BWEA/PPE 007	Retractable Fall Arrest lanyards
• BWEA/PPE 008	Vertical Fall Arrest System (Guided Type Fall Arresters on rigid anchorage lines)

- BWEA/PPE 009 Vertical Fall Arrest System (Guided Type Fall Arresters on **flexible** anchorage lines)
- BWEA/PPE 010 Descender Devices for Rescue
- BWEA/PPE 011 Structural anchors designed to be secured to vertical, horizontal and inclined surfaces (e.g. eyebolts, D-rings, brackets)
- BWEA/PPE 012 Transportable Temporary Anchors (beam clamps, slings, tripods, vacuum anchors)
- BWEA/PPE 013 Vacuum Anchors
- BWEA/PPE 014 Anchor devices employing horizontal flexible lines (permanent and temporary models)
- BWEA/PPE 015 Anchor devices employing horizontal rigid rails
- BWEA/PPE 016 Deadweight anchors for use on horizontal surfaces
- BWEA/PPE 017 Rescue (lifting devices, rescue harnesses and rescue loops)

	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/001 Revision 00
Pages: 1 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Connectors Description: Metallic connectors used to connect PPE to anchor points and harness attachment points		

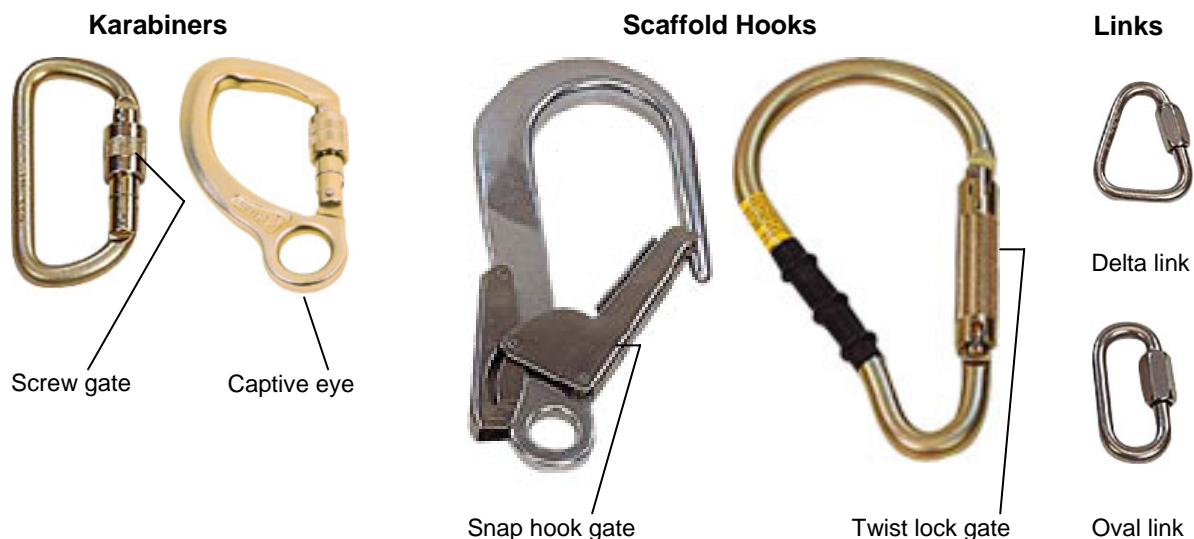
Types of Devices:

The main types of devices on the market are standard karabiners; large scaffold hooks (generally used for attaching around scaffold type poles) and small links (normally used for connecting PPE component parts together, for example an energy absorber element to a lanyard). Connectors are generally plated steel, stainless steel or aluminium.

Connectors come in all shapes and sizes with many additional features. All connectors used for PPE have self-closing gates. There are 3 main types of gate; 'screw gate', where the barrel is manually screwed to lock and unlock the gate, 'twist-lock', where the barrel is manually twisted to unlock, but locks automatically when released and 'snap hook' where the gate is manually unlocked, but locks automatically when released. Twist lock connectors and snap hook connectors are normally equipped with a double acting feature where two deliberate actions are necessary to unlock and open the hook. The type of gate/lock is often the deciding factor when selecting a gate. For instance, if frequent connecting and disconnecting is involved then twist lock or snap hooks may be more appropriate and convenient, where they can be locked and unlocked more quickly than the screw gate type.

Some connectors also feature a captive eye which houses the lanyard termination. This allows the lanyard to be retained in the correct position during use and during a fall and ensures the direction of loading is always through the connector's primary longitudinal axis. It also prevents the lanyard escaping from the connector.

Examples of models and features:



Mandatory Conformity Requirements:
 Tested and CE approved to BSEN362:2004

Additional Requirements:
 May be necessary to consult manufacturer on compatibility between PPE items and anchor points



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/001
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Connectors

Description:

Metallic connectors used to connect PPE to anchor points and harness attachment points

Common Issues:

- Compatibility with other PPE – often sold separately to PPE therefore it is essential that the connector is compatible with the PPE and or anchor point. In particular is the correct fit and shape. If attached to an anchor point the connector should hang freely to ensure loading is applied through the primary longitudinal axis. The connector should not be subjected to sideward loading or bending or configured in any manner that may open the gate during normal use or in the event of a fall.
- Can be confused with sports PPE connectors, which are EC type tested and CE marked to a different EN standard with less rating

Pages 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Fall Arrest (FA) Lanyards

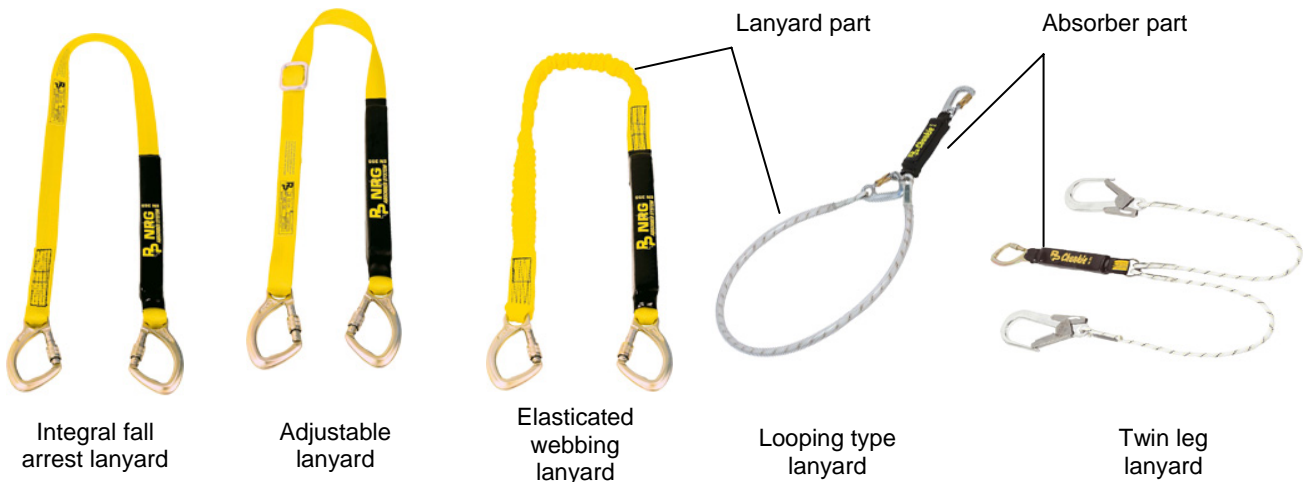
Description:

Lanyards (up to maximum length of 2 metres) which incorporate an energy absorber to limit fall forces to within 6 kN

Types of Devices:

A fall arrest lanyard comprises a lanyard part and an energy absorber part. Although these are generally integral, non-detachable and sold as one complete product, on some models the energy absorber and lanyard are separable and can be sold as two different products to allow replacement of individual component parts. A complete fall arrest lanyard (energy absorber and lanyard) should be no more than 2 metres long (end-to-end). The lanyard part can be constructed from webbing, rope, wire or chain. The energy absorber element usually comprises a length of textile, which is folded several times and stitched together in a small pack. In the event of a fall, the stitching will intentionally part and dissipate the energy as the absorber pack unfolds. The energy absorber pack is normally protected in a plastic cover or heat shrink to prevent damage during normal use. The free end of the energy absorber pack is attached to the harness D-ring and the free end of the lanyard is attached to the structural anchor point. Normally this is a direct line attachment via a suitable connector. However, some types of fall arrest lanyard have been EC type tested and approved to allow looping or choking around specific structures, such as steel beams and poles.


Fall arrest lanyards are available as a single leg lanyard or twin leg lanyard, where the double leg provides a permanent form of attachment when alternating between positions.



Mandatory Conformity Requirements:

Where supplied as an integral product (lanyard & energy absorber) - BSEN355:2002

Where supplied separately: Lanyard part - BSEN354:2002 and Energy absorber part – BSEN355:2002

	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/002 Revision 00
Pages 2 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Fall Arrest (FA) Lanyards Description: Lanyards (up to maximum length of 2 metres) which incorporate an energy absorber to limit fall forces to within 6 kN		

<p>Additional Requirements:</p> <ul style="list-style-type: none"> • For user weights greater than 100 kg (including tools) – request additional notified body dynamic test to cover maximum weight range (PPE should still satisfy the following criteria: peak arrest force less than or equal to 6 kN; arrest distance less than or equal to (2 x product length + 1.75 metres) • For user weights below 80 kg check suitability of PPE with manufacturer • Where manufacturer claims PPE is suitable for looping around or chocking around structures ensure the PPE has been tested in the exact configuration by the notified body during EC type testing for the intended structure • For twin leg lanyards – testing required to VG11-sheet 63, in addition to BSEN355 • Consult manufacturer for suitability if to be used inside caged ladders
<p>Common Issues:</p> <ul style="list-style-type: none"> • Used with user weights greater than 100 kg • Extending drop heights and arrest forces by adding extra connectors and lanyards • Not anchored correctly to structures as instructed by manufacturer • Some twin leg models on the market have not been subjected to VG11 sheet 63 testing. EN355 was not written for twin leg versions, so does not include the lateral load testing typical of twin leg use. It was for this reason VG11 sheet 63 was produced. • Bypassing the energy absorber when using twin leg models (i.e. attaching free end of one lanyard to structure and free end of other lanyard to harness to provide extensive working range) • Use of two single leg models in parallel as a substitute for a twin leg model – the 2 energy absorbers in parallel will double the arrest forces during a fall (e.g. 2 x 6 kN = 12 kN)

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Work Positioning (WP) Lanyards

Description:

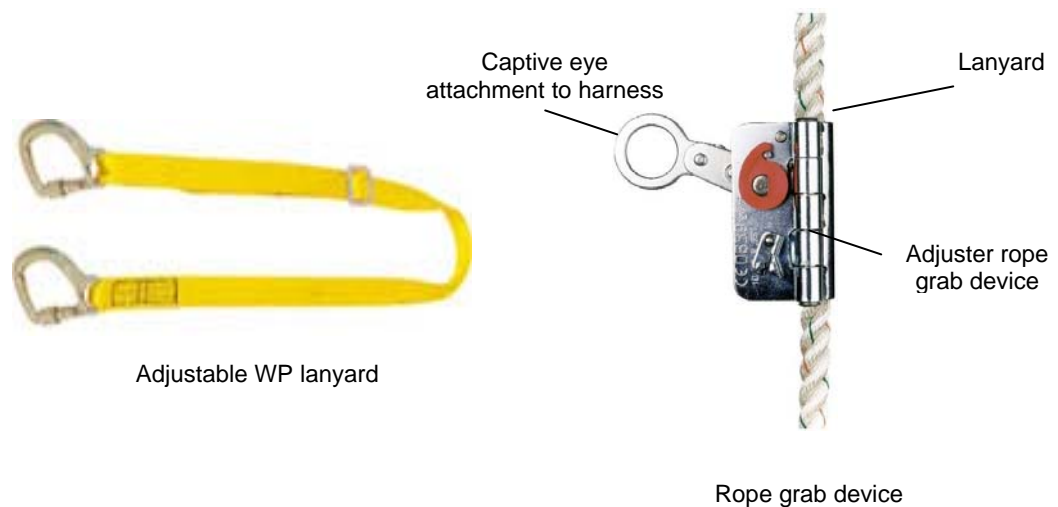
A lanyard that partly or fully supports the worker to aid work positioning

Types of Devices:

A Work Positioning (WP) lanyard is a lanyard that partly or fully supports the worker to aid his/her positioning whilst carrying out work. The WP lanyard is not intended for or designed for fall arrest so has no energy absorber element to dissipate the fall arrest forces experienced in a fall. The lanyard should never be used in situations where there is any slack in the lanyard that could result in free fall.

WP lanyards are either fixed length or adjustable devices. They can come in any working length dependent on the application. Simple designs comprise a single leg lanyard with connectors fitted at both ends to allow attachment between the harness and anchor point. Other more complex models comprise a lanyard fitted with a metallic rope grab, which can be positioned at any point along the length of the lanyard. The rope grab will automatically bite and lock onto the rope and can only be adjusted by deliberate manual adjustment, in other words, unlike a fall arrest system which can often look similar, the WP rope grab will not move freely on the rope.. The rope grab is fitted with a captive eye which allows connection to the users harness point via a suitable connector (often specified by the manufacturer). The lanyard line can be constructed from webbing, rope, wire or chain.

Examples of models and features:



Mandatory Conformity Requirements:

Where supplied as an integral product (lanyard & energy absorber) - BSEN358:2000

Additional Requirements:

- User weights greater than 100 kg (including tools) – request additional notified body dynamic test to cover maximum weight range.
- Where manufacturer claims PPE is suitable for looping around or chocking around structures ensure the PPE has been tested in the exact configuration by the notified body during EC type testing



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/003
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Work Positioning (WP) Lanyards

Description:

A lanyard that partly or fully supports the worker to aid work positioning

Common Issues:

- Used for fall arrest applications
- Adding connectors and lanyards between rope grab and harness

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Fall Arrest Harnesses

Description: A body holding device that supports the worker for fall arrest applications

Types of Devices:

All harnesses used for fall arrest are full body holding devices with leg loops, shoulder straps and chest strap. The harness is designed to safely transfer and distribute the fall forces to the body in the event of a fall. Fall arrest attachment points on a harness is either the rear upper dorsal point (normally located at the crossing of the rear shoulder straps) or front upper thorax point (normally located at the centre of the chest strap). Some harness models have an attachment point on both shoulders, which are joined together by a strap or connector to provide a central connection point. Fall arrest harnesses are often integrated into a multi-purpose harness, which also includes for example work positioning or sit harness attachment points. It is essential that these points are not used for fall arrest as they have not been tested or designed to sustain the loads involved in fall arrest and do not provide adequate support to the body. Ideally fall arrest harnesses should be adjustable at the legs, shoulders and chest to provide the optimum fit and comfort. In fall arrest harnesses primary load bearing straps, including underside leg loops, should be no less than 40 mm wide.

Examples of models and features:




Mandatory Conformity Requirements:

Fall arrest Harness CE marked to BSEN361:2002 (covers fall arrest dorsal and thorax points only)

Multi-purpose (other non-FA points should be CE marked to necessary standard i.e. work positioning EN358, and sit positioning to EN813)

Additional Requirements:

Fall arrest points should be marked by manufacturer with the letter 'A' to denote their approval for fall arrest use

	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/004 Revision 00
Pages: 2 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Description:	Fall Arrest Harnesses A body holding device that supports the worker for fall arrest applications	

<p>Common Issues:</p> <ul style="list-style-type: none"> • Waist points and sit positioning points often used for fall arrest • Poor fit and adjustment of harness • Currently no EC tests to assess migration of harness straps during a fall. Excessive migration of straps, often caused by the sliding retaining plate that houses the dorsal D ring, can lead to garrotting of the neck and strangulation
--

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Work Positioning Belts/Harnesses

Description:

A body holding device that supports the worker during work positioning/restraint

Types of Devices:

A waist belt provides body support for work positioning, whereby supporting the worker to enable both hands free to carry out the work tasks. Waist belts are fitted with either two attachment points at each side for attachment around structures or one attachment point at the front of the waist to allow direct connection to an anchor point. Waist belts are often integrated into full body harnesses or part harnesses fitted with lower leg loops. The WP belt/harness not intended nor designed for fall arrest so should never be used in situations where there is any slack in the WP lanyard that could induce potential free fall. (Although waist attachment points should not be used for fall arrest, it is acceptable to use fall arrest points tested to EN361 for work positioning and restraint applications, where the fall arrest points have been subjected to more rigorous and demanding test criteria than work positioning point).

It should be noted that the Work at Height Regulations 2005 require that a fall arrest back-up system is used with a PPE work positioning system. Since a full body harness fitted with thoral or dorsal fall arrest points is required for fall arrest, this suggests any work positioning belt should be incorporated into a full body fall arrest harness.

Examples of models and features:



Waist belt with front attachment point



Waist belt with side attachment points



Waist belt incorporated into a full body multi-purpose Harness

Mandatory Conformity Requirements:

CE marked to BSEN358:2000

Additional Requirements:

N/A

Common Issues:

- Often misused for fall arrest applications

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Sit Harnesses

Description:

A body holding device that supports the worker in suspension

Types of Devices:

A sit harness allows the worker adequate support and posture when fully suspended during work activities typical of rope access. A sit harness has a D-ring coupling located above the waist point. The harness is often integrated into a full body harness. When connected to the sit-position attachment point the harness should not be used for any free fall applications.

As a form of work positioning it should be noted that the Work at Height Regulations 2005 requires that a fall arrest back-up system is used with a PPE work positioning system. This suggests a sit harness is incorporated into a full body harness.

Examples of models and features:



Sit-harness
attachment point

Sit-harness incorporated into a full
body harness

Mandatory Conformity Requirements:

CE marked to BSEN813:1997

Additional Requirements:

N/A

Common Issues:

Misused for fall arrest applications

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Retractable Fall Arrester (SRL)

Description:

A self-retracting and self locking fall arrest lanyard

Types of Devices:

A retractable fall arrester comprises a lanyard that automatically extracts and retracts freely from a reel to follow the movement of the worker who is attached to the end of the lanyard. The lanyard will lock on the reel instantly if any sudden movement occurs, typical of a fall. The device is designed with built in energy absorbance to cushion arrest forces to within the acceptable 6 kN limit. Due to the retraction mechanism, the device minimises slack in the cable at all times, thus reducing potential free fall. These devices are available in a wide range of lengths, from 2 metre lightweight devices (similar to car seat belt units) up to and beyond 50 metre devices. The units are designed and tested for overhead vertical use (or near to vertical). The lanyards are available in webbing, wire rope and fibre rope. Some devices feature a built in rescue winch or descender device to aid rescue and evacuation.



Short range
lightweight type



Wire lanyard



Webbing lanyard

Mandatory Conformity Requirements:

CE marked to BSEN360:2002

If fitted with descender device also tested and CE marked to EN341

Additional Requirements:

- Request EN360 optional testing: endurance testing; dust conditioning test; oil conditioning test
- Request additional notified body test certificates (dynamic test) where rated for use above 100 kg
- Consult manufacturer on suitability if to be used with user weights under 80 kg
- Where claimed suitable for mounting horizontally and or for use over an edge request additional notified body test certificates, including relevant VG11 testing (Sheet 54 or Sheet 60).
- If claimed suitable for use on tripods (where mounted upside down on tripod leg) request additional notified body testing
- Where claimed suitable for use on a deadweight anchor request additional notified body testing
- If fitted with a rescue winch – request the winch be tested to BSEN1496:1996
- Consult manufacturer for suitability if to be used inside caged ladders

	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/007 Revision 00
Pages: 2 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Retractable Fall Arrester (SRL) Description: A self-retracting and self locking fall arrest lanyard		

Common Issues:

- Used outside weight range
- Used in different orientations from CE testing (horizontal, inclines, inverted)
- Used in non-overhead applications – this can create potential excessive free fall where the user attachment point is located above the casing (lanyard outlet).
- Used in pendulum situations with excessive angles
- Used over edges (Note. The Work at Height Regulations 2005 specify PPE should never be used in situations where it can be cut)
- Used with cable wrapped around and over structures. This incurs friction which slows down the device and prevents it from locking on during a fall
- Fall arrest lanyards added to the end. Adding another energy absorber element to the end of the retractable arrester cushions the input forces and prevents the device from locking on
- Use on solid inclines, (i.e. chutes) prevents sufficient inertia to lock on the device

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

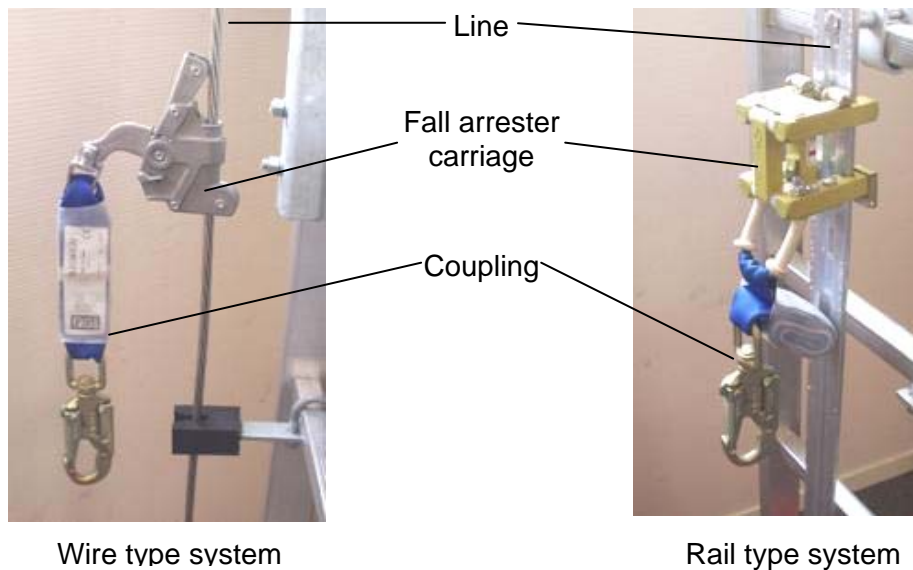
Vertical Fall Arrest System (Guided Type Fall Arresters on rigid anchorage lines)

Description:

A fall arrester mounted on a rigid anchorage line

Types of Devices:

A typical rigid vertical fall arrest system, which is commonly used to provide permanent safe ladder access in wind turbines, comprises a fall arrester carriage that runs up and down on a vertical line, which is either a wire rope or rigid rail. The line is tensioned and fixed at a number of points along its length. This is often on a ladder. The user will attach directly to the fall arrester coupling via the harness thorax D-ring located at the central chest position. The fall arrester coupling is often a single karabiner or a karabiner fitted with a short length textile energy absorber lanyard. In order for the user to climb safely with both hands, the fall arrester is required to meet the EN standard design criteria of having the ability to follow the user upwards and downwards freely without requiring any manual adjustment by the user. Some wire systems feature a built in structural energy absorber mounted in-line with the top anchor to provide the system absorbance and limit the loads transferred to the adjoining structure. The systems are generally EC type tested in a vertical orientation using the standard 100 kg test mass for single person use.



Wire type system

Rail type system

Mandatory Conformity Requirements:

CE marked to BSEN353-1:2002 (incorporating Amendment No1. 1) with National Annex NA
If featuring a work positioning lock of trigger – CE marked also to BSEN358:2000



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/008
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Vertical Fall Arrest System (Guided Type Fall Arresters on rigid anchorage lines)

Description:

A fall arrester mounted on a rigid anchorage line

Additional Requirements:

- Anthropometric dummy testing using 71 kg dummy and 100 kg dummy, covering 4 fall postures: Fall-back test, Sit-back test, Fall-down test, Climb-fall test
- Request EN353-1 optional testing: dust conditioning test; oil conditioning test
- Request additional notified body test certificates (dynamic test) where rated for use above 100 kg (Still required to satisfy test criteria ≤ 6 kN peak arrest force, ≤ 1 metre fall distance)
- Consult manufacturer on suitability if to be used with user weights under 80 kg
- Request additional notified body testing where claimed suitable for use with more than 1 person
- Request notified body testing where claimed suitable for inclined installations
- Consult manufacturer for suitability if to be used inside caged ladders or confined space
- Consult manufacturer on required minimum structural anchorage strength
- Consult the manufacturer on harness advice and compatibility
- Consult manufacturer on installation and maintenance bodies

Common Issues:

- Fall arrester attached to incorrect harness attachment points – it is not acceptable to use work positioning points i.e. stomach for fall arrest applications
- Using systems for work positioning – i.e. to suspend or support the worker (only those systems approved for this use with the lock of feature are acceptable for work positioning)
- Used above 100 kg
- Used below 80 kg where manufacturer not consulted
- Installed in inclines when not tested or CE marked for use on inclines
- Substituting and replacing system parts – only those parts supplied and specified by the manufacturer should be used
- Extending the coupling length by adding additional lanyards and connectors – this increases fall distances and arrest forces beyond those which the system is designed for
- Using with multiple persons at one time when only tested for use with a single person
- Anchored to structures with insufficient strength e.g. hollow aluminium ladders that have not been strengthened to sustain required loading
- Fitted without end-stops at the top and lower levels when there is a risk of falling if the fall arrester detaches inadvertently from the line
- Installed without sufficient clearance around and below the system fall path
- Handling the fall arrester during use or during a fall– this will inhibit the system operation
- Obstructing and hindering the operation of the fall arrester – this can result from positioning the arms and other items in the path of the fall arrester, entanglement of loose garments between moving parts and pushing against the fall arrester mechanism – ensure work practices and training remove these hazards and risks

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

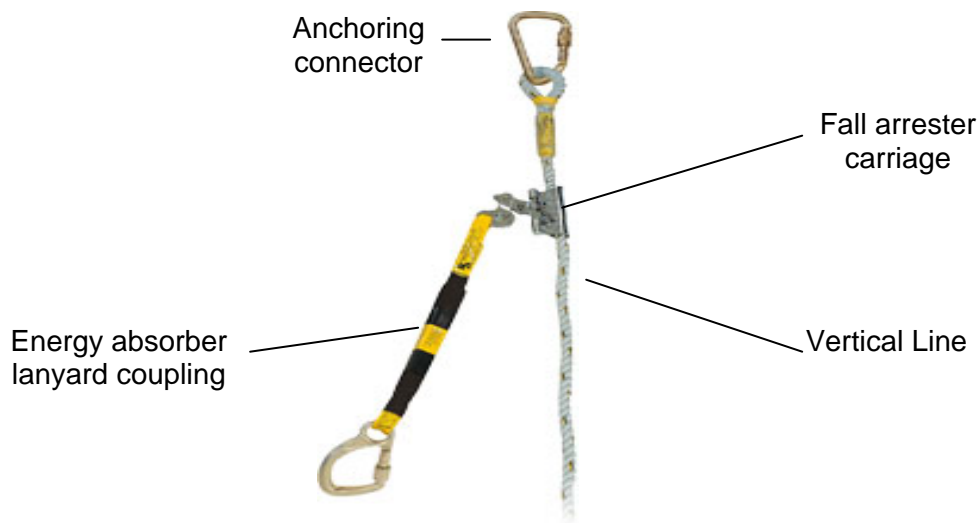
Date: 30 May 2008

Product: Vertical Fall Arrest System (Guided Type Fall Arresters on flexible anchorage lines)

Description: A fall arrester mounted on a flexible anchorage line

Types of Devices:

A typical flexible vertical fall arrest system, used normally as a temporary protection system due to its ease of installation, comprises a fall arrester carriage that runs up and down on a vertical line which is suspended from an overhead anchorage via a connector/karabiner. The vertical line is fixed only at the top point so is free to move horizontally in all directions. The line is slightly taut by the weight of the rope/wire cable, or where a small deadweight has been suspended from the bottom of the line to act as an end stop and a rope tensioner. Where no such weight is fitted to the end of the line, normally the end of the rope has a spliced termination to stop the carriage inadvertently running off the end of the line. The user will attach directly to the fall arrester coupling via the harness fall arrest D-ring. The fall arrester coupling normally comprises a textile energy absorber lanyard. In order for the user to climb safely with both hands, the fall arrester is required to meet the EN standard design criteria of having the ability to follow the user upwards and downwards freely without requiring any manual adjustment by the user. The systems are available in any working lengths and are generally EC type tested using the standard 100 kg test mass for single person use.




Rope type model

Mandatory Conformity Requirements:

CE marked to BSEN353-2:2002

If featuring a work positioning lock of trigger – CE marked also to BSEN358:2000

	PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS	BWEA/PPE/009 Revision 00
Pages: 2 of 2	Prepared by: Lynn Hunter (TUV NEL)	Date: 30 May 2008
Product: Description:	Vertical Fall Arrest System (Guided Type Fall Arresters on flexible anchorage lines) A fall arrester mounted on a flexible anchorage line	

<p>Additional Requirements:</p> <ul style="list-style-type: none"> • Request EN353-2 optional testing: dust conditioning test; oil conditioning test • Request additional notified body test certificates (dynamic test) where rated for use above 100 kg (Still required to satisfy test criteria ≤ 6 kN peak arrest force, ≤ 2 metre fall distance) • Consult manufacturer on suitability if to be used with user weights under 80 kg • Request additional notified body testing where claimed suitable for use with more than 1 person • Consult manufacturer on required minimum structural anchorage strength • Consult the manufacturer on harness advice and compatibility
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<p>Common Issues:</p> <ul style="list-style-type: none"> • Fall arrester attached to incorrect harness attachment points – it is not acceptable to use work positioning points i.e. stomach for fall arrest applications • Used above 100 kg when not covered under CE approval • Used below 80 kg with consulting manufacturer • Substituting and replacing system parts – only those parts supplied and specified by the manufacturer should be used • Extending the coupling length by adding additional lanyards and connectors – this increases fall distances and arrest forces beyond those which the system is designed for • Using with multiple persons at one time when only tested for use with a single person • Anchored to structures with insufficient strength • Fitted without end-stops when there is a risk of falling if the fall arrester detaches from the line • Installed without sufficient clearance around and below the system fall path • Handling the fall arrester – this will inhibit the system operation • Obstructing and hindering the operation of the fall arrester • Introducing pendulum motion – this will dissipate some of the fall energy and may prevent the fall arrester from locking and or introduce risks of workers impacting against other structures • Used in situation where the rope is rubbing/cutting on other surrounding structures during normal use an un fall situations
--

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product:

Descender Devices for Evacuation

Description:

Used to provide controlled descent of personnel in evacuation from elevated areas

Types of Devices:

Descender devices are used for evacuation of personnel from elevated areas at a controlled rate of descent. Single and multi-trip types are available. Some devices are designed for permanent installation where the descent line (wire, rope or webbing) is housed in a protective upper casing, which is suspended from an overhead anchorage point. In the event of an evacuation, the line will extract at a controlled descent from the housing and retract back to the top automatically to allow the next person to descend to safety.

Other devices on the market are designed for temporary, transportable applications and come packaged compactly in a lightweight easy carry rescue kit.

Other models on the market are designed to allow single-hand operated descents for self-assisted rescue.



Permanent Multi-trip
type descender



Temporary lightweight
transportable descender kit

Mandatory Conformity Requirements:

- CE marked to BSEN341:1993 (currently being revised)
- Descenders not conforming to the design criteria of EN341 may require specially devised test specifications agreed by the notified body (the devices should still be CE marked by the notified body regardless of whether it is tested in accordance with EN341)
- Single hand operated devices should be tested to BS8405:2003 (currently being revised). Dependent on the device, additional testing may be required

Additional Requirements: N/A

Common Issues: N/A

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Structural anchors designed to be secured to vertical, horizontal and inclined surfaces
Description: Single point anchors to accommodate direct attachment of PPE systems

Types of Devices:

There has been much confusion and debate within Europe about what should be classified as a PPE anchor and subject to the controls of the PPE Directive 89/686/EC and what should be treated as part of the structure on which the PPE is mounted. The general and recommended approach is to treat a discrete anchor point that can be removed without the use of special tools as PPE. For example, eyebolts welded to the steelwork on the London Eye may quite rightly be treated as the structure on which the PPE is mounted. Whereas, an eyebolt screwed into an insert in a wall for providing a window cleaner with a PPE anchor point, should be classified as PPE. If classified as PPE, the eye-bolt should be EC type tested and CE marked under the PPE Directive and subject to the in-situ periodic inspections and pull tests outlined in BS 7883: 1997 (Code of Practice – Application & use of anchor devices conforming to BSEN 795)

A structural anchor provides a discrete single point for mounting PPE. This involves any type of surface and orientation, covering vertical, horizontal and inclines. Typical anchors include eyebolts. However, any suitable fixing i.e. D-rings, handles could be CE marked as PPE.

These anchors are mechanically fixed, as opposed to bonded or vacuumed.



Typical PPE eye-bolt anchor

Mandatory Conformity Requirements:

- CE marked by notified body under PPE Directive 89/686/EC

Note. This is generally to BSEN795: 1997, Class A1. However, this EN standard alone may not cover the essential health and safety requirements of the PPE Directive. Additional testing may be deemed necessary by the notified body dependent on the product claims. For this reasons, EN795-Class A1 does not provide a presumption of conformity. Testing based on EN795-Class A1 does usually suffice for most anchors of this type.

- Comply with BS 7883: 1997 (Code of Practice – Application & use of anchor devices conforming to BSEN 795)



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/011
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Structural anchors designed to be secured to vertical, horizontal and inclined surfaces
Description: Single point anchors to accommodate direct attachment of PPE systems

Additional Requirements:

- Consult with manufacturer on compatible PPE interface connectors i.e. karabiner, slings
- If claimed for suitable for more than 1-person at one time ensure notified body has conducted additional testing to allow this (e.g. if 2 persons then 2 x 100 kg mass used for dynamic test and 10 kN + 1 kN (for 2nd person) applied during static test)
- Ensure anchor is suitable and has been tested in intended surface/substrate
- Ensure it has been tested and approved for intended installation orientation
- Request advice on installation, maintenance and inspection bodies

Common Issues:

- Used with incompatible interfaces (i.e. connectors)
- Used for more persons than EC type tested for
- Used in the wrong substrate (e.g. tested only in brick and used in concrete or steel)
- Used in wrong orientation (e.g. used in tension when tested only for shear)
- Not subjected to annual inspection and pull testing as required in BS 7883: 1997

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Transportable Temporary Anchors

Description: PPE Anchors that can be easily transported, installed and removed for non-permanent applications

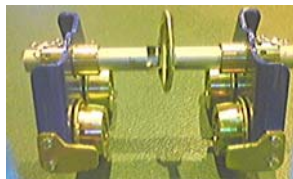
Types of Devices:

PPE anchors used for non-permanent applications can incorporate many different types and kinds of anchor devices. The following provides some types commonly used for fall arrest applications:

- Beam clamp devices
- Beam trolley devices (fitted with rollers to provide adjustment along beams)
- Slings (choked or looped around suitable structures)
- Anchor straps (Looped around suitable structures)
- Man-riding tripods (mounted over man-holes)
- Eyebolts (fitted with trigger catch for fixing through holes)
- Vacuum anchors (used for specified surfaces such as aeroplane wings) **See sheet BWEA/PPE/013**



Beam clamp



Beam trolley



Sling



Temporary eye-bolt



Man-riding tripod



Anchor strap

Mandatory Conformity Requirements:

- CE marked by notified body under PPE Directive 89/686/EC to EN795:1997 Class B

Additional Requirements:

- If claimed for suitable for more than 1-person at any one time ensure notified body has conducted additional testing to allow this (e.g. if 2 persons then 2 x 100 kg mass used for dynamic test and 10 kN + 1 kN (for 2nd person) applied during static test)
- Where necessary ensure anchor is suitable and has been tested for intended substrate/geometry. For example some beam clamps may have only been tested for use on certain types of beams
- Ensure it has been tested and approved for intended installation orientation



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/012
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Transportable Temporary Anchors

Description: PPE Anchors that can be easily transported, installed and removed for non-permanent applications

Common Issues:

- Used in unapproved applications i.e. wrong structures and orientations
- Used by more persons than EC type tested for

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Vacuum Anchors

Description: An anchor fixed to a surface by means of vacuum pressure

Types of Devices:

A vacuum anchor is a complex and sophisticated piece of PPE with many parts and components. It generally comprises a rubber suction pad mounted to the underside of a steel base, on top of which is mounted a D-ring anchor point. The unit is pressurised to a specific vacuum pressure using a compressed air source. This may be from a mains air supply or from a portable gas vessel. For obvious reasons the unit features a number of visual and audible alarms which signal a number of operating states, such as when the vacuum pressure has been achieved, or when the vacuum is losing pressure. In order to maintain vacuum pressure between the suction pad and surface, a non-porous, smooth and even surface is essential. For this reason the use of vacuum anchors are generally limited to specific applications and industries, such as the aerospace industry for use on aircraft wings, where the wings have a superior and ideal surface finish.



Vacuum anchor

Mandatory Conformity Requirements:

These devices are generally considered temporary and transportable, and are therefore tested and CE approved to BSEN 795:1997 Class B. However, they can also be deemed freestanding deadweights and approved to BSEN795: 1997 Class E (inc. VG11 sheet 55). The EC test program should encompass relevant parts from both Class B and Class E test criteria and other factors. These should include:

In addition to the standard dynamic test whereby dropping a 100 kg mass a distance of 2.5 metres and a 10 kN static test, other factors should be assessed. This includes the slippage of the device during the dynamic and static test. A creep test should also be performed which involves a measure of slippage when the maximum rated user weight is suspended from the anchor for a period of time (i.e. simulating a person suspend after a fall and awaiting rescue). A dynamic test should also be performed on a wet surface (unless used indoors only) and a corrosion test should be carried out.



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/013
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Vacuum Anchors

Description: An anchor fixed to a surface by means of vacuum pressure

Additional Requirements:

- Tested in all directions specified by the manufacturer (x,y,z)
- If claimed for suitable for more than 1-person at any one time ensure notified body has conducted additional testing to allow this (e.g. if 2 persons then 2 x 100 kg mass used for dynamic test and 10 kN + 1 kN (for 2nd person) applied during static test)
- Tested for suitability on the specified surface
- Advice on compatible PPE interfaces

Common Issues: N/A

Pages: 1 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Anchor devices employing horizontal flexible lines (permanent and temporary)

Description: A lifeline used to provide a point of anchor over a horizontal span

Types of Devices:

Flexible type horizontal lifelines are available for both temporary and permanent installations. They allow workers to traverse between positions whilst attached to a moving shuttle on the line.

Permanent types are more complex than temporary models and normally comprise a wire lifeline fixed to a rigid structure via intermediate brackets and end-brackets. The end brackets are normally fitted with in-line structural energy absorbers to limit the fall forces and the transfer of loads to adjoining structures. The user attaches to a shuttle (carriage), specially designed to pass the intermediate brackets, via a standard 2-metre fixed energy absorber lanyard. Permanent types, which often incorporate corner pieces, are normally available to accommodate any length, as long as there are sufficient points to mount intermediate support brackets and end anchors.

Temporary systems are intended for shorter length applications. They comprise a single span with no intermediate brackets. A typical design comprises a length of webbing line fitted with an end textile energy absorber lanyard and ratchet tensioner device. Users attach directly to the webbing line via the connector on their fixed energy absorber lanyard. These types are generally packaged in a lightweight carry bag.



Permanent lifeline



Temporary lifeline



PPE (WORK AT HEIGHT) PROCUREMENT GUIDANCE SHEETS

BWEA/PPE/014
Revision 00

Pages: 2 of 2

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Anchor devices employing horizontal flexible lines (permanent and temporary)

Description: A lifeline used to provide a point of anchor over a horizontal span

Mandatory Conformity Requirements:

- **Permanent Types**

These devices are normally tested and CE approved to **BSEN 795:2007 Class C**. Although Class C does not provide a presumption of conformity with the PPE Directive as is recognised that additional testing may be necessary for some types of systems, for most models generally Class C does cover the necessary testing. Under Class C, the manufacturer is required to predict within 20% accuracy the system performance (end loads and line deflections) when subjected to a number of different tests by the notified body covering various system spans and configurations. This demonstrates confidence in the manufacturer's ability to specify different systems to cater for the wide varying applications and configurations in which they are needed. Manufacturers usually model system performance using specially written software packages.

- **Temporary Types**

Due to the temporary nature of these devices, they are often CE approved based on **BSEN 795: 2007 Class B** as temporary transportable anchors. Otherwise they will be CE approved as a **BSEN 795:2007 Class C** device.

Unlike Class C testing, which is more comprehensive, the testing involved in Class B alone does not fully address the requirements for a temporary flexible horizontal line system. Where the devices are CE approved to Class B, the testing should have included a measurement of end loads and line deflections. This is essential to ascertain the resultant loads at the ends for the purpose of specifying the minimum strength requirements for structural anchor points and to acquire the necessary clearances below the lifeline.

As line tension significantly influences system performance on any type of flexible horizontal system, it is important that line tension is measured during test and that the system is designed with a feature which allows the installer and user to check and adjust when necessary the line tension to the required level.

- Comply with BS 7883: 1997 (Code of Practice – Application & use of anchor devices conforming to BSEN 795)

Additional Requirements:

- If claimed for suitable for more than 1-person at any one time ensure notified body has conducted additional testing to allow this
- Ensure it has been tested and approved for intended installation orientation
- Request advice from manufacturer on installation, inspection and maintenance bodies (Permanent types)

Common Issues:

- Used in unapproved applications
- Used by more persons than EC type tested for
- Used in conjunction with retractable type fall arresters – the flexibility and bounce of the line can cushion input forces to the retractable arrester and prevent it from locking on
- Not subjected to annual inspection and pull testing as required in BS 7883: 1997 (permanent devices)

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Anchor devices employing horizontal rigid rails

Description: A rails used to provide a point of anchor over a horizontal span

Types of Devices:

Rigid rails allow workers to traverse between positions whilst attached to a moving shuttle on the rail. The systems are supplied in sections of rail to accommodate any required length. The rails are fixed to suitable structures at intermediate points along the rail. The user attached to the shuttle via a suitable fall arrest lanyard.



Rigid rail

Mandatory Conformity Requirements:

- Tested and CE approved to BSEN 795:1997 Class D
- Comply with BS 7883: 1997 (Code of Practice – Application & use of anchor devices conforming to BSEN 795)

Additional Requirements:

- If claimed for suitable for more than 1-person at any one time ensure notified body has conducted additional testing to allow this
- Ensure it has been tested and approved for intended installation (orientation and suitable for mounting in intended substrate)
- Request advice from manufacturer on installation, inspection and maintenance bodies

Common Issues:

- Used in unapproved applications
- Used by more persons than EC type tested for
- Not subjected to annual inspection and pull testing as required in BS 7883: 1997 (permanent devices)

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Deadweight anchors for use on horizontal surfaces

Description: A free standing anchor device

Types of Devices:

A deadweight anchor is a freestanding device that is not fixed or penetrated to the surface on which it is mounted. It relies on weight and friction to provide a stable fixing. In the UK, deadweight anchors normally comprise a frame, on which is mounted a series of weights. An eyebolt is normally attached to the centre of the device to provide an anchor point for attaching PPE. The undersides of the weights are coated with a material to provide adequate friction to resist slippage. In Europe, water bags are often used as opposed to steel weight. The devices are often used on flat roofs to provide an anchor point for fall protection. They can also be incorporated into horizontal flexible lifelines. The user attaches to the device via a suitable fall arrest lanyard.



Deadweight anchor

Mandatory Conformity Requirements:

Tested and CE approved to BSEN 795:1997 Class E

Additional Requirements:

- Tested to VG 11 Sheet 55
- If claimed for suitable for more than 1-person at any one time ensure notified body has conducted additional testing to allow this (i.e. they may have 2 eyebolts for rescue purposes)
- Ensure it has been tested and approved for intended surface
- Ensure older product on the market before the current BSEN795:1997 standard have been tested in wet conditions (i.e. wet surface have a much less friction coefficient than dry)
- Request advice from manufacturer on installation, inspection and maintenance bodies

Common Issues:

- Used in unapproved applications (not tested on surface on which they are used)
- Used by more persons than EC type tested for
- Used in conjunction with retractable type fall arresters – the movement of the anchor delays the input forces to the retractable arrester and prevents it from instantaneously locking on

Pages: 1 of 1

Prepared by: Lynn Hunter (TUV NEL)

Date: 30 May 2008

Product: Rescue Devices (lifting devices, rescue harnesses, rescue loops)

Description: Devices used for retrieving persons suspended after a fall

Types of Devices:

Rescue devices, including winches, rescue harnesses and rescue loops, were removed from PPE Directive 89/686/EC a number of years ago following the view that rescue items attached after a fall involves a second person so therefore it is not personal and should not be classed as PPE. Devices that are not included under an EC Directive are not allowed to be CE marked. However, often these types of devices are integrated into other PPE items so will therefore bear a CE mark. For example a rescue winch may be integrated into a retractable fall arrester and a rescue harness may be incorporated into a fall arrest full body harness.

Regardless of whether a product falls under an EC Directive or not, a manufacturer is duty bound to ensure any product he/she places on the market place is safe and fit for purpose, especially safety equipment used to protect human life.

The EN test standards that were previously used to test these items before rescue equipment was removed from the controls of the PPE Directive is one method and probably the best method for the manufacturer to demonstrate the safety of the product.



Rescue winch



Rescue Harness

Mandatory Conformity Requirements:

N/A – rescue equipment no longer under the PPE Directive 89/686/EC – see below

Additional Requirements:

Ensure items have been tested to:

BSEN 1496: 1996 (Rescue Lifting Devices)

BSEN 1497: 1996 (Rescue Harnesses)

BSEN 1498: 1996 (Rescue Loops)

Common Issues: N/A