



Fit for Purpose

Constant Force[®] post system

Product Testing
& Performance



Introduction

Over the last fifteen years, Latchways has pioneered the advent of 'top fixed' systems incorporating their patented Constant Force[®] post technology and ManSafe[®] componentry. 'Top fixed' refers to the fall protection being installed to the complete roofing system rather than the traditional method of attaching an anchor through the roof to the building structure.

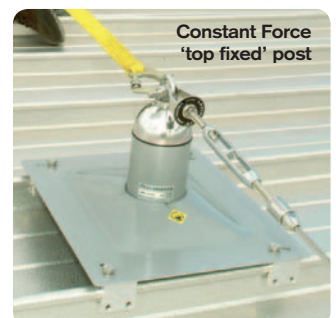
With such a fundamental change to the method of load control and attachment, combined with the proliferation of copy-cat products available on the market, it is imperative that specifiers, contractors, clients and end users can be confident that the selected product is 'fit for purpose'.

In order to do so, Latchways undertake a rigorous two-stage testing programme in conjunction with major roofing system partner manufacturers. As a result, Latchways are able to provide an unrivalled product portfolio with proven performance in excess of the minimum standards.

This document sets out to explain the testing programme behind the ManSafe for Roofing Constant Force post system and how Latchways determine the correct specification of Constant Force post for a given roof construction. The following pages provide a full explanation to assist the decision making process, due diligence, liability and ensure compliance.

Checklist

- ✓ Constant Force technology
- ✓ Representative roof test
- ✓ Roofing system manufacturer approval
- ✓ 300kg dynamic drop test
- ✓ Multi-directional testing
- ✓ Omni-directional post
- ✓ 6000J energy capacity per post
- ✓ Three user unrestricted system
- ✓ EN365 product marking
- ✓ Foreseeable mis-use





Background

The standard governing the testing of anchor devices is EN 795 and should be considered as the absolute minimum requirement. Systems are categorised within this standard as either being class A1, A2, B, C, D or E. The classes pertinent to the Constant Force post are A2 (isolated anchor devices) and C (anchor devices employing horizontal flexible lines).

Under the standard, anchor devices are tested by subjecting them to a dynamic test using a 100 kg mass - the equivalent of one person falling.

As the Latchways Constant Force post is capable of supporting three users on the system at any time and at any point, Latchways test using a 300 kg mass—the equivalent of three persons falling simultaneously on a single post.



EN 795 test

Latchways test

Constant Force technology

At the heart of every Constant Force post is the unique Latchways energy absorbing coil.



Under load the post deploys over, extending the energy absorbing coil whilst, at the same time, limiting the load to the roof to a typical peak of 10 kN (1 tonne) in shear.

Representative roof test

In addition to EN 795, Latchways also undertake extensive testing of the complete roofing system to which the Constant Force post will be attached and, therefore, become part of.

The tests take in to consideration the supporting structure, such as the purlins, deck, spacer system, insulation and the outer waterproof covering (i.e. profiled metal sheet or membrane). The rigs used to carry out the tests typically measure 6 m x 6 m to enable a representative 'as built' construction to be assessed.

Roofing system manufacturer approval

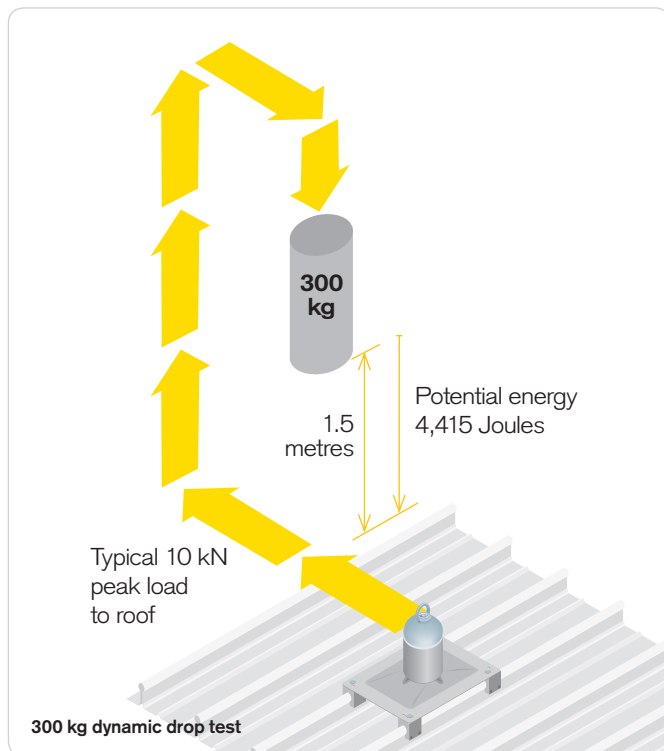
As an essential element of the testing programme, Latchways partner with industry-leading roofing system manufacturers to ensure a holistic approach.

In such a way, Latchways are able to provide both up-to-date solutions for new roofing system innovation and where existing products are upgraded to meet regulatory change such as revised building regulations. In addition, Latchways ManSafe solutions maintain the guarantees/warranties offered by partner manufacturers.

Testing programme

Dynamic drop test—Stage 1

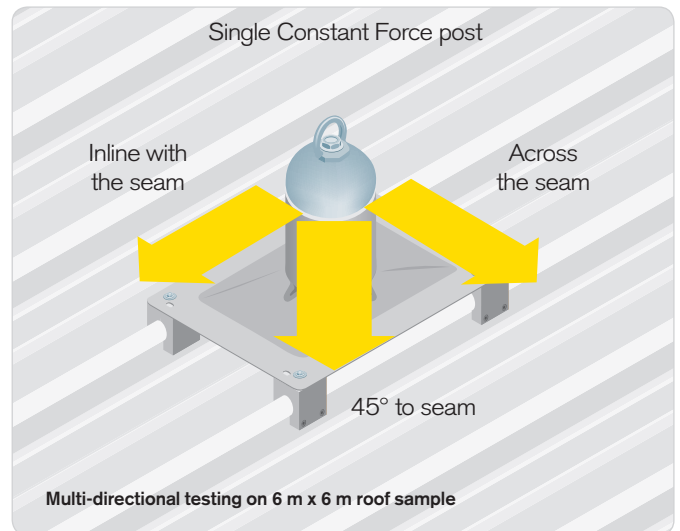
This is the most revealing test for any 'top fixed' post/roof construction and in the case of Latchways is conducted using a 300 kg mass (the equivalent of three users) dropped through a distance of 1.5 m, on one post connected to the roofing system.



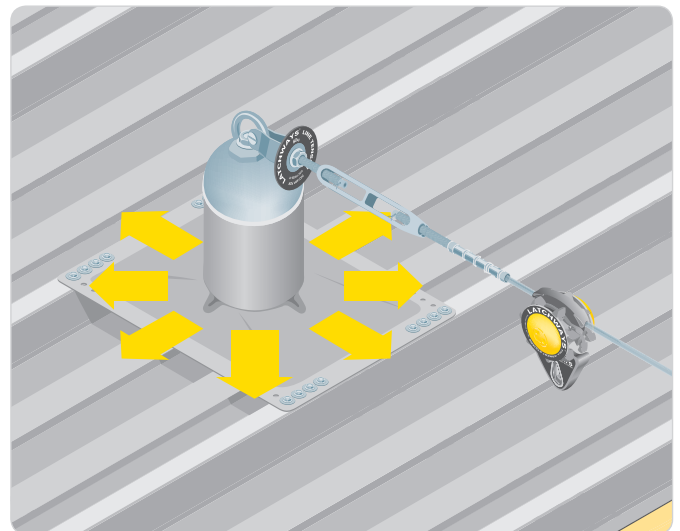
It is important to note that EN 795 only requires the use of a 100 kg mass (the equivalent of one user) dropped on an anchor device.

Multi-directional testing

- 1 In line with the seam, profile or deck
- 2 Across the seam, profile or deck
- 3 At 45° to the seam, profile or deck (static load only)



To ensure maximum protection for users, each post incorporates the Latchways unique Omni-directional Constant Force energy absorber enabling the post to deploy and control load in any direction.



Only when these tests have been successfully conducted, i.e. the test mass was arrested whilst maintaining the integrity of the roof at a typical peak load of 10 kN, will the solution be deemed to have passed. At this stage the Constant Force post system can be installed to the given roof construction in a restraint application, allowing for foreseeable misuse or using the system to undertake rescue following a fall.

Energy absorption comparison

To further underline the performance of Constant Force technology, a comparison can be drawn in terms of the potential energy absorption of the Latchways Constant Force post compared to a basic EN 795 rated anchor device.

Energy input=

Mass (kg) x Gravitational Acceleration (m/s²) x Height (m)

Latchways

$$300 \times 9.81 \times 1.5 =$$

Latchways test
= 4,415 Joules

EN 795

$$100 \times 9.81 \times 1.5 =$$

EN 795 test
= 1,472 Joules

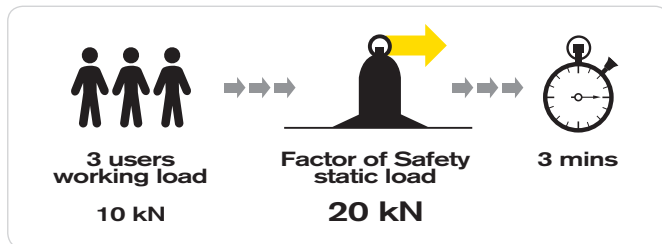
The Latchways Constant Force post has three times the energy absorbing capability compared to an EN 795-rated anchor.

Static load test—Stage 2

For Latchways to determine an appropriate Factor of Safety, each Stage 1 test is subject to a static load held for a given period of time.

Where a Factor of Safety of 2 is required, the whole construction, including the Constant Force post must be able to withstand a static load equivalent to twice the working load achieved during Stage 1. In the case of the Constant Force post, 10 kN must be increased to 20 kN, held for three minutes, with no failure of the complete system.

When all Stage 1 and Stage 2 tests have been successfully conducted the Constant Force post can be installed in a fall arrest application to the given roof construction. Please note that fall arrest applications are only permissible where a sufficient fall clearance is present.



Three user unrestricted system

Unless otherwise stated and with the exception of single point anchors, the Constant Force post system is suitable for access by up to three users at any one time and at any point along the length of the system, even between two anchors.



Product marking

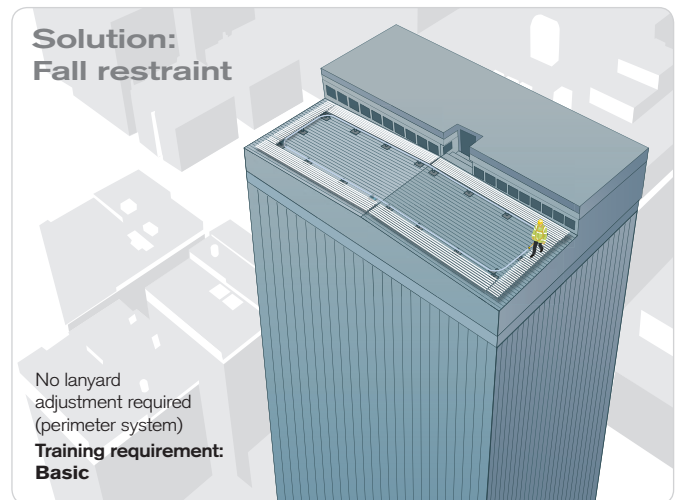
In accordance with EN 365 the anchor device must display the following information:

- 1 Means of identification, e.g. manufacturer's name, supplier's name, or trademark
- 2 Manufacturer's production batch or serial number or other means of traceability
- 3 Model and type/identification
- 4 Number and year of the document to which the equipment conforms
- 5 Pictogram or other method to indicate the necessity for users to read the instructions for use



Fall restraint or fall arrest (including foreseeable mis-use)

Fall arrest is defined as allowing the worker 'exposure' to the hazard i.e. they can get to the edge of a roof and potentially fall, whereas fall restraint allows the worker access towards the roof edge but no further.



Best practice dictates that the system layout be designed in fall restraint, however, Latchways also take in to consideration foreseeable mis-use of their products, i.e. via the use of different PPE such as a lanyard. In certain cases there may also be a requirement to utilise the fall protection system for carrying out rescue following a fall. Therefore, the anchor device should always be capable of controlling multi-user fall arrest loads irrespective of the system classification.

Registered installers

As a key element within the Latchways supply chain, only registered Latchways installers are permitted to install ManSafe products. Such companies are fully trained and able to offer a complete service package to the customer including initial design advice, pricing, installation, maintenance and the correct future annual inspection and recertification of systems.

Further information

For more detailed product information and copies of test reports and manufacturer approval letters please contact info@latchways.com



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