



Latchways Fall Protection Fit for Purpose

Product Testing & Performance
of the Constant Force® Post

2



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.

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. Each element is supported by a full explanation to assist the decision making process, due diligence, liability and ensure compliance.



Traditional 'through the roof' post



Constant Force[®] 'top fixed' post

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.

Checklist

- ✓ **Constant Force[®] technology**
- ✓ **Representative roof test**
- ✓ **Roofing system manufacturer approval**
- ✓ **300 kg dynamic drop test**
- ✓ **Multi-directional testing**
- ✓ **3 user unrestricted system**
- ✓ **Fall Restraint or Fall Arrest**
- ✓ **Factor of safety**
- ✓ **Test report**

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 load of 100 kg—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 load of 300 kg—the equivalent of three persons falling simultaneously on a single post.



The Constant Force post

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 mean of 10 kN (1 tonne) in shear.



Representative Roof

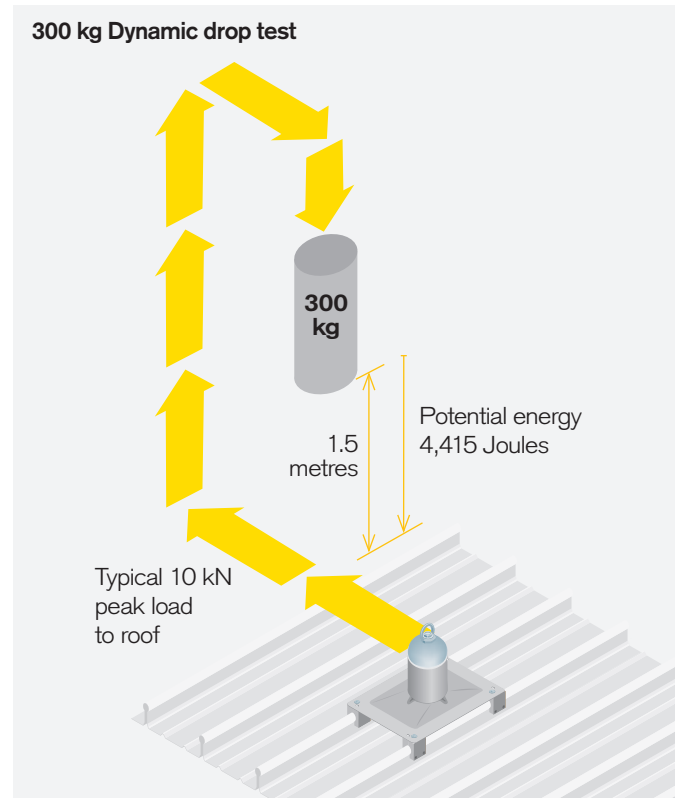
In addition to EN 795, Latchways also undertake extensive testing of the complete roofing system to which the Constant Force® post will be attached and, therefore, become part of.

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.

Testing Programme

Stage 1. Dynamic Drop Test

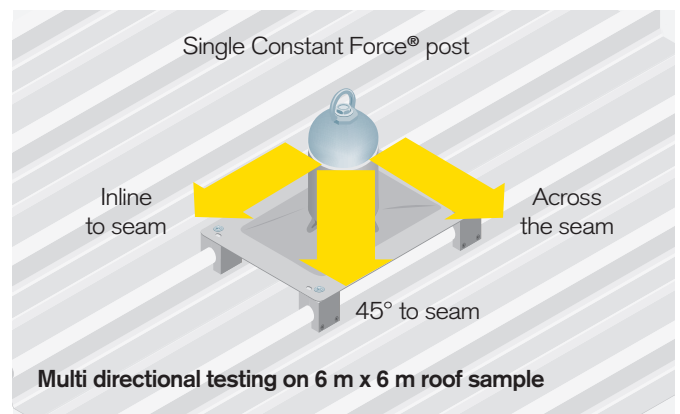
This is the most revealing test for any 'Top Fixed' post/roof construction and in the case of Latchways is conducted using a 300 kg mass (the equivalent of three users) dropped through a distance of 1.5 m, on one post connected to the roofing system.



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.

Dynamic tests are undertaken in three directions;

1. In line with the seam, profile or deck
2. Perpendicular to the seam, profile or deck
3. At 45° to the seam, profile or deck.



Only when all three 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 post compared to a basic EN 795 rated anchor device.

Potential Energy =

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

Latchways

300 x 9.81 x 1.5 = 4,415 Joules

Latchways test
= 4,415 Joules

EN 795

100 x 9.81 x 1.5 = 1,472 Joules

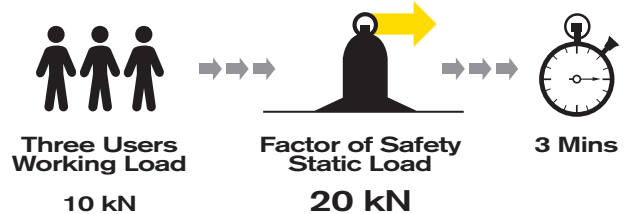
EN 795 test
= 1,472 Joules

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

Stage 2. Static Load Test

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.

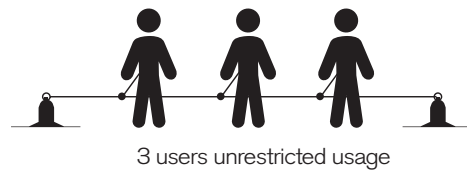
Where a Factor of Safety of 2 is required, the whole construction, including the Constant Force® post must be able to withstand a static load equivalent to twice the working load achieved during Stage 1. In the case of the Constant Force® post, 10 kN must be increased to 20 kN, held for three minutes, 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.

Number of users

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.



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 re-certification of systems.

Further information

For copies of Latchways EC Declarations of Conformity, EC Type-Examination Certificates, Test Reports and Manufacturer Approval letters please contact info@latchways.com

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