

BRE Test Report

Load bearing capacity tests of Penkid window restrictors

Prepared for: Mr. Andrew Boland
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1 Introduction

At the request of Mr. A. Boland, Sales Manager, Universal Hardware Supplies Ltd, Unit 6/7 Dragon Autocentre, Pheonix Way, Swansea Enterprise Park, Swansea, SA7 9FU, BRE issued proposal number 136737 on 08 November 2014. The proposal was accepted on 25 November 2014 and BRE tested specimens of Penkid window restrictors on the 16 December 2014.

The tests were carried out to determine the load bearing capacity of Penkid window restrictors, in accordance with the requirements of clause 5.3 BS 6375-2:2009¹, clause 7.4.3 of BS EN 13126-5:2011+A11:2014² and clauses 5.5.4 and 5.5.5 of BS EN 16281:2013³.

The tests on the specimens were carried out by Mr. M. C. Pound under the BRE Standard Terms and Conditions of Business for testing as BRE Job number 300842 in project number PR0717.



2 Standards, test programme and definitions

The Penkid window restrictor is designed to restrict the opening of the window to an amount governed by the positioning and fixing of the components that make up the restrictor. Note that the device does not hold the window open.

The load bearing tests were carried out to the methods in standards specified in BS 6375-2:2009 for testing applicable to safety devices as fitted to windows, and to the requirements of Clause 7.4.3 in BS EN 13126-5:2011+A1:2014 and clauses 5.5.4 and 5.5.5 of BS EN 16281.

BS 6375-2:2009

BS 6375 is the national application document for BS EN 14351⁴ and identifies the characteristics and classes of performance appropriate for windows and internal/external pedestrian doorsets intended for the UK. BS 6375-2 specifies performance requirements for the operation and strength of manually operated windows and internal/external pedestrian doorsets in their fully finished condition. In this case clause 5.3 is applicable to the Penkid window restrictor when it is fitted as a safety device.

Clause 5.3 BS 6375-2 Load bearing capacity of safety devices:

When fitted in accordance with the manufacturer's instructions and tested in accordance with BS EN 14609⁴ but with the safety device engaged, safety devices shall be capable of achieving the performance requirements given in BS EN 14351⁵. Test is 350 Newtons (N) applied for 60 seconds.

BS EN 13126-5:2011+A1:2014

Part 5 of BS EN 13126 specifies requirements and test methods for durability, strength, security and functionality of devices that restrict the opening of windows and door height windows.

The scope of BS EN 13126-5:2011+A1:2014 does not include child protective window restrictors intended to be installed by the end consumer (i.e. Do-it-yourself DIY) but is for child resistant locking devices intended to be installed by professionals. For the DIY market reference is made to BS EN 16281 (see below).

Clause 7.4.3 Child safety restrictor strength test procedure:

Open the sash and engage the restrictor in the intended stop position. Apply a force of 500 N without shock for 60 seconds to the sash in the direction of opening.

BS EN 16281:2013

Specifies requirements and test methods for locking devices fitted by consumers (i.e. Do-it-yourself) for restricting the opening of windows and balcony doors by children younger than 51 months and intended to prevent the passage of young children.

Clause 5.5.4 Mechanical protective function test (opening test):

Apply a force of 350 N on the sash in the opening direction without shock for 60 +10/-0 seconds. The force shall be applied at the most onerous position.

Clause 5.5.5 Structural integrity test:

Open the sash and engage the locking device. With the locking device engaged in the maximum opening position, apply a force of 500 N without shock for 60 +10/-0 seconds to the sash in the opening direction. Also, apply a force of 200 N without shock for 60 +10/-0 seconds to the locking device at a position and direction putting the most strain on the specimen to cause disengagement.



The initial test was with the restrictor limiting the window opening to 100 mm. Then with the restrictors limiting the opening to 89 mm and finally repositioning the components on the frames to give more leverage on the device.

Definitions:

Safety devices. In BS EN 14351-1:2006 safety devices are defined as retaining and reversing catches, restrictors, and fixing devices for cleaning procedures.

Safety restrictor. In BS EN 13126-5:2011+A1:2014 a safety restrictor is defined as a robust mechanical device intended to limit the initial movement of an active sash in a predetermined position, maximum 100 mm, to prevent accidental passage through the window.

Child safety restrictor. In BS EN 13126-5:2011+A1:2014 a child safety restrictor is defined as a robust mechanical device intended to limit the initial movement of an active sash in a predetermined position, maximum 89 mm, to prevent accidental passage of small children (passage of small children aged from 9 to 12 months in accordance with CEN/TR 13387 Child use and care articles – Safety guidelines).

Locking device. In BS 16281:2013 a locking device is defined as a device that limits the opening of a window or balcony door to a predetermined position.



3 Requirements

BS 6375-2

When tested to BS 6375-2, as described in Section 2 of this report, safety devices shall be capable of achieving the performance requirements given in BS EN 14351 that are to withstand a 350 Newtons (N) force applied for 60 seconds.

BS EN 13126-5:2011+A1:2014

When tested to BS EN 13126-5, as described in Section 2 of this report, safety restrictors shall remain engaged and the restrictor continue to function normally.

BS EN 16281:2013

When tested to BS EN 16281, as described in Section 2 of this report, locking devices shall remain engaged, unbroken with no cracking and without permanent deformation. The device shall continue to function normally during and after the tests.



4 Test specimens

Restrictors

Universal Hardware Supplies Ltd supplied three identical new specimens of Penkid window restrictors as described below. Manufacturer's fitting instructions were printed on each package.

- Type: Penkid window restrictor for inward or outward opening windows and doors.
- Lock unit: A metal unit with keep and key operated lock. The unit has two holes for fixings and a plastic cover that clips into position over the unit hiding the fixings.
- Restrictor unit: The restrictor unit has a 5.0 mm diameter steel cable with plastic cover (5.5 mm overall diameter with cover). Each end of the 200 mm cable has a swaged on metal ferrule. One end is captive in the part that fixes to the window or door frame and the other end is captive in a metal bolt that can be locked into the lock unit. A plastic cover clips into position over the unit hiding the two fixing points.
- Fixings: Four fixing screws are provided in the kit of parts. In this case the steel, self-drilling screws are 4.0 mm diameter x 30 mm long with countersunk heads.
- 3 mm diameter pilot holes were predrilled for ease of installation of the screws.

Window test specimen

The restrictors were fitted to an aluminium framed top hung, open outward window according to the manufacturer's fitting instructions. Wall thickness of the frame profiles is approximately 3 mm.



5 Test preparation

Tests commenced after at least one week had elapsed since the manufacture of the specimen restrictors and test window to allow weather strips to bed in and any sealants to fully cure. Storage and testing of the specimens were carried out in a non-destructive environment within the ranges of 10°C to 30°C and 25% to 75% relative humidity.

The test specimen window was mounted in the BRE test rig consisting of rigid steel sections and moveable steel columns adjusted to fit the specimen. The specimen window is held in the rig by clamps around its outside edge.

The test window was installed into a rigid steel test frame and the restrictors fixed with the screws provided by the manufacturer.



6 Results

The test results for Penkid window restrictors as supplied and described in Section 4 of this report are shown in Table 1 below. These results apply to the Penkid window restrictors fixed to an outward opening aluminium framed window. Figures in Annex A show detail of the Penkid window restrictors.

Test	Requirements	Result
BS 6375-2 Clause 5.3. 350 N for 60 seconds	Withstand the force for the required time	Met the requirement
BS EN 13126-5:2011+A1:2014 Clause 7.4.3. 500 N for 60 seconds	Remain engaged and the restrictor continues to function normally.	Met the requirements
BS EN 16281:2013 Clause 5.5.4 350 N for 60 seconds*	Remain engaged and unbroken with no cracking, without permanent deformation and continue to function normally during and after the tests.	Met the requirements
BS EN 16281:2013 Clause 5.5.5 500 N for 60 seconds** Window opening restricted to 89 mm	Remain engaged and unbroken with no cracking, without permanent deformation and continue to function normally during and after the tests.	Met the requirements
BS EN 16281:2013 Clause 5.5.5 200 N for 60 seconds	Remain engaged and unbroken with no cracking, without permanent deformation and continue to function normally during and after the tests.	Met the requirements
BS EN 16281:2013 Clause 5.5.5 500 N for 60 seconds** With the restrictor repositioned for a more severe test	Remain engaged and unbroken with no cracking, without permanent deformation and continue to function normally during and after the tests.	Met the requirements

*Essentially the same test as that for BS 6375-2 but with more requirements.

**Essentially the same test as that for BS EN 13126-5:2011+A1:2014 Clause 7.4.3 but with more requirements. Note that BS EN 13126-5:2011+A1:2014 is for child resistant locking devices intended to be installed by professionals. For the DIY market reference is made to BS EN 16281.

Table 1. Test results – Load bearing capacity of Penkid window restrictors



7 Summary

When the specimen Penkid window restrictors as supplied and described in Section 4 of this report were tested to the standards described herein they were found to be:

- Sufficiently strong to bear forces up to 500 N without failure
- Sufficiently strong to bear forces up to 200 N without disengagement

The results stated above apply to Penkid window restrictors fixed to outward opening aluminium window frames with the screws supplied by the manufacturer. Tests on different substrates and, or with different fixing screws to those tested may give different results, as may tests with inward opening components.

This was a load bearing capacity test of new Penkid window restrictors and cannot be considered as a durability test.



8 References

1. BS 6375-1:2009 Performance of windows and doors – Part 1: Classification for weathertightness and guidance on selection and specification. BSI London.
2. BS EN 13126-5 Building hardware – Hardware for windows and door height windows – requirements and test methods. Part 5: devices that restrict the opening of windows and door height windows. BSI London.
3. BS EN 16281:2003 Child protective products – Consumer fitted child resistant locking devices for windows and balcony doors – Safety requirements and test methods. BSI London.
4. BS EN 14609 Windows – Determination of the resistance to static torsion. BSI London.
5. BS EN 14351-1:2006+A1:2010 Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics. BSI London.

Annex A Photographs



Figure A1. Top hung, open outward aluminium window with Penkid window restrictor



Figure A2. Top hung, open outward aluminium window with Penkid window restrictor



Figure A3. Penkid window restrictor under test.



Figure A4. Penkid window restrictor under test – mounted higher up the frame, loads applied at bottom of window.