

The image features a dark blue background on the left and a white background on the right, separated by a vertical line. The left side is filled with a complex pattern of thin, yellow, curved lines that create a sense of motion and depth. The 'bre' logo is positioned on the left side of the blue area.

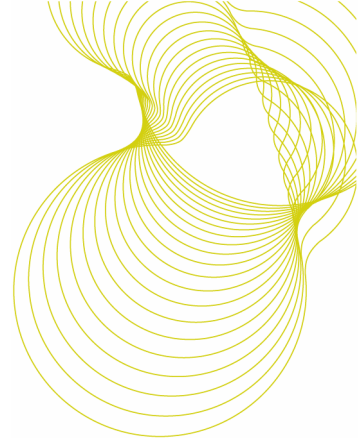
bre

**High speed wind tests  
on Ubbink Ubiflex  
Flashing system.**

Prepared for: Barry Donaghue  
of Ubbink uk Ltd

16<sup>th</sup> June 2008

Test report number 245-513



## Prepared by

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Position Senior Research Technician

Date 14<sup>th</sup> July 2008

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Position Associate director, Building Technology Group

Date 14<sup>th</sup> July 2008

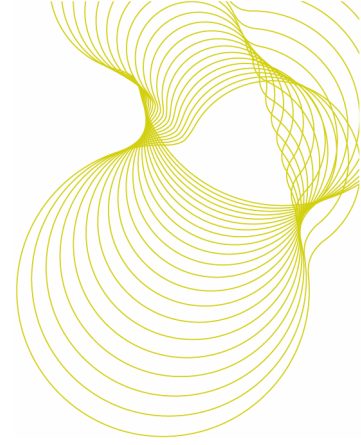
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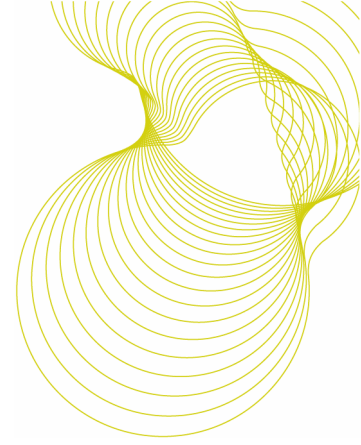
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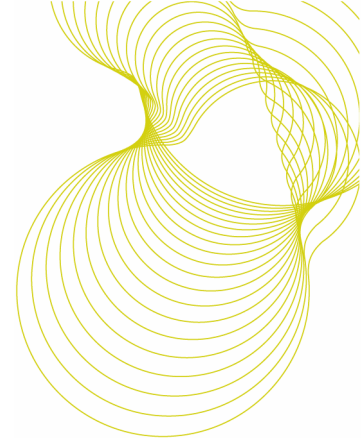


## 1 Introduction

This report details testing undertaken on 30<sup>th</sup> of May 2008 to assess the performance of Ubbink Ubiflex flashing in conjunction with two sealant compounds, firstly Ubi-Seal a 15mm wide butyl tape applied in a single layer and secondly High-Tack, an adhesive sealant compound. The Ubbink Ventilated Dry Ridge System was also tested. The systems were tested under high windspeed conditions. The testing was carried out at BRE, Bucknalls Lane, Watford, WD25 9XX, UK. The client for these tests was Mr Barry Donaghue of Ubbink UK Ltd, located at Borough Road, Brackley, Northants, NN13 7TB.

This testing is based on BRE Proposal No. 122020 dated 3rd March 2008, which was accepted by Mr Barry Donaghue of Ubbink UK Ltd on 28<sup>th</sup> May 2008.

The testing was carried out at BRE as project CV2483 under the BRE Terms and Conditions for Testing. This report describes the work carried and the results obtained.



## 2 Details of testing carried out

The objective of the testing was to assess the performance of the Ubbink Ubiflex flashing in conjunction with two types of sealant compound under high wind speed conditions and also to assess the performance of the Ubbink Ventilated Dry Ridge System. The test systems were installed on a 2m x 2m (plan dimensions) 30° pitch test roof which was mounted at the end of the BRE wind tunnel.

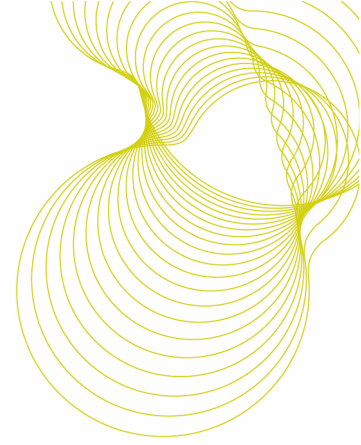
The flashings and sealant were used in conjunction with a chimney constructed from plywood and lined with brick slips which was intended to simulate conditions under which the products were expected to be used on a real roof.

In addition on one side of the roof a standard lead flashing was installed between the 2<sup>nd</sup> and 3<sup>rd</sup> course tiles across the width of the roof and between the 1<sup>st</sup> and 2<sup>nd</sup> course tiles a strip of Ubiflex flashing was installed across the width of the roof with no sealant. See Figures 1 and 2.

The Ubbink Ventilated Dry Ridge System was installed onto the roof in conjunction with Marley Segmented ridge tiles two to one side of the chimney and one to the other side. The ridge tiles were secured with metal ridge clips.

There is no defined procedure for testing systems such as these under wind loading. BS5534:2003 advises that dry roofing products such as verges, ridges, hips and valleys should not adversely affect the performance of a roof as laid. It is advised that users pay particular attention to the resistance to wind load of dry roofing products (Note 2 Clause 4.16.7).

It was decided in consultation with Ubbink that the most appropriate approach would be to subject the chimney and flashing to high windspeeds to observe how they respond. This was done by mounting the test roof at the end of the BRE high speed wind tunnel. The roof was placed on a turntable so that it could be rotated to subject it to winds from a range of directions. For each wind direction tested, the wind speed was increased in increments until the maximum speed of the wind tunnel was reached. The wind speed was held at a constant value for a period of approximately 3 minutes at each step increment. A video of the testing was also produced.



### 3 Details of the test products

The chimney and tiles were installed by Ubbink at their plant and the finished assembly was shipped to BRE for testing. Each side of the roof was tiled differently and opposite sides of the chimney the flashings were fixed with different sealants. The chimney consisted of a plywood frame surfaced with brick slips. The ridge was of three sections of Marley Segmented ridge tiles two to one side of the chimney one to the other side these were secured with metal ridge clips.

#### **Side 1. Double pantiles with Ubiflex and Ubi-Seal Sealant tape**

Tiled with four courses of double pantiles with a granular finish (Marley Mendips). Flashings around the chimney were Ubiflex sealed to the roof with a single strip of 15mm wide Ubi-Seal. See Figure 1.

#### **Side 2. Flat concrete tiles with Ubiflex and High-Tack Sealant**

Tiled with four courses of flat concrete tiles with a granular finish (Marley Modern). Between the 1<sup>st</sup> and 2<sup>nd</sup> course was a 150mm strip of Ubiflex flashing with no sealant and between the 2<sup>nd</sup> and 3<sup>rd</sup> course was a code 4 lead flashing installed for comparison. See Figure 2.

Flashings around the chimney were Ubiflex sealed to the roof with High-Tack Sealant.

#### **Roof ridge. Ubbink Ventilated Dry Ridge System**

This was installed across the roof ridge in conjunction with Marley Segmented ridge tiles and these were secured to the ridge with metal ridge clips. See Figures 3 and 4.

The following representatives from Ubbink were present to witness the testing. Keith Plummer, Barry Donaghue, Charlie Greenaway.

Further photographs of the test specimens are included in Annex A.

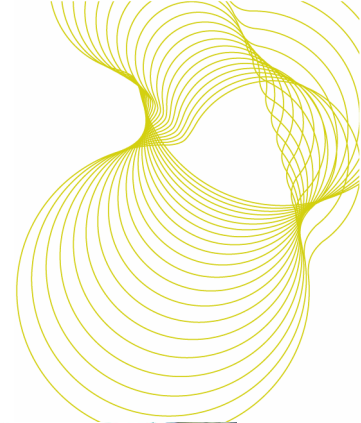


Figure 1. Side 1 Double pantiles and Ubiflex flashing around the chimney.

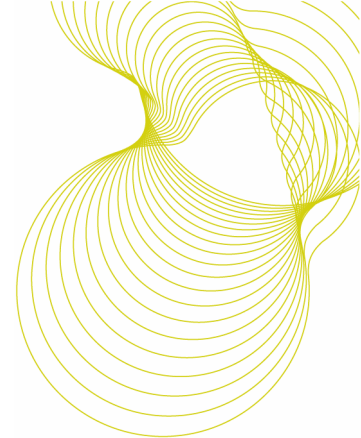


Figure 2. Side 2 Flat concrete tiles and flashing around chimney with additional flashing fitted between courses of the roof tiles.



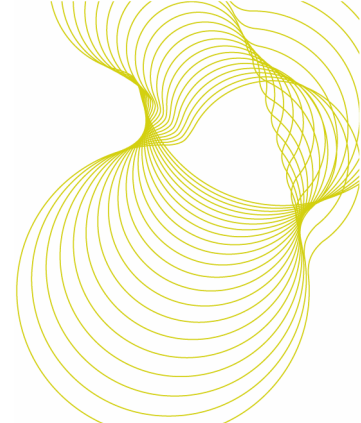


Figure 3 Side 2 showing detail of the Ubbink Ventilated Dry Ridge system

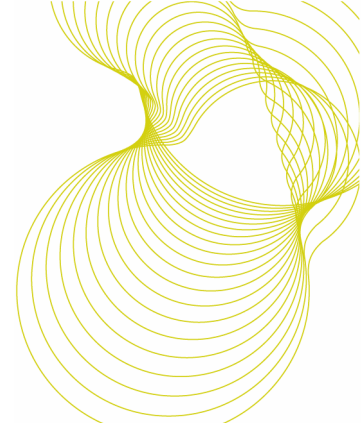
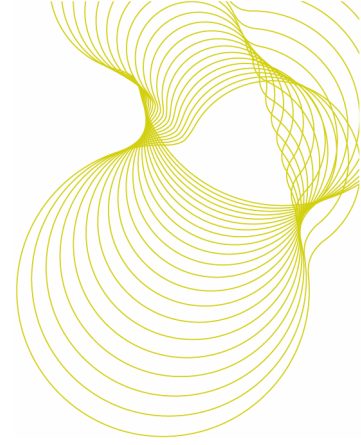


Figure 4 Side 1 showing detail of Ubbink Ventilated Dry Ridge system



## 4 Test results

### 4.1 High Speed Testing

The roof was tested with wind approaching from a range of wind directions. With wind blowing on to the gable end (wind direction 0°), on to the corner at 45° and on to the eaves (wind direction 90°). Log sheets of the tests are given in Annex B. The testing was also filmed and the wind speeds attained were indicated by holding a card in front of the Camera. Any tiles displaced during testing were reset before starting the next stage of testing.

#### 4.1.1 Testing of side 1. Double pantiles with Ubiflex and Ubi-Seal sealant

During testing the flashing around the chimney resisted the maximum wind speed of 49m/s (109mph) without visible damage.

At an angle of 45° and for wind speeds above 40m/s (90mph) the 1<sup>st</sup> and 2<sup>nd</sup> course tiles started to lift, this became severe at the maximum wind speed but the tiles stayed on the roof.

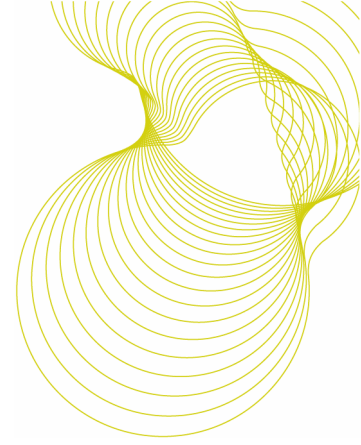
With the wind at 90° to the eaves tiles started lifting at a wind speed of 40 m/s (90mph) and the whole of the 2<sup>nd</sup> and 3<sup>rd</sup> course flipped up at a speed of 41m/s (92mph)

#### 4.1.2 Testing of side 2. Concrete flat tiles with Ubiflex and High-Tack sealant

During testing the flashing around the chimney resisted the maximum wind speed of 49m/s (110mph) without visible damage.

At an angle of 45° the unsealed Ubiflex flashing bent progressively back over the tiles as the wind speed increased the effects being more severe at the corner into the wind. The lead flashing started to lift at a wind speed of 35m/s (78mph) and this became progressively more severe as the wind speed increased. At a speed of 45m/s (101mph) the whole of the lead flashing flipped back lifting the 3<sup>rd</sup> course of tiles up to about 45° at which point they locked into position against the 4<sup>th</sup> course of tiles and remained in place.

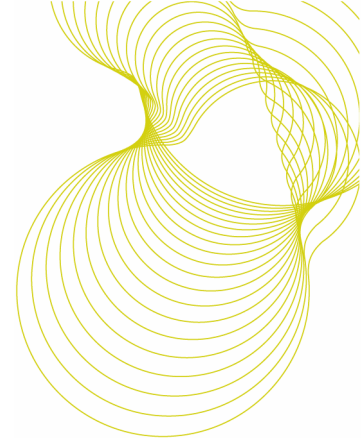
Prior to testing with the wind at 90° to the eaves the Ubiflex flashing was fixed to the roof with a strip of 15mm Ubi-Seal around the perimeter. This remained in place without any visible damage during the course of the test. During the course of the test the lead flashing lifted from the surface of the roof as the wind speed increased until at the end of the test it was bent back approximately 90° against the tiles. At 45m/s (101mph) on the left hand side of the roof the 3<sup>rd</sup> course of tiles lifted approximately 200mm but remained on the roof for the rest of the test.



#### **4.1.3 Testing of Ubbink Ventilated Dry Ridge system**

During the course of the testing described above there was no visible damage to the Ridge tiles or to the Ubbink Ventilated Dry ridge system.

To put a wind speed of 49m/s (110mph) into context, from BS6399: Part 2 (the British Standard for wind loading on buildings) the design wind speed to be expected on a two-storey house in the London area in a fifty year design life would be of the order of 25m/s (56mph) to 35m/s (78mph) (depending on factors such as the roof height, distance to sea and distance from the edge of the town and the heights and spacing of surrounding buildings). For a similar house in a town in Scotland the design wind speed would vary from about 35m/s (78mph) to 45m/s (101mph). These examples exclude the effects of topography and ground altitude. If the building is on the top of a steep hill then the wind speeds can be increased by up to 36%, wind speeds also increase by about 10% for every 100m increase in ground level. To determine the actual design wind speed at any particular site it is necessary to follow the procedures given in BS6399-2.

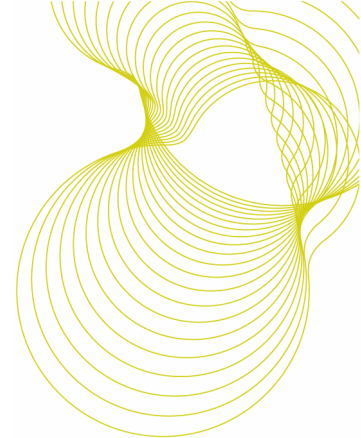


## 5 Summary

The results from these tests on the Ubiflex Flashing surrounding the chimney show that the flashing and the two types of sealant used will resist wind speeds of at least 49m/s (110mph) without failing or demonstrating any other visible signs of distress. It is very likely that these systems will be able to withstand higher wind speeds than the maximum applied during the testing, although this was not demonstrated in the testing because the maximum speed of the wind tunnel was reached.

Testing also demonstrated that the performance of the Ubiflex Flashing with either sealant type performed far better than Ubiflex flashing or standard lead flashing alone.

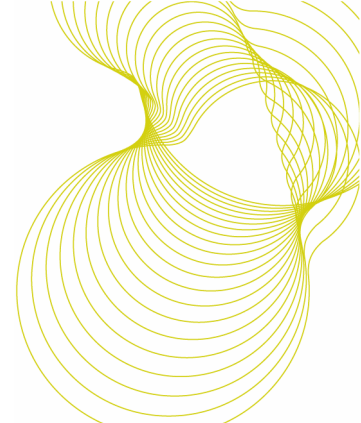
Testing demonstrated that the Ubbink Ventilated Dry ridge system in conjunction with Marley segmented roof tiles and metal ridge clips will resist wind speeds of at least 49m/s (110mph) without failing or demonstrating any other visible signs of distress. It is very likely that this system will be able to withstand higher wind speeds than the maximum applied during the testing, although this was not demonstrated in the testing because the maximum speed of the wind tunnel was reached.



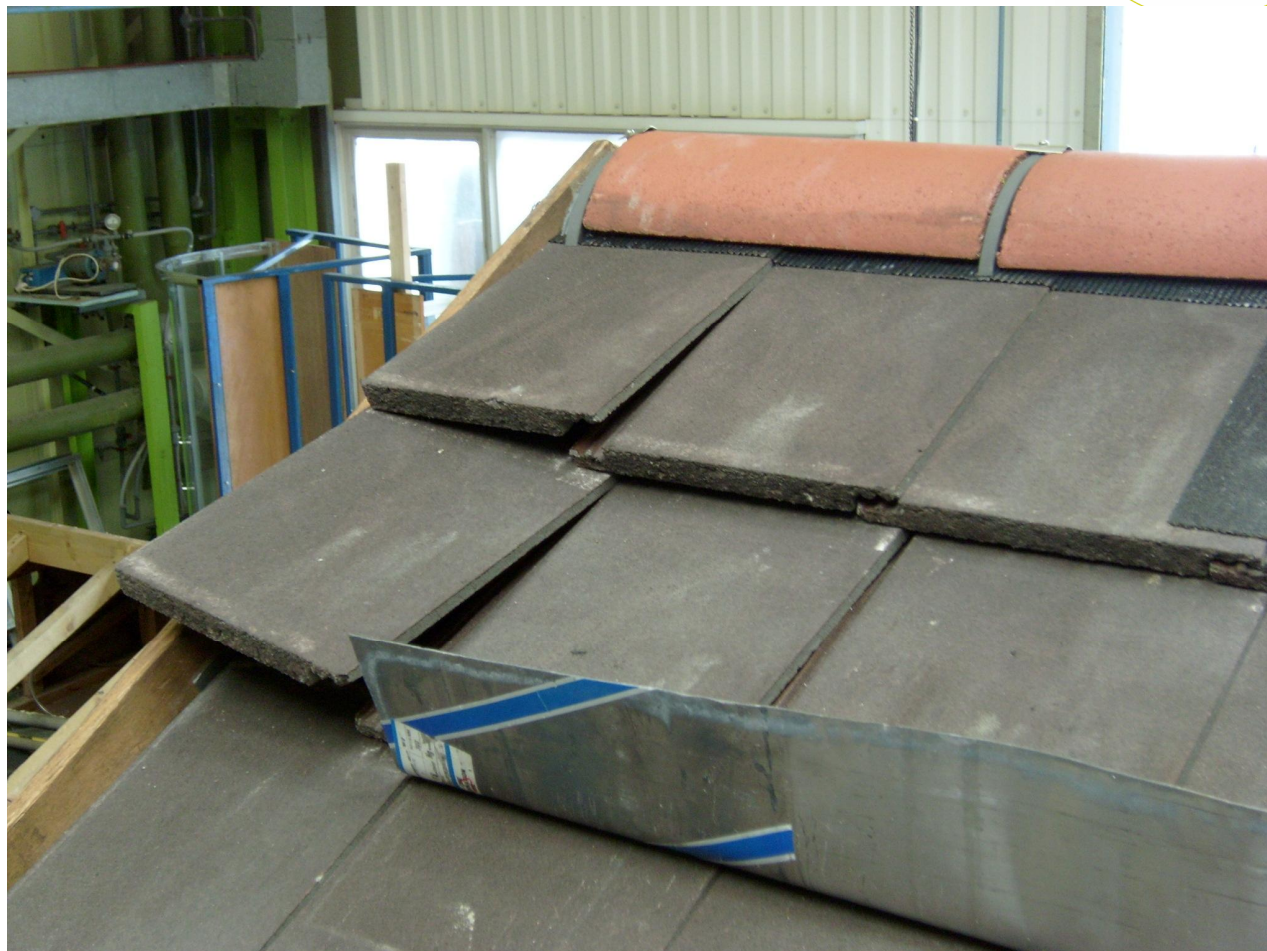
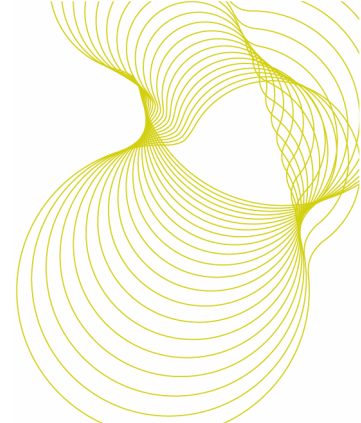
## Annex A - Additional photographs of the test specimens



**Figure A1** side 2 showing flashing after completed test programme 45m/s (101mph)

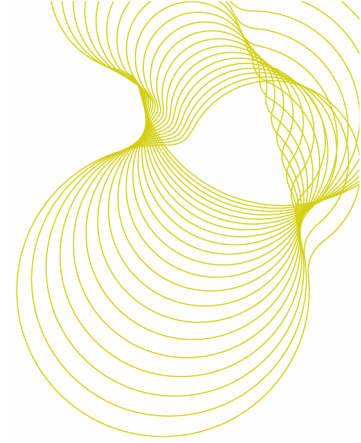


**Figure A2** side 2 after completed test programme showing damage to lead flashing and tiles 45m/s (101mph)



**Figure A3** side 2 showing detail of damage to lead flashing and displaced tiles at a wind speed of 45m/s (101mph)

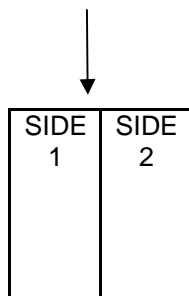




## Annex B - Test Results

### Test 1 Ubiflex flashing system with Ubi-Seal and High-Tack Sealant

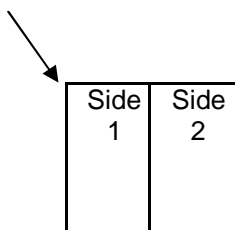
Wind direction 90°. Arrow indicates wind direction.



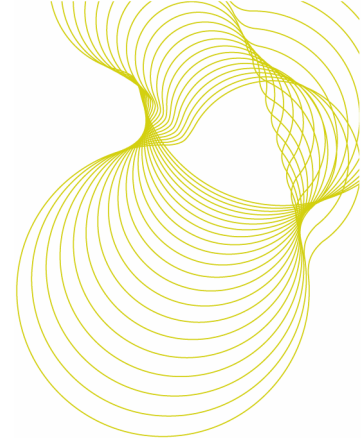
Wind speed m/s (mph)	Observations
25 (56)	No movement of tiles or flashing
30 (67)	No movement of tiles or flashing
35 (78)	No movement of tiles or flashing
40 (90)	No movement of tiles or flashing
45 (101)	No movement of tiles or flashing
49 (110)	No movement of tiles or flashing on side 1. Lead flashing lifting a little on side 2. No damage to the ridge system observed

### Test 2 Double pantiles and Ubiflex with Ubi-Seal Sealant

Wind direction 45°. Arrow indicates wind direction.

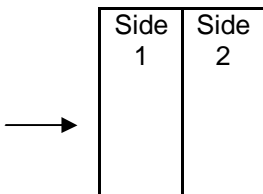


Wind speed m/s (mph)	Observations
25 (56)	No movement of tiles or flashing
30 (67)	No movement of tiles or flashing
35 (78)	No movement of tiles or flashing
40 (90)	1 <sup>st</sup> and 2 <sup>nd</sup> course tiles upstream corner lifting a little
45 (101)	Tiles as above lifting and dropping 50 to 70mm
49 (110)	Tiles as above lifting and dropping more, remaining in place. No damage to the ridge system observed



**Test 3 Double pantiles and Ubiflex with Ubi-Seal Sealant**

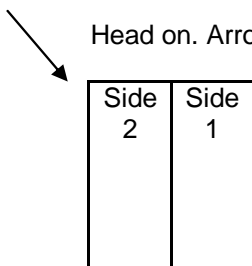
Head on. Arrow indicates wind direction.



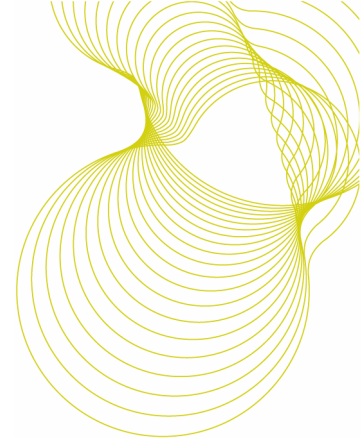
Wind speed m/s (mph)	Observations
25 (56)	No movement of tiles or flashing
30 (67)	No movement of tiles or flashing
35 (78)	No movement of tiles or flashing
40 (90)	1 <sup>st</sup> and 2 <sup>nd</sup> course tiles lifting a little especially towards edges
41 (92)	Whole of 2 <sup>nd</sup> and 3 <sup>rd</sup> course flips up 2 <sup>nd</sup> course locked into place by 3 <sup>rd</sup> course tiles. No damage to the ridge system observed

**Test 4 Flat concrete tiles with Ubiflex flashing between 1<sup>st</sup> and 2<sup>nd</sup> courses unsealed**

Head on. Arrow indicates wind direction.

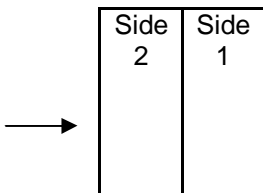


Wind speed m/s (mph)	Observations
25 (56)	Lead flashing lifting a little across the whole width, unsealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles lifting a little more than the lead and particularly at upstream corner
30 (67)	Lead flashing similar, unsealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles lifting more approx 50mm
35 (78)	Lead flashing lifting more particularly left corner, unsealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles lifting more left corner at 90° to roof
40 (90)	Unsealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles left corner bent back over tile
45 (101)	Lead flashing lifted and took 3rd course tiles with it wedging at 45° against 4 <sup>th</sup> course tiles. No damage to the ridge system observed



**Test 5 Flat concrete tiles with Ubiflex flashing between 1<sup>st</sup> and 2<sup>nd</sup> courses sealed with Ubiseal**

Head on. Arrow indicates wind direction.



Ubiflex flashing between 1<sup>st</sup> and 2<sup>nd</sup> course tiles sealed to roof with a perimeter of Ubi-Seal tape

Wind speed m/s (mph)	Observations
25 (56)	Lead flashing chattering a little, sealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles no movement
30 (67)	Lead flashing chattering a little, sealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles no movement
35 (78)	Lead flashing lifting and dropping approx 15mm, sealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles no movement
40 (90)	Lead flashing flips back to a little over 90 <sup>0</sup> to roof tiles, sealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles no movement
45 (101)	Lead flashing bent backwards to roof tiles a little, sealed Ubiflex flashing between 1 <sup>st</sup> and 2 <sup>nd</sup> course tiles no movement. No damage to the ridge system observed

=====REPORT ENDS=====