



BRE
Bucknalls Lane
Watford, Herts
WD25 9XX

+44 (0)333 321 8811
enquiries@bregroup.com
bregroup.com

TEST REPORT

Smart Limited – MCS 012
weathertightness testing on PF1 and
SF1 anchor and flashing kits

Prepared for: Smart Limited
Date: 12.09.2024
Report number: P128636-1003
Issue: 1
Status: Final - Commercial in Confidence

Prepared for:

Ben Share
Smart Limited
Enfield Works
Mucklow Hill
Halesowen
B62 8DL

Prepared by:

Name Manvir Singh
Position Project Engineer
Date 12 September 2024

Signature 

Test manager:

Name Devinder Athwal
Position Senior Laboratory Technician
Date 12 September 2024

Signature 

Authorised by:

Name Matt Hobbs
Position Senior Structural Engineer
Date 12 September 2024

Signature 

This report is made on behalf of Building Research Establishment Ltd. (BRE) and may only be distributed in its entirety, without amendment, and with attribution to BRE to the extent permitted by the terms and conditions of the contract. Test results relate only to the specimens tested.

BRE has no responsibility for the design, materials, workmanship or performance of the product or specimens tested. This report does not constitute an approval, certification or endorsement of the product tested and no such claims should be made on websites, marketing materials, etc. Any reference to the results contained in this report should be accompanied by a copy of the full this report, or a link to a copy of the full this report.

BRE's liability in respect of this report and reliance thereupon shall be as per the terms and conditions of contract with the client and BRE shall have no liability to third parties to the extent permitted in law.



Table of contents

1.	Executive summary	3
2.	Introduction	4
3.	Specimen details	4
3.1	Specimen 1	4
3.2	Specimen 2	5
4.	Test setup	6
4.1	Deluge – sub-test D	6
5.	Test results.....	8
	References.....	9

1. Executive summary

Weathertightness testing was carried out on two separate products using the procedure set out in MCS012 Issue 3.0 for sub-test D. A summary of the results is given in Table 1.

Table 1: Summary of results for both of Smart Limited’s products for sub-test D.

Product	Roof Pitch	Material	Bond	Batten Gauge	Lap	Observations
PF1 kit - Plain tile anchor and flashing	30.0°	Concrete Tiles	Broken	100mm	65mm	No leaks
SF1 kit - Slate roof anchor and flashing	22.5°	Fibre Cement Slate	Broken	250mm	100mm	No leaks

2.Introduction

The proposal for the testing, P128636-1001, was accepted by Ben Share, Smart Limited on the 17th July 2024.

The testing for this report took place on the 5th August 2024 in Building 21, BRE, Watford WD25 9XX.

This report details the tests undertaken to assess the weathertightness performance of two products, see section 3 for details of the products. The tests were carried out using the procedure set out in MCS012 Issue 3.0 [1].

3.Specimen details

All component and product references in this report were provided by Smart Limited.

Each specimen consisted of two products installed on a test roof. The test roofs were built on the BRE test rig to the client’s specification, a summary of each is specimen is given in Table 2.

Table 2: Specimen details.




Specimen	Product	Roof Pitch	Material	Bond	Batten Gauge	Lap
1	PF1 kit - Plain tile anchor and flashing	30.0°	Concrete tiles	Broken	100mm	65mm
2	SF1 kit - Slate roof anchor and flashing	22.5°	Fibre cement slate	Broken	250mm	100mm

3.1 Specimen 1

Concrete tiles were installed onto the BRE test rig at a batten gauge of 100 mm. Two PF1 kits were then installed. The test rig was then lifted into position and raised to a pitch of 30.0°.

Table 3 shows the components in the PF1 kit and Figure 1 shows them installed on the test rig.

Table 3: PF1 kit components.

Component Name	Part number	Image
Bracket	RAS 1	
Self tapping screw (25 mm)	P2	
Flashing (Plain tile)	PF1	
Rafter screw (80 mm x 6 mm)	P1	
Foam pad 170 mm	P3	

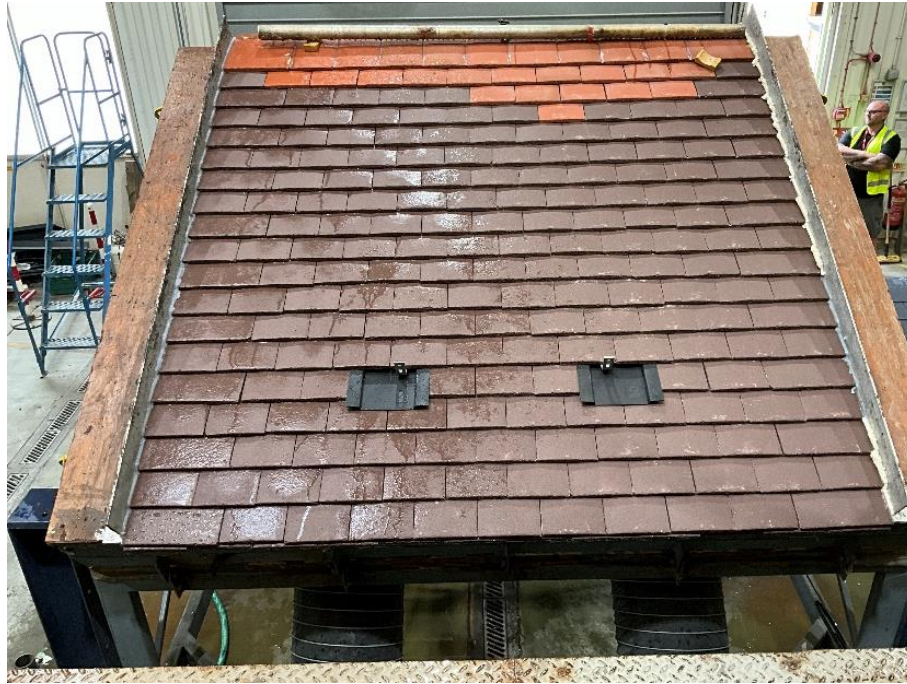





Figure 1: Specimen 1 on the BRE Test Rig.

3.2 Specimen 2

Fibre cement tiles were installed onto the BRE test rig at a batten gauge of 250 mm. Two SF1 kits were then installed. The test rig was then lifted into position and raised to a pitch of 22.5°.

Table 3: SF1 Kit Components.

Component Name	Part number	Image
Bracket	RAS 3	
Flashing	SF1	
Rafter screw (120 mm x 6 mm)	S1	
M8 Washer	S2	
Copper Rivet	S3	
PA45 Foam scrim pad	S4	
31 mm rubber washer	S5	


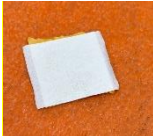
Component Name	Part number	Image
Wood Packer	S7	
Slab Pad	S8	



Figure 2: Specimen 2 on the BRE test rig.

4. Test setup

The weathertightness testing was conducted to the principles of MCS 012 Issue 3.0 [1] and the relevant sections of PD CEN/TR 15601:2012 [2], which it references.

The effect on the unprotected gaps of installing the products onto the test roof was not assessed.

The tests were conducted under sub-test D (deluge) of PD CEN/TR 15601 [2] using two fixing penetrations and without a solar panel in place.

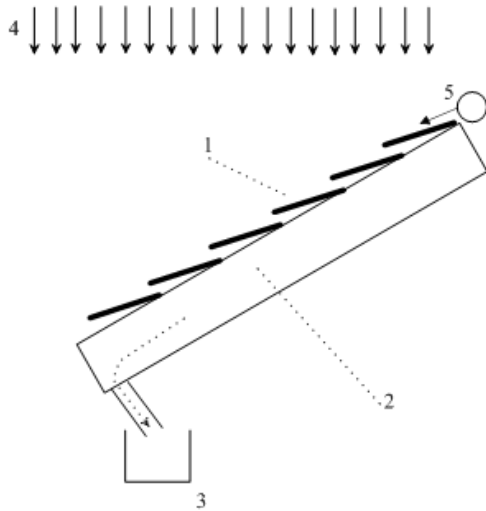
The BRE test rig consists of an adjustable frame on which the test specimen can be built and set to the test angle. Underneath the specimen is a chamber which can collect and measure any water that penetrates the specimen.

4.1 Deluge – sub-test D

Sub-test D of PD CEN/TR 15601 [2] specifies rainfall rates based on climate zone. The tests were conducted based on a climate zone of 'Northern Europe Coastal', which specifies a rainfall rate of 225 mm/h. This was applied to the specimens for 2 minutes with any observed leakage noted and measured.

At the top of the specimen water is released to simulate run-off water, and above the specimen water is released to simulate rain.

A diagram of the test rig is included as Figure 3, and a photo of a test in progress is included as Figure 4.



- 1. Test specimen
- 2. Chamber
- 3. Water collector
- 4. Rain
- 5. Run-off water



Figure 3: Diagram of the test rig.

Figure 4: Photo of the test rig during testing.

5. Test results

The pass / fail performance criteria for deluge (sub-test D) testing is set out in A3.34 of MCS 012 [1]. A product meets the criteria and passes when it does not worsen the performance of the roof covering.

No leakage was recorded for both Specimen 1 (PF1 Kit) and Specimen 2 (SF1 Kit). In each case the performance of the roof covering was not worsened by the installation of the product so both products passed sub-test D.

References

- [1] MCS 012 Issue 3.0 (2023), “The Solar Mounting Standard”, The MCS Service Company Ltd.
- [2] PD CEN/TR 15601:2012, “Hygrothermal performance of buildings – Resistance to wind-driven rain of roof coverings with discontinuously laid small elements – Test methods.”, BSI Standards Limited.