



0013

## PHYSICAL TESTING ANALYSIS REPORT

**Description:** Determination of Frost Resistance

**Test Method:** EN 539-2:2013

**Lucideon Reference:** (152667)-14945

**Client:** Tudor Roof Tile Company Limited  
Denge Marsh Road  
Lydd  
Kent  
TN29 9JH

**For the Attention of:** Mr. Paul Lythgoe

**Date Logged:** 03-Jul-2015

**Date of Tests:** 03-Jul-2015 to 07-Aug-2015

**Report Date:** 11-Aug-2015

**Purchase Order No.:** PjL010715

Please find attached the results for the sample(s) recently submitted for analysis.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

**Miss Zoe Kinally**  
**Author**

**CLAY ROOFING TILES –  
 TEST FOR FROST RESISTANCE FOR DISCONTINUOUS LAYING  
 DETERMINATION OF PHYSICAL CHARACTERISTICS  
 BS EN 539 Part 2 Test for Frost Resistance 2013**

**1 SAMPLES RECEIVED**

6 plain tiles with nominal dimensions of 265 x 160 mm, as sampled by client.

**2 TEST PROCEDURE**

**2.1 Saturation of Tiles**

The samples were dried at 110°C, weighed and examined for existing defects, then progressively immersed in water over a period of 5 days. After the tiles are fully immersed they are then left to soak for a further 72 hours, then they are removed and weighed. The water absorption results are given in Table 2.

**2.2 Freeze/Thaw Tests**

The tiles were tested according to the method described in BS EN 539-2: 2013 European Single Test Method using the apparatus illustrated in that standard. The tiles were examined at 30, 90 and 150 cycles.

**2.3 Results**

The tiles are assessed for damage using the criteria stated in Table 1.

**Table 1 - Interpretation of the Result**

|    |   | Front | Back           |
|----|---|-------|----------------|
| 1  | Pit                                     | -     | -              |
| 2  | Hair Crack                              | -     | -              |
| 3  | Nascent Crack                           | -     | -              |
| 4  | Surface Crack                           | X     | X <sup>a</sup> |
| 5  | Surface Damage (chip, peeling, flaking) | X     | X <sup>a</sup> |
| 6  | Structural                              | X     | X              |
| 7  | Loss of Interlocking ribs               | X     | X              |
| 8  | Break                                   | X     | X              |
| 9  | Delamination                            | X     | X              |
| 10 | Loss of all Nibs                        | X     | X              |

**X** = unacceptable / **-** = acceptable

Note: the degree of damaging can be demonstrated through a change in the impermeability and/or flexural strength of the product

<sup>a</sup> Where the degree of damage indicates that the functional performance of the product would not be assured.

**Lucideon Reference:** (152667)-14945  
**Customer Reference:** Plain & Peg  
**Description:** Tudor Roof Tile Handmade Various Colours

**Table 2**

| Tile No:    | % Water Absorption | Frost Damage      |                  |                   |                  |                    |                   |
|-------------|--------------------|-------------------|------------------|-------------------|------------------|--------------------|-------------------|
|             |                    | 30 Cycles (Front) | 30 Cycles (Back) | 90 Cycles (Front) | 90 Cycles (Back) | 150 Cycles (Front) | 150 Cycles (Back) |
| 1           | 4.6                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| 2           | 4.5                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| 3           | 5.0                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| 4           | 4.6                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| 5           | 4.2                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| 6           | 4.1                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |
| <b>Mean</b> | 4.5                | No Damage         | No Damage        | No Damage         | No Damage        | No Damage          | No Damage         |

The tiles were examined after 150 cycles for signs of damage due to the action of frost.

### 3 SUMMARY AND CONCLUSIONS

The samples meet the criteria for level 1 minimum 150 cycles in the above standard.

**END OF TEST REPORT**