

**PHYSICAL TESTING ANALYSIS REPORT**

**Description:** Determination of Frost Resistance

**Test Method:** In House Method based on prEN772-22

**Lucideon Reference:** (174449)-34355

**Client:** Plansure Building Products Ltd  
Units A-C  
Birdlymess Farm  
Porton Road  
Porton  
Salisbury  
SP4 0ND

**For the Attention of:** Mr. Scott Rawlinson

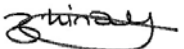
**Date Logged:** 27-Sep-2017

**Date of Tests:** 17-Oct-2017 to 15-Nov-2017

**Report Date:** 21-Nov-2017

**Purchase Order No.:** PC5112

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



**Miss Zoe Kinally  
Manager**

## **DETERMINATION OF FREEZE/THAW RESISTANCE OF CLAY MASONRY UNITS (Tested in Accordance with DD/CEN/TS 772:22: 2006)**

### **1 SAMPLES RECEIVED**

Blocks of flint faced concrete of varying sizes were received from the client for testing.

### **2 TEST PROCEDURE**

#### **2.1 Introduction**

The test has been carried out in accordance with the European Method DD CEN/TS EN 772-22: 2006 which involves subjecting a panel of brickwork to repeated freeze-thaw cycles designed to simulate naturally occurring conditions. From the test the bricks are given a freeze-thaw resistance classification, which categorises the bricks as being suitable to withstand the following conditions:

- F2 – Severe Exposure
- F1 – Moderate Exposure
- F0 – Passive Exposure

The test method is summarised as follows:

#### **2.2 Sample Preparation**

Each unit was numbered and any existing defects on individual bricks noted before testing.

#### **2.3 Construction of Test Panel**

A panel of units was built to give approximate dimensions 740 x 660mm as shown in Figure 1 below. The panel was then pointed and left to cure in ambient laboratory conditions for a minimum of 3 days before testing.



**Figure 1 – Construction of panel**



## 2.4 Freeze/Thaw Cycles

The panel was immersed in water at room temperature for 7 days before installation in a freeze-thaw apparatus which subjects the main face of the panel to repeated cycles of freezing and thawing following an initial freeze at an air temperature of -15°C for 6 hours. The rear of the panel was insulated with a 50 mm thick extruded polystyrene foam board and the sides insulated with a 25mm thick polystyrene board.

A freeze-thaw cycle consists of 120 minutes ( $\pm 5$  mins) of freezing to -15°C ( $\pm 3$ °C) air temperature, heating with re-circulated warm air to 20°C ( $\pm 3$ °C) for 20 minutes, 2 minute flood coat spray at a water temperature of 18-25°C followed by a two minute drain period. This gives 10 cycles every 24 hours and a standard test will continue for 100 cycles.

## 2.5 Assessment of Freeze/Thaw Resistance

The panel was examined after 15 and 50 cycles. After 100 cycles the panel was allowed to thaw completely, removed from the apparatus and photographed. The panel was then dismantled and individual bricks examined for frost damage as categorised in Table 1.

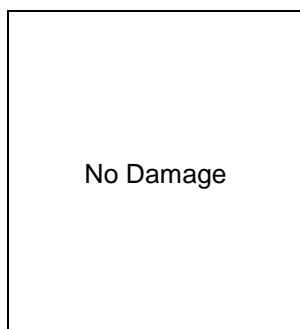
**Table 1**

Categories/Types of Damage	Type
None	0
Crater (e.g. lime-burst)	1
Hair Crack $\leq 0.2$ mm	2
Minor Crack	3
Surface Crack $> 0.2$ mm	4
Through Crack	5
Chipping, Peeling, Scaling	6
Fracture	7
Spalling, Delamination	8

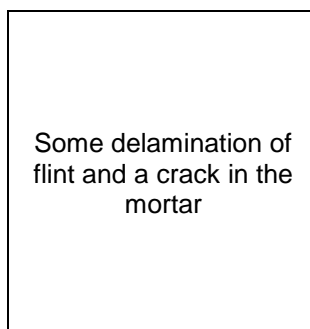
## 2.6 Results

### Incidence of Damage

#### After 10 Cycles



#### After 50 Cycles



#### After 100 Cycles

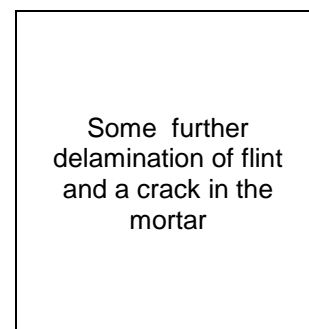




Figure 2 – Images of damage at 50 cycles and at 100 cycles at the end of the test.

### 3 CONCLUSIONS

From the test carried out damage greater than type 3 (see Table1) was observed after 100 freeze-thaw cycles and therefore the units are classified as being F1 i.e. suitable for use in conditions of moderate exposure.

Guidance on the type of masonry subject to moderate exposure conditions is given in Appendix B3.3 of BS EN 771-1 “Specifications for Clay Masonry Units”

Additional guidance may be offered by the manufacturer and the use of these bricks in specific situations.

**END OF TEST REPORT**