



0013

## PHYSICAL TESTING ANALYSIS REPORT

**Description:** Determination of Frost Resistance

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

**Lucideon Reference:** (18161)-1498/CR1

**Client:** Dreadnought Tiles  
Dreadnought Works  
Dreadnought Road  
Pensnett  
Brierley Hill  
West Midlands  
DY5 4TH

**For the Attention of:** Christopher Dyke

**Date Logged:** 10-Jan-2018

**Date of Tests:** 04-Apr-2018 to 10-May-2018

**Report Date:** 13-Jun-2018

**Purchase Order No.:** 29126

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.

**This report supersedes the report dated 16 May 2018 Ref: (18161)-1498 Determination of Frost Resistance.**

**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**

35 regular shaped, smooth solid clay bricks with dimensions of 215 x 102.5 x 65 mm were received for testing as sampled by the client.

**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

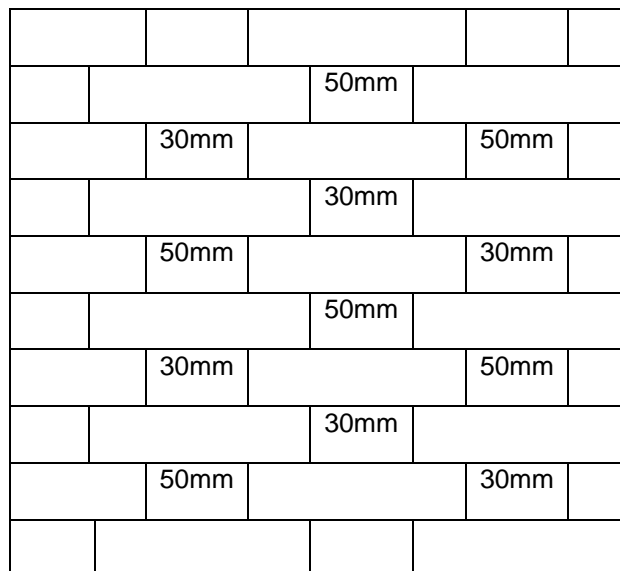
The test method is summarised as follows:

**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 brickwork consisting of 10 courses of bricks was built to give a panel of approximate dimensions 740 x 660 mm some header were projected 30 mm and 50 mm as shown in the diagram below. A 1:4 by volume High Alumina Cement: Sand mortar was used with a bucket handle tooled finish to the joint. The panel was then left to cure in ambient laboratory conditions for a minimum of 3 days before testing.





## 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 (+5 mins) of freezing to -15°C (+3°C) air temperature, heating with re-circulated warm air to 20°C(+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

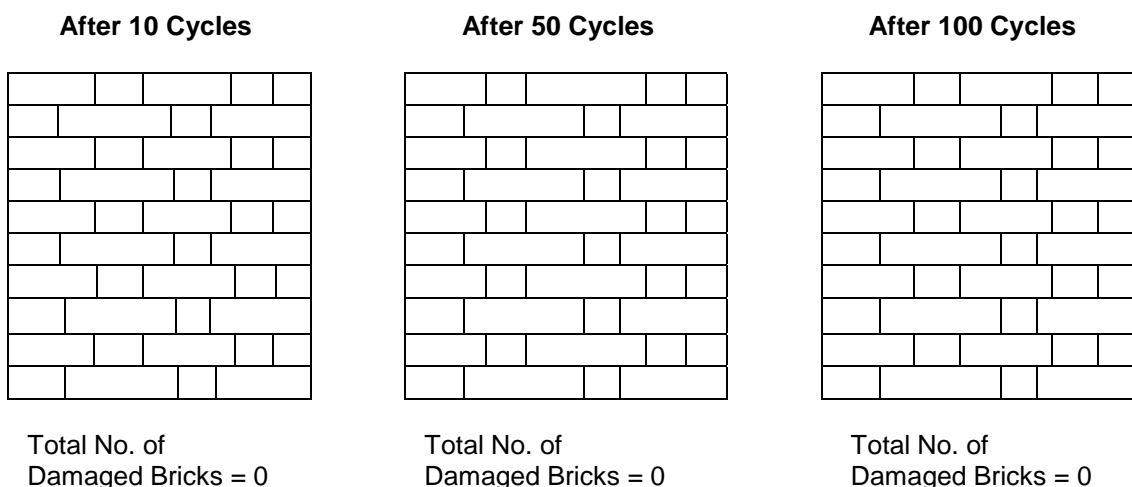
The panel was examined after 10 and 50 cycles. After 100 cycles the panel was allowed to thaw completely, removed from the apparatus and photographed. The panel was then dismantled and individual bricks examined for frost damage as categorised in Table 1.

**Table 1**

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

## 2.6 Results

### Incidence of Damage



Incipient delamination detected by tapping the face of the panel with a metal rod is reported as **C** at 10 and 50 cycles if delamination is confirmed at 100 cycles.

**Lucideon Reference:** (18161)-1498/CR1  
**Customer Reference:** WC65  
**Description:** 65mm Solid Ketley Class A Bricks



### **3 CONCLUSIONS**

From the test carried out no damage greater than type 3 (see Table 1) was observed after 100 freeze-thaw cycles and therefore the units are classified as being F2 i.e. suitable for use in conditions of severe exposure.

Guidance on the type of masonry subject to severe exposure conditions is given in Appendix B3.2 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**