

**PHYSICAL TESTING ANALYSIS REPORT**

**Description:** Determination of Initial Shear Strength

**Test Method:** EN1052-3

**Lucideon Reference:** (135405)-22969/CR1

**Client:** Birchover Stone Ltd  
Capstone House  
Dunston Way  
Off Dunston Road  
Chesterfield  
S41 9RD

**For the Attention of:** Mr Nigel Morton

**Date Logged:** 22-Oct-2013

**Date of Tests:** 02-Jan-2014 to 29-Jan-2014

**Report Date:** 20-Mar-2014

**Purchase Order No.:** 08091

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 issued on 12 February 2014 Ref: (135405) - 22969 Determination of Initial Shear Strength.**



**Mr Simon Hall**  
**Author**

## DETERMINATION OF INITIAL SHEAR STRENGTH BS EN 1052-3:2002

### 1 INTRODUCTION

Units of Birchover natural stone were received from the client for testing for shear strength to BS EN 1052-3:2002: Methods of Test for Masonry – Part 3: Determination of Initial Shear Strength.

### 2 SAMPLES RECEIVED

The units received were referenced as 'Birchover Gritstone' with nominal dimensions as follows; 445 x 100 x 142mm (Length x Width x Height).

The units were solid with a natural stone face and pinkish-grey (5YR 8-1) in colour.

The units were allowed to condition in the laboratory for at least 7 days prior to construction of the test specimens.

### 3 METHOD OF CONSTRUCTION

Nine stack-bonded specimens were constructed: the stack bonded specimens consist of three units stacked on top of each other with each course separated by a 10mm mortar bed. Following construction the specimens were pre-compressed by a uniform mass to give a vertical stress of nominally  $3.5 \times 10^{-3} \text{ N/mm}^2$ . The specimens were close covered with polythene sheets for 28 days at ambient laboratory temperatures, typically 14-18 °C with a relative humidity between 60% and 75%.

The specimens were cured using the prescribed method detailed in BS EN 1052-3:2002.

Mortar properties of the specimens are given in Table 1.

### 4 METHOD OF TEST

A specimen was placed into the testing rig such that the faces of the masonry units where the shear load is applied were plane and perpendicular to the direction of the load.

Testing was carried in accordance with 'Procedure A', as detailed in clause 8.2.1 of BS EN 1052-3:2002.

As the compressive strength of the supplied units was in excess of  $10 \text{ N/mm}^2$ , pre-compressions of 0.2, 0.6 and  $1.0 \text{ N/mm}^2$  were applied.

The loading rate was that as prescribed in the standard.

### 5 RESULTS

Individual shear results are shown in Table 2. A chart of shear strength versus pre-compression is given in the Appendix.

### 6 SUMMARY

The characteristic initial shear strength of the 'Birchover Gritstone' units, manufactured by Birchover, tested with designation (iii) mortar was  $0.10 \text{ N/mm}^2$ .

**Table 1: Mortar Properties to BS EN 998-2**

Test Identification	Test Specification	Air Content (%)	Flow Value	Compressive Strength (N/mm <sup>2</sup> )
Shear Strength	BS EN 1052: Part 3:2002	4.5	120	4.2

**Table 2: Birchover Gritstone Initial Shear Strength Results**

Sample No.	Date of Construction	Date of Testing	$F_{i,max}$ Maximum Shear Load (N)	Length (mm)	Width (mm)	$f_{pi}$ Precompressive stress of individual sample (N/mm <sup>2</sup> )	$f_{voi}$ Shear Strength of an individual sample (N/mm <sup>2</sup> )	Failure Mode
1	02/01/14	28/01/14	25240	442	100	0.20	0.29	A1
2			15540	441	99	0.20	0.18	A1
3			27490	365	100	0.20	0.38	A1
4			46480	441	100	0.60	0.53	A1
5			46170	440	99	0.60	0.53	A1
6			39680	441	99	0.60	0.45	A1
7			70000	443	100	1.00	0.79	A1
8			69260	441	100	1.00	0.79	A1
9			82300	441	100	1.00	0.93	A1

- . Mean Value Initial Shear Strength = 0.12 (N/mm<sup>2</sup>)
- . Characteristic Mean Value Initial Shear Strength = 0.10 (N/mm<sup>2</sup>)
- . Angle of Internal Friction = 35°
- . Characteristic value of internal Friction = 28°

**NOTE:** The results given in this report apply only to the samples that have been tested.

**END OF TEST REPORT**

**APPENDIX**

**Chart 1**

Shear Strength versus pre-compression of Birchover Gritstone Units Manufactured by Birchover Chesterfield

