

# **BS 680 Assessment of “Matthew Charlton Chinese Blue Black 4-7mm” Natural Roofing Slate**

*Report commissioned by*  
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NE46 1QL

**IBIS Report 1448-002, May 2007**



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**Services**

*expert witness  
consultancy  
geological appraisal  
roped access  
testing including NDT  
quarry evaluation  
condition surveys  
heritage consultancy  
façade investigation  
fire damage  
blast damage  
petrography  
design advice  
thermography  
dye testing  
accident investigation  
GPR (radar)  
maintenance  
endoscopy  
X-ray diffraction  
scanning electron  
micro-analysis  
conservation advice  
microscopy  
bespoke solutions*

**Materials**

*building stone  
roofing slate  
concrete  
external cladding  
plaster  
render  
high alumina cement  
screed  
paint  
internal lining  
rock  
aggregate  
mortar  
composites  
brick  
ceramic  
terracotta  
faience  
dimension stone  
glass  
lime & hydraulic lime  
pozzolana  
cement  
dusts*

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For IBIS Limited

### Barry J Hunt

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Director

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# **BS 680 Assessment of “Matthew Charlton Chinese Blue Black 4-7mm” Natural Roofing Slate**

## **1 INTRODUCTION**

At the request of the Client, advised “Matthew Charlton Chinese Blue Black 4-7mm” natural roofing slate of nominal 400mm by 250mm size, has been subjected to independent testing in accordance with the procedures given in the former British Standard.

This report briefly describes the assessment procedures carried out and the results obtained which are provided in more detail in the Appendix. Remarks are then provided concerning the likely performance of the slate when used for roofing purposes.



## 2 ASSESSMENT METHODS AND RESULTS

### 2.1 Sampling

The slates used for the testing were sampled by IBIS from a batch of 70 slates submitted by the Client. A total of 9 slates were randomly selected to provide enough material for the required testing. The sample details are provided below in **Table 2.1**, which includes a schedule of the tests carried out.

**Table 2.1: Schedule of Samples and Testing**

| IBIS Reference | Sample Details                                                             | Test Carried Out            |
|----------------|----------------------------------------------------------------------------|-----------------------------|
| 1448/1-3       | Advised "Matthew Charlton Chinese Blue Black 4-7mm" natural roofing slates | Water Absorption            |
| 1448/4-6       |                                                                            | Wetting & Drying Resistance |
| 1448/7-9       |                                                                            | Acid Resistance             |
| 1448/10-70     |                                                                            | Spare                       |

### 2.2 BS 680 Testing

The nine test specimens were subjected to the procedures described in BS 680<sup>1</sup>. The nine test specimens were split into three sets of three test specimens for water absorption, wetting and drying resistance, and acid resistance testing. The detailed test procedures and results are provided in the Certificates of Testing and Analysis given in **Appendix A**. A summary of the results is given below in **Table 2.2**.

**Table 2.2: Summary of BS 680 Test Results**

| Test             | Result    | Classification |
|------------------|-----------|----------------|
| Water Absorption | 0.3 %     | Pass           |
| Wetting & Drying | No change | Pass           |
| Acid Resistance  | No change | Pass           |

<sup>1</sup>

BS 680: 1971. Specification for Roofing Slates. Part 2, Metric Units. British Standards Institution, London, UK.



### 3 REMARKS

An assessment has been carried out to assess the properties of advised "Matthew Charlton Chinese Blue Grey 4-7mm" natural roofing slate. The slate passed the three criteria given in the BS 680 for water absorption, wetting and drying resistance and acid resistance. On this basis the roofing slate is considered to be acceptable for roofing purposes.

It must be remembered that BS 680 has been superseded by BS EN 12326<sup>2</sup>. In order to comply with the England and Wales Building Regulations all slates must now conform to the new standard.

Any samples taken for laboratory investigation will be retained for a period of one month from the date of this report. After this time the samples will be disposed of unless otherwise instructed. On request the samples may be either returned or stored, either action incurring a small administration charge.

These remarks conclude the work so far requested and should be taken as being applicable only to materials properly represented by these samples. Natural roofing slate resources may be expected to exhibit both lateral and vertical variations in composition and properties and single or small samples necessarily may not be reliably representative of a resource or even specific locations within that resource.

If you require any further assistance in this matter please do not hesitate to contact us.

<sup>2</sup>

BS EN 12326: Slate and stone products for discontinuous roofing and cladding.  
Part 1: 2004, Product Specification.  
Part 2: 2001, Methods of Test.  
Published by the British Standards Institution, London, England.



# **BS 680 Assessment of “Matthew Charlton Chinese Blue Black 4-7mm” Natural Roofing Slate**

## **Appendix A BS 680 Test Results**

### **Contents**

Certificate No. 2138/1448: Water Absorption of Natural Roofing Slate  
Certificate No. 2139/1448: Wetting & Drying Resistance of Natural Roofing Slate  
Certificate No. 2140/1448: Acid Resistance of Natural Roofing Slate



## Certificate of Testing & Analysis Water Absorption of Natural Roofing Slate BS 680: 1971

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| Client and Sample Details |                                                                                                                 |                     |             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------|-------------|
| <b>Client</b>             | The Charlton Group Ltd, Charlton House, Chisholm Place, Hexham, Northumberland, NE46 1QL                        |                     |             |
| <b>IBIS Ref. No</b>       | 1448                                                                                                            | <b>Sample No</b>    | 1-3         |
| <b>Source</b>             | Ex-China                                                                                                        |                     |             |
| <b>Sample Details</b>     | Nominal 400mm by 250mm natural roofing slate<br>Advised to be "Matthew Charlton Chinese Blue Black 4-7mm" slate |                     |             |
| <b>Sampled by</b>         | Client                                                                                                          | <b>Date Sampled</b> | Not advised |
| <b>Tested by</b>          | PS-JEL                                                                                                          | <b>Date Tested</b>  | 10-17.04.07 |

### Services

*expert witness  
consultancy  
geological appraisal  
roped access  
testing including NDT  
quarry evaluation  
condition surveys  
heritage consultancy  
façade investigation  
fire damage  
blast damage  
petrography  
design advice  
thermography  
dye testing  
accident investigation  
GPR (radar)  
maintenance  
endoscopy  
X-ray diffraction  
scanning electron  
micro-analysis  
conservation advice  
microscopy  
bespoke solutions*

| Methods of Testing and Analysis |                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Method</b>                   | British Standard BS 680: 1971. Standard Specification for Roofing Slate, Part 2, Metric Units.<br>The method has been withdrawn as a British Standard and is now superseded by BS EN 12326: Part 2: 2000.       |
| <b>Comments</b>                 | Three nominal 50mm square specimens were selected from a batch of nine slate samples and tested by determining the weight gain following immersion in boiling water for a period of 24 hours after oven drying. |
| <b>Accreditation</b>            | The test was carried out by a UKAS accredited laboratory that retains specific UKAS accreditation for the test.                                                                                                 |

### Materials

*building stone  
roofing slate  
concrete  
external cladding  
plaster  
render  
high alumina cement  
screed  
paint  
internal lining  
rock  
aggregate  
mortar  
composites  
brick  
ceramic  
terracotta  
faience  
dimension stone  
glass  
lime & hydraulic lime  
pozzolana  
cement  
dusts*

| Results               |                                                                      |              |             |
|-----------------------|----------------------------------------------------------------------|--------------|-------------|
| <b>Absorption, %</b>  | 0.32                                                                 | <b>Range</b> | 0.30 – 0.34 |
| <b>Other Details</b>  | The slates remained intact during the immersion phase of the testing |              |             |
| <b>Classification</b> | Pass                                                                 |              |             |

### Remarks

The mean water absorption rounded to one decimal place was found to be 0.3% and equal to the maximum 0.3% limit given in the standard.

Date of Issue: 05.05.07

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**Certificate of Testing & Analysis**  
**Wetting & Drying Resistance of Natural Roofing Slate**  
**BS 680: 1971 (Withdrawn July 2004)**

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| Client and Sample Details |                                                                                                                 |                     |                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------|----------------|
| <b>Client</b>             | The Charlton Group Ltd, Charlton House, Chisholm Place, Hexham, Northumberland, NE46 1QL                        |                     |                |
| <b>IBIS Ref. No</b>       | 1448                                                                                                            | <b>Sample No</b>    | 4-6            |
| <b>Source</b>             | Ex-China                                                                                                        |                     |                |
| <b>Sample Details</b>     | Nominal 400mm by 250mm natural roofing slate<br>Advised to be "Matthew Charlton Chinese Blue Black 4-7mm" slate |                     |                |
| <b>Sampled by</b>         | Client                                                                                                          | <b>Date Sampled</b> | Not advised    |
| <b>Tested by</b>          | PS-JEL                                                                                                          | <b>Date Tested</b>  | 10.04-01.05.07 |

**Services**

*expert witness  
consultancy  
geological appraisal  
roped access  
testing including NDT  
quarry evaluation  
condition surveys  
heritage consultancy  
façade investigation  
fire damage  
blast damage  
petrography  
design advice  
thermography  
dye testing  
accident investigation  
GPR (radar)  
maintenance  
endoscopy  
X-ray diffraction  
scanning electron  
micro-analysis  
conservation advice  
microscopy  
bespoke solutions*

| Methods of Testing and Analysis |                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Method</b>                   | British Standard BS 680: 1971. Standard Specification for Roofing Slate, Part 2, Metric Units.<br>The method has been withdrawn as a British Standard and is now superseded by BS EN 12326: Part 2: 2000.                                                                                                   |
| <b>Comments</b>                 | Three nominal 50mm square specimens were selected from a batch of nine slate samples and tested by completing 15 cycles of immersion in deionised water for 6 hours followed by drying at 105°C for at least 17 hours. The specimens were allowed to cool to room temperature prior to the immersion phase. |
| <b>Accreditation</b>            | The test was carried out by a UKAS accredited laboratory that retains specific UKAS accreditation for the test.                                                                                                                                                                                             |

**Materials**

*building stone  
roofing slate  
concrete  
external cladding  
plaster  
render  
high alumina cement  
screed  
paint  
internal lining  
rock  
aggregate  
mortar  
composites  
brick  
ceramic  
terracotta  
faience  
dimension stone  
glass  
lime & hydraulic lime  
pozzolana  
cement  
dusts*

| Results                |               |
|------------------------|---------------|
| <b>Softening</b>       | None observed |
| <b>Delamination</b>    | None observed |
| <b>Surface Flaking</b> | None observed |
| <b>Splitting</b>       | None observed |
| <b>Other Details</b>   | None          |
| <b>Classification</b>  | Pass          |

**Remarks**

On the basis that the samples did not exhibit any signs of softening, delamination, surface flaking or splitting, the slate was considered to have passed the test.

Date of Issue: 05.05.07

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## Certificate of Testing & Analysis Acid Resistance of Natural Roofing Slate BS 680: 1971 (Withdrawn July 2004)

| Client and Sample Details |                                                                                                                 |                     |             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------|-------------|
| <b>Client</b>             | The Charlton Group Ltd, Charlton House, Chisholm Place, Hexham, Northumberland, NE46 1QL                        |                     |             |
| <b>IBIS Ref. No</b>       | 1448                                                                                                            | <b>Sample No</b>    | 7-9         |
| <b>Source</b>             | Ex-China                                                                                                        |                     |             |
| <b>Sample Details</b>     | Nominal 400mm by 250mm natural roofing slate<br>Advised to be "Matthew Charlton Chinese Blue Black 4-7mm" slate |                     |             |
| <b>Sampled by</b>         | Client                                                                                                          | <b>Date Sampled</b> | Not advised |
| <b>Tested by</b>          | PS-JEL                                                                                                          | <b>Date Tested</b>  | 10-24.04.07 |

| Methods of Testing and Analysis |                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Method</b>                   | British Standard BS 680: 1971. Standard Specification for Roofing Slate, Part 2, Metric Units.<br>The method has been withdrawn as a British Standard and is now superseded by BS EN 12326: Part 2: 2000. |
| <b>Comments</b>                 | Three nominal 50mm square specimens were selected from a batch of nine slate samples and tested by complete immersion in a sulfuric acid solution for 10 days.                                            |
| <b>Accreditation</b>            | The test was carried out by a UKAS accredited laboratory that retains specific UKAS accreditation for the test.                                                                                           |

| Results                |               |
|------------------------|---------------|
| <b>Effervescence</b>   | None observed |
| <b>Softening</b>       | None observed |
| <b>Delamination</b>    | None observed |
| <b>Surface Flaking</b> | None observed |
| <b>Splitting</b>       | None observed |
| <b>Other Details</b>   | None          |
| <b>Classification</b>  | Pass          |

### Remarks

On the basis that the samples did not exhibit any signs of initial effervescence, softening, delamination, surface flaking or splitting, the slate was considered to have passed the test.

Date of Issue: 05.05.07

*Barry Hunt*

Barry J Hunt  
Director, IBIS Limited

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### Services

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consultancy  
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roped access  
testing including NDT  
quarry evaluation  
condition surveys  
heritage consultancy  
façade investigation  
fire damage  
blast damage  
petrography  
design advice  
thermography  
dye testing  
accident investigation  
GPR (radar)  
maintenance  
endoscopy  
X-ray diffraction  
scanning electron  
micro-analysis  
conservation advice  
microscopy  
bespoke solutions*

### Materials

*building stone  
roofing slate  
concrete  
external cladding  
plaster  
render  
high alumina cement  
screed  
paint  
internal lining  
rock  
aggregate  
mortar  
composites  
brick  
ceramic  
terracotta  
faience  
dimension stone  
glass  
lime & hydraulic lime  
pozzolana  
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dusts*

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