Hi Joshua

I will get back to you and let you know if the resident agrees with the suggested time.

Kind regards,
Hassan

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Wednesday, May 17, 2023 9:22:23 AM
To: Hassan Howlader <hassan@sohoha.org.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Dear Hassan,

Would 11am tomorrow (Thursday 18th May 2023) be okay? She is quite busy.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 16 May 2023 15:50
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Joshua

The housing officer will e-mail the resident requesting access. can you please let me know when you and a conservation officer will be free to attend a joint visit to the flat effected below to inspect and advise on agreed repairs?

Regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Thursday, May 11, 2023 10:26 AM
To: Hassan Howlader <hassan@sohoha.org.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT
Importance: High

Dear Hassan,

Thank you for your emails. I have recently received a comment from our Principle Conservation Officer and further to my email dated 27th April 2023:

1. The forthcoming material sample should be accompanied with its own data sheet (which should include its origin, whether a new or second hand slate will be employed, colour, dimensions). I would remind you that there is an outstanding request for you to provide sufficient evidence that the old tiles and underlying timber structure were beyond repair.

2. We also require a more detailed report of the as-built roof works and, per my emails dated 29th March 2023, the detailed scope of repair works that you would propose to carry out to the below flat for the Council's (Conservation and Building Control's) assessment. After such assessments, I will then advise you on what needs to be done, but I would advise you that at least one Listed Building Consent application will be needed for the matters at 22 Montague Street. You are therefore recommended to also seek planning advice in connection with your consultations with HE and SPAB.

Again, all the above should be provided by the **18th May 2023**. Until this is provided I

will have to prepare for the service of a Listed Building Enforcement Notice and/or legal action.

I look forward to hearing from you.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 02 May 2023 15:50
To: Ramesh Depala <Ramesh.Depala@camden.gov.uk>
Cc: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Ramesh

That's fine thank you for our help.

Kind regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

From: Ramesh Depala <Ramesh.Depala@camden.gov.uk>
Sent: Tuesday, May 2, 2023 1:13 PM
To: Hassan Howlader <hassan@sohoha.org.uk>
Cc: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Mr Howlader,

I wouldn't know I'm afraid, you will have to wait for Josh to return when I will speak with him, however, do note that the onus is on the developer/owner to demonstrate that no breach has occurred or to fully justify the works by way of a listed building application. It only needs to appear to the council that a breach has occurred.

I hope this helps

Kind regards

Ramesh Depala
Senior Planning Officer

Telephone: 02079741048

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 02 May 2023 10:33
To: Ramesh Depala <Ramesh.Depala@camden.gov.uk>
Cc: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Ramesh

Joshua is returning on the 9th of May to the office, and it said on his auto response to contact yourself.

All I wanted to know was how Camden Council confirmed the slates to be Welsh slate as there is no official entry list on Historic England and the previous slate which were on the roof that was shown to Joshua is Spanish slate as it is across all other roofs going to the end of 29 Montague Street.

We will continue to co-operate to have all matters resolved.

Kind Regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

From: Ramesh Depala <Ramesh.Depala@camden.gov.uk>
Sent: Tuesday, May 2, 2023 10:14 AM
To: Hassan Howlader <hassan@sohoha.org.uk>
Cc: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Dear Mr Howlader,

Thank you for your email, while I'm not sure what is happening on the 9th of May, I can confirm that the tiles which have been installed are unacceptable, and you will be required to remedy this or suitably justify the works, possibly via an application. I would ask that you liaise with Mr Cheung in this respect and ensure that you comply with the council's requirements.

Having not spoken to Josh recently on this matter I am not sure where he is with the investigation but the council have an obligation to inspect the entire premises and so please ensure you arrange a suitable time for that to take place which I think is the 9th of May that you refer to .

As the property is a listed building, the breach will have to be remedied and the council may also consider a prosecution in His Magistrate's court accordingly. It would be in your best interest to co-operate and ensure that you work with us.

Josh will consult with the conservation officers and outline what must be done and I trust we will have your co-operation in the matter.

Kind regards

Ramesh Depala
Senior Planning Officer

Telephone: 02079741048

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 02 May 2023 09:49
To: Ramesh Depala <Ramesh.Depala@camden.gov.uk>
Subject: FW: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Ramesh

Hope you are well.

Please see the e-mail below.

I need some clarity from Camden Council, and I can't wait until the 9th May if you can provide me a response, I would be grateful.

Kind regards

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

From: Hassan Howlader

Sent: Tuesday, May 2, 2023 9:44 AM
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Joshua

Thanks for the extension.

I just wanted to get some clarity on how you confirmed the following: “the current works that I witnessed cannot be considered ‘like-for-like’. Our conservation officer’s investigations suggest that the listed properties along and surrounding Montague Street have Welsh Slates in place, thus no 22 would require Welsh Slates as the only acceptable repair material”.

How have you confirmed the slates to be Welsh slates? as there is no official entry list on Historic England regarding the slates and
the slates which were on their previously that was shown to you on you visit is Spanish slate which go across all the way to 29 Montague street.

I am still waiting to hear back from SPAB.

Regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

A registered society within the meaning of the Co-operative and Community Benefit Societies Act 2014. Register No 20784R. Registered with the Regulator of Social Housing as a registered provider of social housing, No LH1321.

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Friday, April 28, 2023 2:43 PM
To: Hassan Howlader <hassan@sohoha.org.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Hassan,

I can provide you an extension of 1 week for your own consultations.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 28 April 2023 10:22
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: RE: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT

Hi Joshua

Hope you are well.

Before we proceed with anymore further work It is important to confirm that all the slate tiles on the roof, including those up to 29 Montague street, as you say are indeed Welsh slate so can I kindly ask to have more time to speak with Historic England and The Society For The Protection Of Ancient Buildings to confirm exactly what the previous existing slate including those up to 29 Montague are?

Kind regards

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

Enterprise Inclusion Guardianship

A registered society within the meaning of the Co-operative and Community Benefit Societies Act 2014. Register No 20784R. Registered with the Regulator of Social Housing as a registered provider of social housing, No LH1321.

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Thursday, April 27, 2023 4:57 PM
To: Hassan Howlader <hassan@sohoha.org.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: EN23/0247: DO NOT IGNORE: CAMDEN COUNCIL ENFORCEMENT
Importance: High

Dear Hassan,

Thank you for your patience – our conservation officers have a substantial backlog of cases. I have discussed the matter with our conservation officers and would advise as follows:

Unless you can sufficiently demonstrate that what was previously in-situ (the 'damaged' tiles) were Spanish Slates, the current works that I witnessed cannot be considered 'like-for-like'. Our conservation officer's investigations suggest that the listed properties along and surrounding Montague Street have Welsh Slates in place, thus no 22 would require Welsh Slates as the only acceptable repair material.

I must advise you that the procedure that should have been taken is to first inform the Council that urgent repair works are required, by which after an assessment we would provide a form of authorisation to carry out certain repair works and to regularise any planning issues after the fact. Our conservation officers would likely have informed you, during the initial appraisal, that Listed Building Consent for the installation of Spanish Slates would be refused, thus your urgent repair works would have taken the form of something more acceptable/temporary in nature.

Nonetheless, as the matter currently stands, unauthorised works to the Listed Building have been carried out and require urgent action.

In light of the above, in order to hold in abeyance the service of a Listed Building Enforcement Notice on all those with an interest in the land:

Within 2 weeks of the date of this letter, you must;

1. Provide me written confirmation that you will be removing the Spanish Slates and replacing them with Welsh Slates.
2. Organise the provision of a material sample(s) of the Welsh Slates for our assessment (prior to the commencement of the remedial works).

Though you have provided a report stating: *"Recommended to maintain the existing*

tiles due to being a Grade II listed building if it's not possible to maintain existing tiles then replace roof tiles (sized measured at 20x10) identify material and replace with exact like for like.". I would advise you that the above is not sufficient evidence that the tiles were beyond repair, thus we do not consider the discarding of the historic fabric as justified.

3. You are therefore also requested to provide a full report demonstrating that both the previous tiles and underlying timber support frames were beyond repair.

I look forward to hearing from you soon.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 20 April 2023 12:44
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: Re: DATA SHEET MONTAGUE

Hi Joshua

No need to apologise and of course I'll will continue to stand by.

Kind regard

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Thursday, April 20, 2023 12:41:56 PM
To: Hassan Howlader <hassan@sohoha.org.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: RE: DATA SHEET MONTAGUE

Dear Hassan,

My apologies, I am still awaiting the comment of our senior conservation officer – please continue to standby.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <hassan@sohoha.org.uk>
Sent: 03 April 2023 12:47
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>; Hassan Howlader <rubelh1@hotmail.co.uk>
Subject: RE: DATA SHEET MONTAGUE

[EXTERNAL EMAIL] Beware – This email originated outside Camden Council and may be malicious Please take extra care with any links, attachments, requests to take action or for you to verify your password etc. Please note there have been reports of emails purporting to be about Covid 19 being used as cover for scams so extra vigilance is required.

Hi Joshua

Please see attached data sheet.

Currently the work is 60% complete due to the recent rainfall there has been a delay in the completion time.

I can send you an invite of the sign off stage and if you would like to have further more site visits do let me know so I can arrange access.

Kind regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

soho housing Enterprise Inclusion Guardianship

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Friday, March 31, 2023 4:51 PM
To: Hassan Howlader <rubelh1@hotmail.co.uk>; Hassan Howlader <hassan@sohoha.org.uk>
Subject: RE: DATA SHEET MONTAGUE

Hi Hassan

Thank you for facilitating the site visit today.

I am currently liaising with our conservation department on our next steps, whereby I will likely request further/more specific information(s) and perhaps conducting another site visit before informing you of our next enforcement steps.

In the meantime, per our conversation today, you should send me further/all outstanding details on this matter (reports, data sheets).

I look forward to receiving them.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

London Borough of Camden

Web: camden.gov.uk

5 Pancras Square
London N1C 4AG

Camden

From: Hassan Howlader <rubelh1@hotmail.co.uk>
Sent: 31 March 2023 10:26
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Subject: DATA SHEET MONTAGUE

[EXTERNAL EMAIL] Beware – This email originated outside Camden Council and may be malicious Please take extra care with any links, attachments, requests to take action or for you to verify your password etc. Please note there have been reports of emails purporting to be about Covid 19 being used as cover for scams so extra vigilance is required.

Hi Joshua

I've attached the data sheet.

Kind regards,
Hassan

Appendix 02 - Camden Comments EN23/0247

22 Montague Street, London, WC1B 5BH Our Ref: EN23/0247 Date: 28th June 2023

Please pass this document to your planning agent.

SCHEUDLE A - Planning breach(es) which require action (See Annex 1):

1. Replacement of the Welsh Slates on the pitch roof and staircase cover with Spanish Slates;
2. Replacement of the underlying timber frames of the pitch roof with new;
3. Installation of new Hip and Ridge tiles on the pitch roof;
4. Installation of waterproof membranes/linings to the staircase cover roof, roof landings and the bases of the high chimneys and parapets; and
5. Installation of a new rooflight.

SCHEDULE B - Associated damages to the below flat (Flat G) (See Annex 2):

1. Various damp damages to the ceilings and walls across the flat; and
2. Poor quality internal finish of the new rooflight.

SCHEDULE C - In order to avoid formal action, you are required to: Submit ONE (1) Listed Building Consent application which must encompass the following:

- The reinstatement of the Welsh Slates on the pitch roof and staircase cover.
- Your scheme/scope of works to repair the associated damages caused to the below flat.
- *Addressal of the as-built pitch roof's timber frame.
- *Addressal of the as-built Hip and Ridge tiles on the pitch roof.
- *Addressal of the as-built waterproof membranes/linings to the roof landings, high chimneys, and parapets.
- *Addressal of the as-built rooflight.

*It is at your discretion to put forward more appropriate schemes. Please be prepared to propose new/alter existing schemes in line with the case officer's advice for each of the 'as-builts' – particularly if their retentions are advised to be unacceptable.

SCHEDULE D - Prior to the submission of the Listed Building Consent:

1. **See Annex 3.** Please describe what this white uPVC pipe is used for, why and when it was installed. This may affect the requirements of Schedule C.
2. Send Joshua Cheung – Joshua.cheung@camden.gov.uk – your proposal description, drawings and supporting documents/reports/statements for a review. We would provide you some advice so that you may carry out any final alterations before you submit and pay the fee.

You must fulfil the requirements of Schedule D within a period of 5 weeks from the date of this document.

If you have any concerns or questions, please do not hesitate to contact me.

Yours faithfully,

Joshua Cheung
Supporting Communities
Planning Enforcement Officer

22 Montague Street, London, WC1B 5BH Our Ref: EN23/0247 Date: 28th June 2023

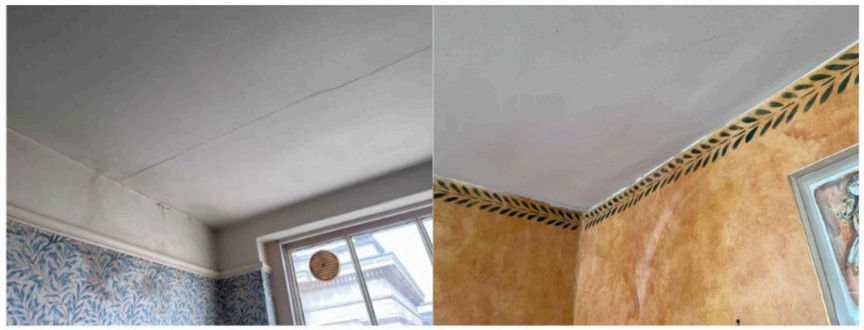
Annex 1

Schedule A Items 1, 2 and 3

Schedule A Item 4 – Waterproof membranes/linings currently present on the roof are not limited to these photos.

Schedule A Item 5 & Schedule B Item 2

Annex 2



Schedule B Item 1 – Damages present at the below flat (Flat G) are not limited to these photos – the above demonstrates a few of the most notable damages.

22 Montague Street, London, WC1B 5BH Our Ref: EN23/0247 Date: 28th June 2023

Annex 3

Schedule D Item 1

Appendix 03 - IBIS Slate Report July 2023

Our ref: 2882-r1-230718-Report

18 July 2023
by email (hassan@sohoha.org.uk)

Mr Hassan Howlader
Soho Housing Association
18 Hanway Street
London
W1T 1UF

Dear Hassan,

Assessment of Natural Roofing Slates
Re-roofing of Property in Soho, London

Introduction

Independent Building Investigation Services Limited (IBIS) has prepared this report in accordance with the instructions of Mr Christopher Cockerell of Cockerell Design on behalf of Soho Housing Association ("the Client"), by email dated 07 June 2023. It was requested that IBIS provide an independent view on the apparent origin of slate removed from an existing roof. A reference sample of replacement slate, which was advised to be of Spanish origin, was also assessed.

IBIS is an independent consultancy that has been undertaking the investigation of natural roofing slate since it began trading in 2002. Prior to this Barry Hunt, Director of IBIS and author of this letter report, had been undertaking the investigation of natural roofing slates for two independent civil engineering consultancies (Sandberg and STATS (now RSK)).

IBIS has investigated natural roofing slates from around the world, including materials from England, Wales, Scotland, Ireland, Canada, United States, Brazil, Argentina, Spain, France, Vietnam, India, Italy, China, Iran, Mongolia and resources elsewhere.

IBIS considers that it is in a strong position to provide expert advice on the performance of natural roofing slate materials. The Author has provided expert witness testimony in a number of legal cases involving natural roofing slates, these from around the world, used in a variety of circumstances and experiencing a range of problems.

Documents and Sources of Information

The following documents and sources of information have been received or consulted in the preparation of this letter report:

- BS EN 12326-1:2014, Slate and stone products for discontinuous roofing and cladding – Part 1: Product Specification. British Standards Institution, London, England.
- BS EN 12326-2:2011, Slate and stone products for discontinuous roofing and cladding – Part 2: Methods of test for slate and carbonate slate. British Standards Institution, London, England.
- Gibbons, W. & Moreno, M. T. (eds) 2002. *The Geology of Spain*, Geological Society, London.
- Jenkins, J. 2003. *The Slate Roof Bible, Second Edition.* Jenkins Publishing, PO Box 607, Grove City, PA 16127, USA.
- *Slate Roofs.* National Slate Association, United States. Reprint by Vermont Structural Slate Co. Inc.

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Materials
building stone
roofing slate
mortar & concrete
screed, plaster & render
lime & hydraulic lime
cement & pozzolana
high alumina cement
rock & minerals
aggregate & soil
glass & refractories
composites
brick & ceramic
terracotta & faience

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Established 2001

VAT No. GB 791 9073 94

Comparing Natural Roofing Slates

A major factor when comparing any natural materials is that by their nature every single piece of rock is unique. This is regardless of whether the rock is from the same quarry or even a specific bed or feature within a rock unit. Therefore it is necessary to look at very generalised properties and those that are actually relevant to the use of a material.

The simplest way to compare natural roofing slates is by colour and texture, and really other than determining that a natural roofing slate is fit for purpose, this should be all that is necessary. In the past, natural roofing slates have been compared on the basis of geological age, formation, mineralogy, chemistry and other factors, and all these factors prove to be essentially irrelevant. A number of simple examples of why this is the case have been provided below.

With regard to geological age, at any given point in time, the rocks that are then forming include sandstone, limestone, basalts, granites, etc. Basically a huge variety of rocks at any one particular moment are at various stages of formation but in the future, at any one particular moment, they will all be seen to be of the same age. There will be times in geological history where locally rocks may be altered once, twice, three and more times. All this is not forgetting that each rock will have started out with a multitude of variations due to seasonal and other changes. Stating that any two or more slates are of the same or similar age and assigning anything to such is wholly misleading.

Table 1 below has been provided to demonstrate some natural roofing slates and the ages assigned to them. The Vermont slate is shown in two ages but actually crops up in the Silurian and Devonian too. The formation of slate and the properties it obtains is typically dependent on later geological movements completely independent of the original sediments.

Table 1: Some well known slates and their place in geological time.

Geological Period	Millions of Years Ago	Slate Type
Devonian	359 – 416	Delabole
Silurian	416 – 444	Llangollen
Ordovician	444 – 488	Cwt y Bugail Angers (France) Most Spanish slates Glendyne (Canada) Burlington Vermont (USA)
Cambrian	488 – 542	Penrhyn Vermont (USA)
Pre-Cambrian	> 542	Alpina (Brazil)

Described rocks as being from the same formation is also problematic, for the same reasons as outlined in the above paragraphs, because a formation also represents a particular moment in time. For example, the chalk that forms a large part of the south and south-east of England and the flint that occurs within the same formation are two extremely contrasting rock materials. Some formations stretch for hundreds and occasionally thousands of miles, and the rocks are not necessarily the same along the whole length of such formations. The potential for rocks to be the same within a formation is better than for those of the same age but not formation, but using this for comparison is again misleading.

Considering the aforementioned, and understanding that geology has no relevance to today's geopolitical boundaries, the absurdity of distinguishing slates on the basis of a country or region and assigning some performance to them on that basis becomes very clear. However, the question that has been asked about the origin of the slate at the Soho property can be answered by looking for a set of geological features that are specific to a location.

Comparing the mineralogy can be misleading as this very much depends on how an analysis is carried out and the data presented. An analysis of Cretaceous chalk will show that it is essentially 100 % calcium carbonate or calcite ($CaCO_3$), but many other completely unrelated limestones such as Jurassic Portland or Carboniferous Frosterly Marble, will provide the same answer, though their formation, geological history and performance properties are completely different. Mineralogy is, however, useful in comparing a particular resource and looking for variations within it that may relate to performance issues and other items.

Mineralogies determined from a number of natural roofing slates has found considerable variation in the mineral contents, with quartz ranging in one slate sequence from 17 % to 43 %, but variation in quartz, mica and chlorite contents of 5 % to 10 % for most slates is not untypical.

None of the tables of elemental analyses that are available for natural roofing slate have really shed much light on the final performance properties of a slate. This may be due to a lack of thorough and/or coordinated research, but if this is the case then attempting comparisons is misguided until the parameters involved are sufficiently and properly understood to allow scientific assessment. Assessments carried out in the United States of 19 natural roofing slates of good quality stretching across eight States revealed silica (SiO_2) contents that ranged from 47% to 68 %, whilst aluminium as Al_2O_3 varied from 11% to 25 %. All other chemical components exhibited similar ranges. The analysis of such a wide range of natural roofing slates helps to demonstrate that such analysis is of relatively low importance and is not a good way to compare different natural roofing slate materials other than for purely informative use.

The current British and European Standard for natural roofing slate requires a range of tests to be undertaken in order for any material proposed for use as natural roofing slate, whether or not it is a true geological slate, to be assessed for its performance properties. The Standards determine whether a material is able to perform as a natural roofing slate. There are different levels of performance for water absorption, weather resistance and acid resistance, and slates may be compared using these tests.

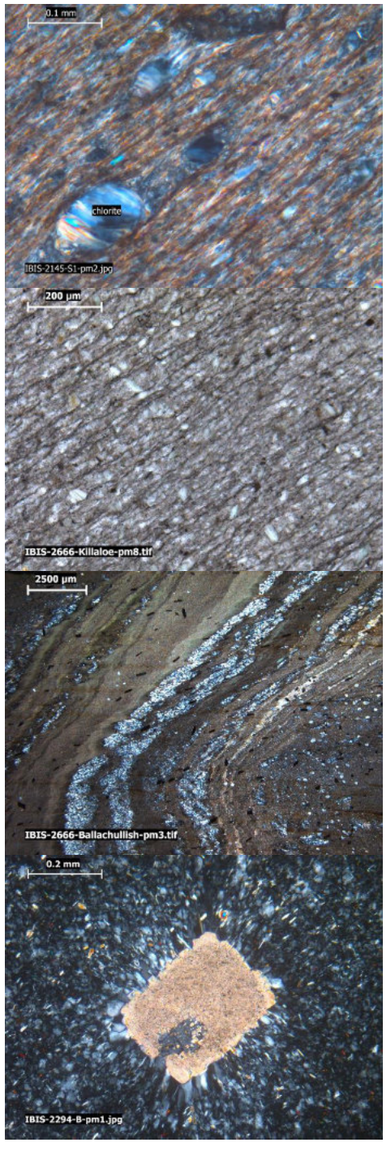
EN 12326 does have a number of limitations and issues as the various requirements are considered by some to be rather wide and easy to conform to, which is a view that the Author also takes. The most critical factors with roofing slate performance generally are the flexural strength and water absorption. Higher strength provides greater resistance to breakage from wind and other roof loadings and also to internal stresses from frost and other weathering mechanisms. The lower the water absorption, the lower the volume of water present that may freeze within a saturated slate and may act to promote damage, and the stronger a slate is the better it will be able to resist the presence of internal freezing forces.

The most problematic aspect of natural roofing slate is the presence of metallic inclusions of various minerals that are often grouped together and termed as pyrite or fool's gold. Pyrite itself is a relatively stable mineral form but which has many varieties based on changes in crystal structure and the elements present. The EN 12326 tests do not necessarily highlight the presence of reactive forms of metallic inclusions, and soundness usually is determined from actual experience in use or from quarry inspection of overburden materials.

The ways in which slates are cleaved typically imparts a secondary texture as the progression of the split exploits different planes of cleavage on a microscopic level. Essentially the split can jump across different cleavage planes just a few millimetres apart. This can impart a secondary structure that may appear as lines across the slate surface that often turn towards the point of splitting. Many Spanish slates are split from the side and thus these lines tend to traverse across the width of the slate, whilst many Welsh slates are split from the top and thus the lines tend to run mostly longitudinally. This can impart a subtle difference to the look of the slate.

Some Slates for Consideration

Provided below is a series of photographs taken down the microscope of different slates along with a brief description of the slates. These are used as the base terms of reference for comparison with the materials received from the Client.



Greaves Welsh slate with chlorite lenses floating in a mass of phyllosilicate minerals. There is rutile and a strong secondary splitting direction.

Killaloe Irish slate with a microgranular texture and the presence of carbonates in discontinuous veins. Also present is micro-lensing of chlorite and framboidal pyrite forms.

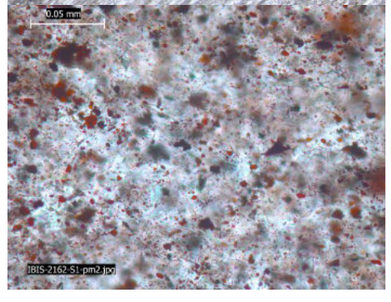
Ballachullish Scottish slate with a heavily banded structure resulting in a rough texture with variable quartz and phyllosilicate rich bands. There is a high opaques content.

Spanish slate with occasional rhombic carbonate crystals with radiating quartz and phyllosilicates, wavy secondary splitting planes and occasional higher-grade metamorphic mineral 'spots'.

Argentinian 'Riverstone' slate that geologically classifies as a type of phyllite, with coarser quartz crystals often concentrated into bands.

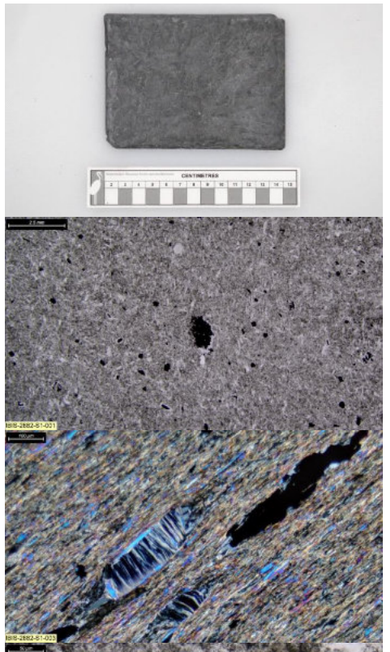
Minas Gerais Brazilian slate that geologically classifies as a type of shale borderline with slate. This has irregular lamination related to the size and proportion of different mineral components that were part of a repeated sedimentary fining-up sequence.

One of many different Chinese origin slates that IBIS has tested, in this instance with graphite-rich bands occurring at irregular intervals.



Vermont Purple American slate that exhibits abundant finely disseminated iron oxide particles throughout the rock fabric.

Slate recovered from the roof that was then replaced

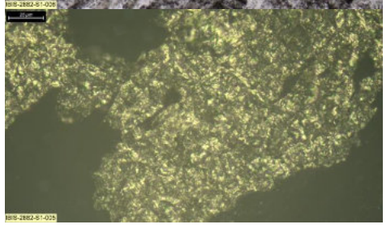


Sample taken for thin-sectioning.

Spots of opaque pyrite and other related iron-sulfide minerals scattered throughout the slate fabric, a feature typical of many slates found within Spain.

A mixture of larger chlorite lenses and mixed with opaques and quartz. This is a feature also more typical of many slates found within Spain.

A rod-like crystal of possible sillimanite or other higher-grade metamorphic crystal form that are very typical of a number of slates found in Spain. These are not present in slates found in other countries.

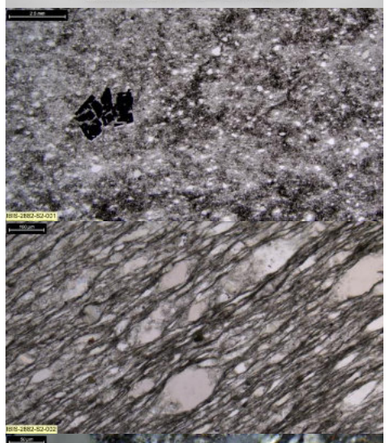


Pyrite is shown here exhibiting a strong yellow bireflectance. Pyrite and related minerals are found in all slates to some level but it generally are more disordered in slates found within Spain.

In summary, the examination of this slate yielded many strong features that are considered to be typical of slates found within Spain, and certainly not of slates from Wales and other UK locations. Resources around the world other than Spain were also ruled out.

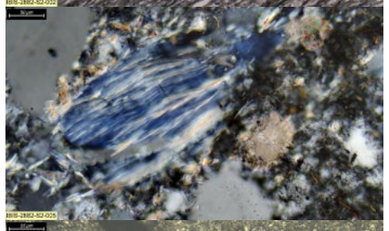
Unused slate that was employed for the recent replacement works

Sample taken for thin-sectioning.

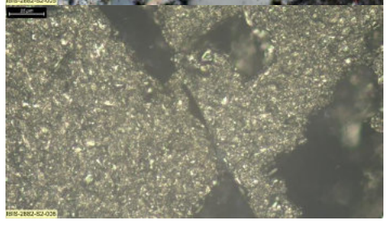


Scattered large irregular spots of opaque pyrite and other related iron-sulfide minerals were present throughout the slate fabric, a feature typical of many slates found within Spain. The background fine darkness is possible graphite, which is another feature typical of certain slates found within Spain.

Abundant chlorite micro-lenses were present throughout the slate fabric, a feature typical of many slates found within Spain.



A mixture of chlorite lensing with fuzzy-looking quartz and carbonates is a texture that is almost unique to slates found within Spain.



Pyrite is shown here exhibiting a strong yellow bireflectance. Pyrite and related minerals are found in all slates to some level but it generally are more disordered in slates found within Spain.

In summary, the examination of this slate yielded many strong features that are considered to be typical of slates found within Spain, and certainly not of slates from Wales and other UK locations. Resources around the world other than Spain were also ruled out.

Summary Conclusions

Natural roofing slate exhibits a considerable variety of colours and textures that can make it seem to be a highly variable material. However, the physical properties of the greater majority of natural roofing slates are reasonably comparable due to the underlying and quite specific geological processes that are required to form slate.

There are a variety of tests available for the assessment of natural roofing slates. The BS EN 12326 slate tests have been discussed in previous sections of this report, with petrographic examination being the primary method for assessing slate origin and quality.

The petrographic examination of slates taken from a formerly existing roof and a newly replaced roof has revealed that these are both typical of slates quarried in Spain. Several features identified might be considered to be unique to materials originating in Spain. There was no evidence to suggest that either slate was derived from a location outside of Spain.

In final conclusion the slate presently installed at the Property is of Spanish origin and replaces one that also was of Spanish origin. Thus there appears to be no reason to remove the current slate from the roof, which will provide many years of service.

Remarks

The observations and comments provided must be regarded as general given the limitations of the brief. However, it is hoped that the investigation findings provide a sufficiently accurate and usable picture of the issues presented.

The Author would like to take this opportunity to confirm that the opinions provided are given independently and to the best of his ability. It is acknowledged that the Author's opinions may be based on potentially incomplete information and thus he reserves the right to alter his opinions should new information present itself that requires their reconsideration.

A copy of the career summary of the Author of this letter report has been provided in **Annex 1**. In brief summary, the Author is a Chartered Geologist and Chartered Surveyor with 35 years' experience in the investigation of construction problems, specialising in materials properties. The Author is a member of the Stone Federation of Great Britain's Technical Committee and has been involved in the production of many of the current British and European Standards dealing with natural stone and related materials.

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Yours sincerely

Barry J Hunt
BSc MSc MASI MCIOB CGeol EurGeol FGS CSci MRICS FRMS
Director, IBIS Limited

Encl. Annex 1, Career Summary of Mr Barry J Hunt, 11 pages

Career Summary of Barry J Hunt

BSc MSc MASI MCIOB CGeol EurGeol FGS CSci MRICS FRMS

Including Selected Summaries of Experience and List of Publications

Career Summary

Barry Hunt is chartered as a geologist, surveyor and scientist. He has been awarded the designation of European Geologist and is a Corporate Building, Conservation and Specialist Surveyor. Barry is also a Member of the Chartered Institute of Building and a Fellow of the Royal Microscopical Society.

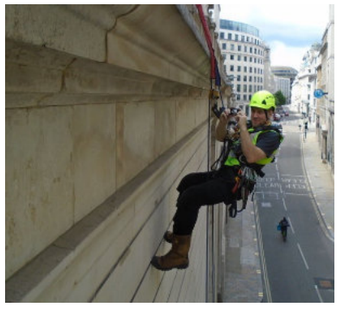
Barry gained 14 years experience working as a consultant for two renowned materials consultancies. During six years with Sandberg, he was responsible for the resolution of a wide range of construction related problems involving site inspection and testing, and laboratory based investigation. During his time at Sandberg, Barry obtained a Masters Degree in construction materials science, sometimes referred to as 'geomaterials'.

When Barry joined STATS in 1994 the company was undertaking limited materials consultancy, much of this being concrete petrography. By marketing services within the fields of expertise developed whilst with Sandberg, Barry helped to build STATS' capabilities in the geomaterials field. He developed a successful materials consultancy service and achieved the position of Associate Director.

In 2001 Barry formed his own company, IBIS, specialising in the investigation of all construction materials. The specialist knowledge obtained and services provided by Barry have allowed him to be instrumental in the resolution of problems ranging from blast damaged claddings in London's West End to advice on the quarrying and extraction of stone from abroad for import to the UK. Other areas of experience include the investigation of all types of building elements and finishes, specialist advice on remedial treatments and the preparation of advice for actual and potential use in litigation or arbitration. Barry has published many papers and articles concerning some of the findings of his numerous investigations.

Having worked for consultancies that both undertook in-house laboratory investigation to UKAS requirements, Barry is also able to conduct or oversee a wide range of on-site and laboratory techniques and ensure that they are carried out to traceable standards. One speciality in all investigations is the hands-on approach adopted. Being trained in industrial roped access (abseiling) allows him to get close to the problems with external building envelopes quickly, efficiently and cost-effectively.

Barry has developed the petrographic capabilities at IBIS and uses three microscopes to assist with materials investigation: Leica DMRXP & MZ16, and Nikon LV100POL. He also has the full PETROG point counting system and employs a Niton GOLDD XRF analyser for elemental analysis. Barry is one of the very few geomaterials experts who routinely undertake their own petrography.



Barry surveying the Bank of England in July 2020

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XRD and SEM
microscopy

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building stone
roofing slate
mortar & concrete
screed, plaster & render
lime & hydraulic lime
cement & pozzolana
high alumina cement
rock & minerals
aggregate & soil
glass & refractories
composites
brick & ceramic
terracotta & faience

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Selected Experience with Commercial/Public Stone Masonry

Exhibition Road, London	Retained as a consultant to Project Centre to provide advice on all matters related to the selection, quality control and installation of natural stone setts and pavers for a large innovative streetscaping scheme. The shared use scheme, is one of the largest and most prominent of its type in the world.
Hindu Mandir London	Training of client operatives to undertake quality assurance selection of stone at a quarry in Vrabeshnitsa, Bulgaria, for a building designed to last more than 1000 years. The main selection criteria were based on visual characteristics. The Mandir construction has been acclaimed world-wide.
Nostell Priory, Yorkshire	Investigation of stable block to large Georgian manor house and the effects of coal mining subsidence on the stone masonry. Later provision of expert witness services and attendance at arbitration. Considerable disaggregation of the façades had occurred as a consequence of ground movements.
Bank of England	Survey of external stone façades to provide advice on safety to the public in addition to developing a medium to long term maintenance strategy.
Cornmarket Street, Oxford	Expert witness services including representation at Mediation provided for the lead Architect following the failure of a streetscape scheme. Elements of the design, workmanship and site supervision were considered to be at fault. The use of a gun-applied grout into wide joints formed between cropped edges was considered to be the major problem.
National Gallery, London	Assessment of a large statue suspected of movement and thus posing a threat to public safety. The statue and surrounding stone masonry were visually surveyed assisted by roped access and inclinometers were installed to allow monitoring of possible movement.
Den Haag, Holland	Investigation of movement and cracking affecting 16,000m^2 of paving in the centre of Den Haag. Advice provided on the causes along with possible remedial actions. The bedding was considered to have been badly formed whilst there was insufficient restraint to counteract the thermal expansion and contraction effects.
Buckingham Palace, London	Investigation of Nero Marquina limestone panels used for large skirtings in a re-fit of the Queen's Galleries that had suffered various degrees of cracking. Problems identified as moisture sensitive clay minerals within stylolite features.
Bluewater, Dartford, Kent	Assistance with flooring specification and assessment of 11 stones used in the project. The effects on pedestrian slip properties by different floor treatments was investigated, including setting up quality control in the factory in Germany.
Upper Ground Street, London	Investigation of failure of stone setts and pavers whilst construction was on-going. Advice on methods to reduce potential for failure provided in addition to suggested alterations to the design.
High Street, Truro	Investigation of granite sett failure where bedding materials had not been properly hydrated leading to their under-compaction, low strength and ultimate collapse.
New Parliamentary Building, Edinburgh	Investigation of stone to be used for both paving and cladding in and around the building. Visits to quarries and extensive examination and testing regime carried out to ensure and control the quality.
Chiswick Park, London	Investigation of damage occurring to internal atrium flooring of a large office building identified to be from excessive flexure of the floor that had been constructed on top of a pedestal system.
Martineau Square, Birmingham	Investigation of marble cladding warping, one of the few incidences of this phenomenon world-wide. Mostly visual surveying was conducted via roped access and also the measurement of over 5000 panels for degree of flatness. Dye penetration testing carried out on site to assess the presence and nature of cracks induced by the warping.
Broadgate, London	Investigation of bomb blast damaged stone cladding systems as part of a multi-million pound insurance claim. A major part of the months of investigation involved dye testing techniques which were developed for the project. Findings had major consequences concerning the quality of cladding construction.
Green Park, Reading	Investigation of internal flooring that had cracked excessively. Long term monitoring of crack propagation determined that problems related to initial drying shrinkage and underfloor heating system. This also allowed less expensive replacement options to be taken without risk of the effects recurring.
Houses of Parliament, London	Slip resistance testing of road and pedestrian areas for health and safety purposes and advice on specification of new sett materials. Assessment of existing stone paved areas also undertaken following a number of incidents where members had suffered falls.
Hanover Street, London	Investigation of imported glass floor tiling that had stained and was beginning to come loose. The tiles had been etched by cleaning fluids, allowing them to hold dirt. The cleaning water had also attacked the adhesive, which then released salts leading to widespread debonding.

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Chartered Geologists
Chartered Surveyors

Selected Experience with Stone Sourcing, Selection and Processing

Vratza limestone, Bulgaria – Hindu Mandir, London	Training of client operatives to undertake quality assurance selection of stone at a quarry in Vrabeshnitsa, Bulgaria, for a building designed to last more than 1000 years. The main selection criteria were based on visual characteristics. The Mandir construction has been acclaimed world-wide.
Portland stone – British Museum, London	Expert witness services provided on behalf of the Evening Standard in their defence of a libel action brought by Sir Norman Foster and Foster and Partners regarding the use of the wrong stone for the South Portico of the Great Court. Visits to the quarries and processing works to determine how the wrong stone was used.
Rhon Dolomit, Germany – Bluewater, Dartford, Kent	Assistance with flooring specification and assessment of 11 stones used in the project. The effects on slip properties by floor treatments was investigated, including setting up quality control in the factory in Germany. Slip testing of stone also undertaken in Germany to demonstrate long term slip resistance of some of the stones to be used.
Ancaster limestone – St Pancras, London	Assessment of Ancaster Hard White limestone used in the original construction of St Pancras station and then inspection of quarries currently producing the same stone to determine the level of matching following a dispute. The quality of the stone and gauged brick masonry mock-ups and initial construction work were also assessed.
Ruschita marble, Romania	Investigation of Ruschita marble quarry which had suffered a dramatic decrease in the volume of finished material from 50% down to less than 5% following modernisation of plant. Problems identified to be caused by stress fracturing affecting the larger blocks being cut. New quarrying practices were advised that significantly increased production levels.
Tunisian limestones, various – for use in the UK	Several visits over a number of years for different clients to seven different quarries producing marbles, limestones and sandstones for export to Europe. Advice provided to both the Tunisian quarries and potential buyers on problems with recovery and ways to minimise costs in production and reduce waste. Selection of over 1000 tonnes of block also carried out for one client.
Achscrabster Caithness stone	Inspection of quarry on two occasions for different reasons. The first to determine the quality of stone to allow its use for paving around the New Parliamentary Building in Edinburgh. The second visit was to assess the waste materials and whether they were liable for the aggregate tax, which had been newly introduced at that time; the material was considered to be exempt given that it could be classified as a type of shale/mudstone.
Vermont slate, USA – Berkeley Square, London	Inspection of Unfading Green and Unfading Purple slate quarries in Vermont, USA, and including sampling and testing of slate both in the quarries and back in the UK. Inspection of processing works undertaken in addition to slate roof constructions in Vermont. Quality control regime set up and regular inspections undertaken.
Iran – various sites	Undertaking reconnaissance of potential Iranian roofing slate resources for a private client. This has included visits to over 30 sites covering 5,000 miles of highly variable terrain. Potential sites identified by reviewing over 400 geology maps and their memoirs following an initial visit to view some of the major geological units within Iran. Liaison and working with experts from Tehran University also undertaken. Work is still on-going.
Independent Whitbed Portland stone	Quarry inspections to determine the extent of a new bed of Portland stone with the aesthetic appeal of Whitbed but the properties of Basebed. Extensive sampling and laboratory investigation undertaken to determine and then compare the properties of the stone with existing materials and also to predict the potential long term durability.
Jura limestone, Germany – The Chimes, Uxbridge	Inspection and assessment of quarry and stone production facilities and then sampling and testing of stone prior to its use in a large shopping centre development. Setting up and testing large mock-ups in addition to an extensive laboratory programme to investigate staining and discoloration potential and durability characteristics.
Creeton limestone, Lincolnshire	Investigation of relatively undeveloped quarry producing aggregate and hoping to produce dimension stone. Extensive sampling and testing undertaken both in the quarry and laboratory with advice provided on the potential uses of the stone and problems within the quarry with continued supply.
Albion Stone, Portland, Dorset	Investigation and advice on the use of lime and pozzolanic additives in the treatment of Portland stone to increase aesthetic appeal and decrease potential weathering problems.
Ruther Quarry, Caithness – Aggregate Tax	Inspection of quarry to assess the waste materials and whether they were liable for the aggregate tax, which had been newly introduced at that time; the material was considered to be exempt given that it was considered to be mostly of shale and/or mudstone.

Selected Experience with Façade Surveys

Westminster Bridge, London	Investigation of bridge pier construction using borescope and radar techniques to identify the location of metal fascia panels passing into the stonework to allow a finite element analysis. The location and condition of stone fixings and also the stone condition were assessed.
Broadgate, London	Investigation of bomb blast damaged cladding systems as part of a multi-million pound insurance claim. A major part of the months of investigation involved dye testing techniques which were developed for the project. Findings had major consequences concerning the quality of cladding construction. Investigation of Statuario Venato Carrara marble quality issues for internal linings to a lobby areas. Later investigation of Statuario Venato and Bianco Carrara marbles subjected to fire.
Tolworth Tower, London	Inspection of tiled mosaic covering external concrete elements up to 23 storeys high that was suffering varying degrees of debonding and which had suffered a number of low level failures. Delaminated and cracked areas located and plotted showing how a lack of expansion joints was creating issues at higher levels, probably related to building creep over time.
Martineau Square, Birmingham	Investigation of marble cladding warping, one of the few incidences of this phenomenon world-wide. Mostly visual surveying was conducted via roped access and also the measurement of over 5000 panels for degree of flatness. Dye penetration testing carried out on site to assess the presence and nature of cracks induced by the warping.
South Quay Plaza, London	Damage assessments of bomb blast affected claddings. Both visual inspection and dye penetration testing was carried out to determine the presence of cracks and their likely origin. Work was carried out using roped access techniques after safety of cradle system was not able to be guaranteed.
Regent Street, London	Inspection and advice regarding the retention of a stone masonry façade suffering from 'Regent Street disease'. Bressumer beams had sagged causing excessive cracking and a repair strategy was recommended.
Victoria Palace Theatre, London	Inspection of faience façade on Grade II listed building following a fall of masonry on to a glass entrance canopy. Radar techniques were used to determine the location of fixings and metal superstructure. A remedial repair programme was recommended along with a prediction of the future safety of the facades. A survey of a Portland stone façade was also carried out.
Trinity House Lighthouse Service	Inspection of a number of lighthouses around the UK following de-manning and full automation, which had led to a number of unforeseen problems. Lack of heating and day to day maintenance had led to slats ingress problems and related accelerated decay issues. The proficiency of paint and other coating systems was reviewed.
Cavendish Square, London	Investigation of 1960s 23 storey office block clad by exceptionally large stone panels following an internal explosion that had shaken the building, causing considerable damage at lower levels. It was additionally identified that long term building creep and a lack of movement joints had led to panels being forced off their fixings leading to a regime of replacement and monitoring.
Nelson Gate, Southampton	Inspection of 1960s concrete tower suffering reinforcement corrosion resulting in large fins suffering detachment with a potential to fall. A number of fins were removed during the inspection to make the building temporarily safe.
Aquatical House, London	Condition inspection of brick masonry clad building in the heart of the City to provide a reference point prior to adjacent works beginning on the construction of several large skyscrapers. The building will be re-surveyed post construction to determine whether the adjacent construction disturbs the building.
International House, Tower Bridge, London	Inspection of several thousand metres of old mastic filling movement and window joints and categorising condition into ease of removal and replacement to allow potential contractors to price the works with greater precision. This followed abandonment of previous works when the contractor realised the mastic was in a considerably worse condition than anticipated.
Barts and the NHS, London	Full condition survey of nine storey former nursing home including concrete, brick and stone masonry, glazing systems and balcony railings. As a consequence of findings all railings were removed and a £1 million programme of remedial actions instigated. Works regularly overseen and checked.
Bristol City Council – Various tower blocks	Inspection of concrete condition and full sampling, including coring, undertaken using roped access, of several buildings to determine present condition and provide an insight for future maintenance. The effectiveness of previous maintenance procedures and protective systems applied was also assessed.
Irish Castles	Condition assessment of Monkstown, Waterford and Dufftown castles and also Waterford City walls with advice provided on local stones and types of mortar employed. This formed part of major restoration works undertaken to the various properties.

Selected Experience with Roofing Slate

Sydney, Australia	Investigation for the owner of a prestige property concerning the deterioration of Greaves Welsh slate. As a result of the ensuing litigation a new roof was obtained and a judgement given that pyrite must not be considered inert in slate.
Moortown, Leeds	Investigation of newly built slate roof to determine the quality of the roofing slate employed. The slate did not comply with Building Regulations and it was also determined that the roof had been badly constructed.
Cembrit Blunn, London	Testing of the full range of roofing slates offered by Cembrit Blunn to the new British and European Standard. Advice was provided on potential life expectancy of the slates along with prediction of possible problems. The work was used to help formulate a new table for roofing slate service life expectancy.
No. 1, The Aldwych, London	Inspection and testing of Grade I listed building during major refurbishment works and resulting in advice to replace the existing slate, which had reached the end of its useful life. The slate was identified to be Cornish; an unusual occurrence in London.
SIG Roofing, Cambridgeshire	Assessment of over 20 different slates comprising the major proportion of roofing slates marketed and sold by the UK's largest slate supplier. Guidance was provided on the likelihood of problems with the different slates, particularly those containing carbonate minerals with the potential for discoloration and lightening in service. As a consequence several of the slates being marketed were suspended from use pending more in-depth enquiries.
Mill Hill Quarry, Devon	Assessment of quarry for re-opening of slate vein not used for 100 years, to supply a major heritage project. Also the assessment of imported Argentinean slate for use as a cheap substitute to the locally produced slate.
The Tabernacle, London	Investigation of fibre-cement tiles and their possible re-use within part of a large refurbishment project. Tiles were considered to have altered to the shape of the roof and their brittleness made re-use unfeasible.
Eternit UK Ltd, Hertfordshire	Series of seminars undertaken to train all sales staff in the properties of and problems with slates for roofing. Training also carried out at Tegral (Eternit owned) in both Dublin and Belfast. The objective was to provide the sales team with knowledge to allow them to answer technical questions from architects and other interested parties, thus gaining a significant advantage over other sales teams. A manual was produced to complement the series of lectures.
The Glades, Bromley, Kent	Investigation of extensive new slate roofing covering the large shopping centre and car parks. The slate was identified to be of Spanish origin and comprising a mixture of at least five different qualities of material. A major proportion of the slate was already suffering discoloration, and splitting during construction. Welsh slate was used to replace the Spanish material. The Welsh slate was also investigated to ensure that similar problems were not able to recur.
SSQ Group, London	Assessment of an Argentinean slate to American, French and German standards prior to product launch throughout Europe. Included the preparation of a marketing manual covering the geology and history of the slate and expected performance. A marketing manual was also prepared for the Group's existing Del Carmen slate and provision of training sessions to sales personnel.
Springfields Nursing Home, Devon	Investigation of slate roofing problem during the initial scares over the quality of imported Spanish slates during the late 1980s. The slates were found to be a mixture of five different qualities and incorporating materials that were not fit for purpose. Approximately 50% of the slates were discolouring whilst 20% were suffering splitting and other damage. The roof was recommended to be replaced.
Basingstoke, Hampshire	Investigation of fibre-cement slates that were suffering from loss of surface and apparent bowing. Petrographic investigations identified the presence of a curing layer and alteration in the carbonation state of exposed surfaces causing differential shrinkage and other effects.
Braintree, Essex	Investigation of wind uplift affecting hook-fixed slates on a large, low pitch school hall roof. Ripple effects were observed during high winds and calculations were carried out to determine the potential for slates to detach. Problems with wind driven rain were also assessed.
Hove, Sussex	Investigation of roof of Grade II listed building which had been re-slated 15 years previously. The roof was to be redesigned and it was hoped that the existing slates could be salvaged. However, the slates were found to be from Xemil, Spain, where most problem Spanish slates were supplied from and the level of deterioration meant that salvage was not possible.
Newton Ferrers Estate, Devon	Inspection of country estate undergoing major redevelopment with new Spanish slate roof coverings being applied. The slate was identified to be weak and suffering discoloration and splitting prior to placement on the roof. Construction was stopped until a suitable replacement material could be identified.

Selected General Experience

Sint Maarten, Dutch Antilles	Investigation of buildings suffering from various forms of concrete decay including assessment of the quarry where the aggregates were obtained from. Guidance was provided concerning continuation of the quarry extraction and, following geological reconnaissance, suggestions made regarding other possible areas to quarry on the island. The quarry was closed and moved to the main alternative location suggested.
Harrods, London	Investigation of existing terracotta materials to determine the original method of manufacture including the mix proportions and firing temperatures. Following this a replacement terracotta was manufactured which proved to be compatible with the old material.
Aga Khan Hospital, Karachi, Pakistan	Assessment of the construction of a hospital complex and possible problems should different levels of earthquake occur. The biggest problem was the debonding of external 'snotted' plaster.
Aylesbury Prison, Buckinghamshire	Investigation of replacement render cracking and advice on remedial actions following a major refurbishment. Later investigation of finish render debonding and cracking also carried out.
Thelwall Viaduct, M6	Investigation of long term performance of large concrete structure including the petrographic examination of over 300 core samples, which were also all subjected to expansion testing and a variety of test procedures. The aggregate combinations were identified to be potentially alkali-reactive and some of the concretes were demonstrated to have a high potential for reaction. A range of recommendations was provided to reduce the potential for future alkali reaction.
SKM House, Hayes, Middlesex	Assessment of fire-damaged concrete structure used as a warehouse for the storage of organic materials, including determining the effects of organic acids released by the fire on the concrete.
Alton College, Hampshire	Investigation and advice on flooring system design for a new sports hall exhibiting problems with recurring damp affecting the newly laid wooden flooring which had warped on three separate occasions.
Mediterranean, Various locations	Assessment of ancient concretes from around the Mediterranean including the determination of the constituents and their likely provenance. Different locations were compared and the use of particular additions from specific regions that had then been exported for use was identified.
Bank of America, Frankfurt and Lahore	Survey of premises for asbestos-containing construction products, as part of a wider survey of over 30 offices around the World. This followed a federal directive to ensure all offices were free of asbestos products.
Houses of Parliament, London	Investigation of floor construction and advice on the presence of deleterious reactions within 19thC Portland cement based concrete. Various sulfate reactions identified related to the presence of clinker and unburnt or partially burnt coal within the aggregate particles.
Maritime Museum, London	Investigation of 300 year old brick masonry to assess the potential for supporting a new construction for the Millennium celebrations.
Wimpey Homes, London	Investigation of concrete block walling following the serious collapse of an apartment building. It was determined that the wrong strength blocks had been used in the internal leaf construction which had to support large concrete beams.
Sussex University, Brighton, Sussex	Assessment of damp penetration across the cavity walls of over 200 newly built student residences. During the investigation sulphate attack of the brickwork mortars was identified and guidance was given concerning remediation including comments concerning potential forms of over-cladding.
Minster Court, London	Investigation of damage to the superstructure caused by a major fire. Over 1000 concrete cores were taken from a grid of locations on different floors of the building and the temperature profiles plotted. This enabled a good understanding of the spread of the fire and the likely damage to all of the concrete elements.
HMP Everthorpe	Investigation of an extensive area of floor tiling that was failing prematurely under the conditions of use within the kitchens and food stores, presenting a very serious problem as tiles could be removed and used as potential weapons. The original specification and tiles employed were both found to be at fault and procedures were recommended to minimise future problems.
Dover and Pevensey Castles, Kent	Investigation of historic concrete used in the construction of the original Roman fortifications. A range of unusual reactions was identified including the dissolution of quartz sand grains. Advice was provided on the likely source of the aggregate materials used for the concrete.

INDEPENDENT BUILDING INVESTIGATION SERVICES
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Selected Experience with Domestic Properties

St Johns Wood, London	Investigation of extensive use of Crema Marfil stone for internal flooring, ceramic tiling for both flooring and wall tiling, and glass panels for wall tiling. Comment provided on failure of all materials in relation to both design and workmanship issues.
Wisset – Tiling adhesive failure	External ceramic tiling to a swimming pool surround found to be lifting as a consequence of failure of the adhesive. The adhesive manufacturer claimed inadequate movement joints were to blame but this could not be substantiated. Workmanship was not found to be at fault.
Portman Square, London – Turkish travertine flooring	Investigation of very large format tiles over 1m^2 in size that were suffering cracking and debonding. Whilst being outside current British Standard guidance the tiles had not been properly bedded and there was insufficient allowance for differential movement.
W1, London – Glazing leakage	Investigation of internal leakage problems caused by faulty installation of large window panels on the corner of the penthouse to a ten storey apartment. Inappropriate use of mastic materials and low quality non-stainless fixings had compromised the seals and directed water inwards. Construction details were found not to reflect the original design brief.
Orpington – Kitchen worktop damage	Inspection of 'black granite' installation where the surface had been scratched by the installers. It was also identified that the installation was incorrect in many ways being improperly restrained with unsupported thin elements and insufficient allowance of movement.
Derby – Equestrian area construction	Investigation of paddock behind a private residence that had been refurbished to provide an equestrian surface for two horses. The construction methods and materials were found not to comply with recommended guidelines and the health of the horses had been put at risk.
Tonbridge – Basaltina worktop	Advice provided on the installation of an exceptionally large 'Basaltina' kitchen work surface that had a flaw that was potentially unavoidable but also had been poorly repaired.
Penn, Bucks. – Refurbishment problems	Full survey of internal and external construction of a large house following a dispute between the main contractor and home owner. Problems included plaster cracking, poor alignment and flatness, trip hazards, incorrect guttering, inappropriate soil drainage, sub-standard masonry, cold-bridging problems, incorrect dpc and inadequate venting.
Emperador marble worktop, Norwich	Inspection of very large limestone slab used for an island work surface that had been subjected to re-finishing to change the finish from polished to honed but which had resulted in an uneven finish. Recommendations were provided to allow the stone to be re-finished more evenly without replacement.
Residence in Hampstead, London	Advice on the installation of internal flooring that had suffered cracking. This was found to have been caused when an adjacent bath was filled and the floor deflected. The situation was exacerbated by improper bedding procedures and the omission of both a decoupling membrane and two cross bonded ply layers to a timber substrate.
Clapham – Isola slate tiling	Investigation of stone tiling to both the floors and walls within bath and shower room areas. Although the design and workmanship were generally considered to be of a reasonable quality the stone itself had a number of flaws that resulted in cracking that then led to problems with the substrate as water accumulated behind the structure.
Kensington – Bateig Blue limestone tiling	Inspection of large format slabs lining a shower installation that wee exhibiting signs of surface decay despite surface sealing. Problems identified with joint construction allowing water and salts to become trapped behind the slabs and then crystallise below the sealed stone surface.
Brookwood – Nero Impala staining	Investigation of staining affecting an advised 'Nero Impala' stone worktop. Worktop considered likely to comprise a Chinese material of similar appearance but different performance as a consequence of reaction to mildly acidic spillage leading to considerable lightening in colour.
Barking – Roofing failure	Inspection of a relatively new roof to a block of flats following incidences of damp ingress to the top flat. The original layer was found not to have been stripped away and detailing around pipes and outlets was incorrect. It was recommended that a new surface be installed.
Holland Park – Portland stone external paving	Investigation of high specification external garden paving that was suffering staining and loss of grout from joints. The staining and damage were caused by inappropriate bedding procedures that were encouraging the concentration of moisture at specific locations. The quality of the stone supplied was also found to be lower than expected, which was admitted by the installer.
Bishops Sutton – Swimming pool tiling	Inspection of completed mosaic tiling that was considered to be or a low standard with uneven surfaces and variable grouting. A lack of allowance for differential movement had resulted in cracking and the installation of movement joints was recommended.

Appendix 02 - IBIS Slate Report

IBIS INDEPENDENT BUILDING INVESTIGATION SERVICES
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Publications – Sole Author

Buried treasure. Preserving stonework. Natural Stone Specialist, Vol. 55, No. 6, pp 28-31, July/August 2020.

Totternhoe Clunch. The white choice of stone for Woburn Abbey. Natural Stone Specialist, Vol. 50, No. 6, pp 34-38, July/August 2015.

Clipsham. The stone that has rescued the Houses of Parliament. Natural Stone Specialist, Vol. 50, No. 4, pp 26-30, May 2015.

The choice is undoubtedly yours but let me make a suggestion. Science meets art, Understanding stone. Natural Stone Specialist, Vol. 50, No. 3, pp 10-14, April 2015.

Ffestiniog slate. Ffestiniog shades of grey. Natural Stone Specialist, Vol. 50, No. 2, pp 34-40, March 2015.

Bath stone. A construction stone to challenge the rules. Natural Stone Specialist, Vol. 50, No. 1, pp 30-33, January/February 2015.

Caithness stone. A quintessential stone for construction. Natural Stone Specialist, Vol. 49, No. 9, pp 30-33, November 2014.

DeLank granite. A stone that is virtually indestructable. Natural Stone Specialist, Vol. 49, No. 8, pp 32-35, October 2014.

Cumbrian slate. A slate like no other. Natural Stone Specialist, Vol. 49, No. 7, pp 32-34, September 2014.

York stone. So famous, yet so elusive. Natural Stone Specialist, Vol. 49, No. 6, pp 38-42, July/August 2014.

The stone beneath our feet. A heritage that continues to be set in stone. Natural Stone Specialist, Vol. 49, No. 5, pp 34-38, June 2014.

Portland limestone. The greatest of all British stones… probably. Natural Stone Specialist, Vol. 49, No. 4, pp 34-38, May 2014.

Verde. Green… but maybe not so environmentally friendly. Natural Stone Specialist, Vol. 49, No. 3, pp 36-38, April 2014.

Black granite. Any colour as long as it's black. Natural Stone Specialist, Vol. 49, No. 2, pp 35-38, March 2014.

Travertine. Marble's young pretender. Natural Stone Specialist, Vol. 49, No. 1, pp 35-38, January/February 2014.

Slate (Part 2). The Earth's greatest gift. Natural Stone Specialist, Vol. 48, No. 12, pp 30-33, December 2013.

Slate (Part 1). The Earth's greatest gift. Natural Stone Specialist, Vol. 48, No. 11, pp 30-34, November 2013.

Granite (Part 2). The hard man of the stone industry. Natural Stone Specialist, Vol. 48, No. 10, pp 28-31, October 2013.

Granite (Part 1). The hard man of the stone industry. Natural Stone Specialist, Vol. 48, No. 9, pp 39-41, September 2013.

Marble. The most regal of stones. Natural Stone Specialist, Vol. 48, No. 8, pp 25-28, August 2013.

Sandstone (Part 2). Simple… but misunderstood. Natural Stone Specialist, Vol. 48, No. 7, pp 30-33, July 2013.

Sandstone (Part 1). Simple… but misunderstood. Natural Stone Specialist, Vol. 48, No. 6, pp 30-33, June 2013.

Limestone. The original building stone. Natural Stone Specialist, Vol. 48, No. 5, pp 28-31, May 2013.

The geological comfort factor. Natural Stone Specialist, Vol. 48, No. 4, pp 60-63, April 2013.

What's in a name? A technical review. Natural Stone Specialist, Vol. 47, No. 2, pp. 37-38, February 2012.

Building Stones Explained 5: Sandstone. Geology Today. Vol. 24, No. 1, pp. 33-38, January/February 2008.

Building Stones Explained 4: Slate. Geology Today. Vol. 22, No. 1, pp. 37-44, January/February 2006.

A not so clean slate. Structural Survey. Vol. 23, No.5, pp. 334-345, 2005.

Setting new slate standards. Roofing Cladding & Insulation. Pp. 60-62, September 2005.

A not so clean slate. Natural Stone Specialist. Vol. 40, No. 9, pp. 47-50, September 2005.

Building Stones Explained 3: Granite. Geology Today. Vol. 21, No. 3, pp. 123-130, May/June 2005.

Building Stones Explained 2: Marble. Geology Today. Vol. 20, No. 3, pp. 112-117, May/June 2004.

Falling Facades, Part 2. Natural Stone Specialist. Vol. 38, No. 10, pp 42-46, October 2003.

Falling Facades, Part 1. Natural Stone Specialist. Vol. 38, No. 9, pp 29-32, September 2003.

Building Stones Explained 1: Introduction & Limestone. Geology Today. Vol. 19, No. 4, pp. 151-156, July/August 2003.

Edge bedded Portland paving. Natural Stone Specialist. Vol. 36, No. 2, pp 25-26, February 2001.

Highly strung. Rope Access. Natural Stone Specialist. Vol. 35, No. 11, pp 37-38, November 2000.

It's easy when you know how. Use of Stone. Natural Stone Specialist. Vol. 35, No. 6, pp 17-22, June 2000.

On slippery ground. Natural Stone Specialist. Vol. 33, No. 12, pp 21-28. December 1998.

Chinese Roofing Slate – telling the good from the bad. Roofing Cladding & Insulation. Pp 54-56, October 1998.

Chinese slated? Natural Stone Specialist. Vol. 33, No.5, pp 21-23. May 1998.

Discoloration, designing out the problem. Natural Stone Specialist. Vol. 31, No. 9, pp 12-18. September 1996.

Roofing Slate: The Material Facts. Technical note No. 51. Roofing, Cladding & Insulation, May 1996.

The use of fluorescent dyes in highlighting some construction problems. Structural Survey. Vol. 12, No. 6, 1993/4, pp 4-7. February 1995.

Working with stone. Briefing, The Architects Journal. P28, 4 August 1994.

The changing face of slate. Stone Industries. Vol. 29, No. 4, pp 14-22. May 1994.

There's no alternative. A review of the sodium salt crystallisation test. Stone Industries. Vol. 29, No. 1, pp 37-39. February 1994.

A mechanism of marble staining. Quarterly Journal of Engineering Geology, Volume 24, No. 1, pp 49-53. 1991.

Publications – Co-Authored

Natural stone in swimming pools. A guide to its selection design, use and maintenance. Published by Stone Federation Great Britain, May 2010. (Lead Author supported by Technical Committee.)

Natural Stone Swimming Pools. Data Sheet. Published by Stone Federation Great Britain, May 2010. (Lead Author supported by Technical Committee.)

Selecting the Correct Stone. Published by Stone Federation Great Britain, April 2010. (Member of Technical Committee and contributing author.)

England's Heritage in Stone. Proceedings of a Conference. Tempest Anderson Hall, York, 15-17 March 2005. Edited by P Doyle. Published by the English Stone Forum, 2008

Natural Stone Flooring. Code of Practice for the design and installation of internal flooring, 2nd Edition. Published by the Stone Federation Great Britain, June 2005. (Member of Technical Committee and contributing author.)

Natural Stone Kitchen Worktops. Code of practice for the design, manufacture, installation and maintenance of natural stone kitchen worktops – including reception desks, counter tops and other similar horizontal and associated vertical surfaces for use in domestic and commercial situations. Published by the Stone Federation Great Britain, February 2005. (Member of Technical Committee and contributing author.)

Practical petrography: the modern assessment of aggregates for alkali-reactivity potential (with I Sims and S A S Smart). Scott, P W & Bristow, C M (eds). Industrial Minerals and Extractive Industry Geology. Geological Society, London, pp 183-188, The Geological Society of London 2002.

Analysing modern concretes (with F Everitt). Concrete. Pp 40-42, January 2001.

Natural Stone Flooring. Code of Practice for the design and installation of internal flooring. Published by the Stone Federation Great Britain, September 2000. (Member of Technical Committee and contributing author.)

Conservation of Stone Flooring, Ancient and Modern (with C M Grossi). Proceedings of the 9th International Congress on Deterioration and Conservation of Stone, Venice, 19-24 June 2000. pp 83-90.

Practical Petrography - The Modern Assessment of Aggregates for AAR Potential. (with I Sims and S A S Smart) Proceedings of the 11th International Conference of Alkali-Aggregated Reactivity, Quebec, 2000. Pp 493-502.

Urban pollution and stone decay (with C M Grossi and S A S Smart). Natural Stone Specialist. Vol. 34, No. 7, pp 22-32, July 1999.

Stone: Building stone, rock fill and armourstone in construction. Geological Society Engineering Geology Special Publication No. 16. Edited by M R Smith. Produced by a Working

Party the Engineering Group of the Geological Society. Published by the Geological Society, 1999. (Member of Working Party and contributing author.)

Designing with stone. 'Thin stone cladding' and 'Discoloration'. Ed. M Burton. Ealing Publications Ltd, 1999.

The staining and discoloration of stone (with B F Miglio). Structural Survey. Vol. 11, No. 3, pp 234-243. Winter 1992/93.

Deterioration of stone floors (with B F Miglio). Stone Industries. Vol. 27, No. 6, pp 21-28. July/August 1992.

Quantifying Microscopical Examinations of Concrete for AAR and other Durability Aspects (with I Sims and B F Miglio). Proceedings of the G.M. Idorn Durability Symposium, ACI Convention, Toronto, Canada, March 1990. ACI Special Technical Publication. Published in 1992.

Publications – Ask the Expert*

* A Q&A column in the Natural Stone Specialist.

X *BS EN 1342 – Setts of natural stone for external paving.* Vol. 48, No. 3, p6, March 2013.

X *BS ENs 12057 & 12058, Tiles and slabs for flooring and paving.* Vol. 48, No. 2, p6, February 2013.

X *BS 1469, Slabs for Cladding,* Vol. 48, No. 1, p6, January 2013

X *BS 6542, Sills and Copings.* Vol. 47, No. 12, p6, December 2012.

X *BS EN 1341, External Paving.* Vol. 47, No. 11, p6, November 2012.

X *BS 5385, Wall and Floor tiling.* Vol. 47, No. 10, p6, October 2012.

X *BS 8415, Specification for Memorials.* Vol. 47, No. 9, p6, September 2012.

X *BS 8298, Cladding and Lining.* Vol. 47, No. 7, p6, July 2012.

X *BS EN 1467, Rough Blocks.* Vol. 47, No. 6, p6, June 2012.

X *The website of the British Standards Institution.* Vol. 47, No. 5, p6, May 2012.

X *Sampling stone for testing.* Vol. 47, No. 4, p6, April 2012.

X *Scanning electron microscopy and X-ray diffraction.* Vol. 47, No. 3, p6, March 2012.

X *Petrography review, Part 2.* Vol. 47, No. 2, p6, February 2012.

X *Petrography review, Part 1.* Vol. 47, No. 1, p6, January 2012.

X *In-service slip resistance prediction.* Vol. 46, No. 12, p6, December 2011.

X *Salt crystallisation testing.* Vol. 46, No. 11, p6, November 2011.

X *Frost resistance testing.* Vol. 46, No. 10, p6, October 2011.

X *Abrasion resistance testing.* Vol. 46, No. 9, p6, September 2011.

X *Density testing.* Vol. 46, No. 8, p6, August 2011.

X *Flexural strength testing.* Vol. 46, No. 7, p6, July 2011.

X *Slip resistance testing.* Vol. 46, No. 6, p6, June 2011.

X *Water absorption testing.* Vol. 46, No. 5, p6, May 2011.

X *Compressive strength testing.* Vol. 46, No. 4, p6, April 2011.

X *What is the most useful stone test and why?* Vol. 46, No. 3, p6, March 2011.

X *What treatments would you recommend for external paving?* Vol. 46, No. 1, p6, January 2011.

X *Large blocks of a well known stone with many veins that have never caused a problem before have recently started splitting. Can you help?* Vol. 45, No. 12, p6, December 2010.

X *Is there something I can treat stone patios with to stop leaf litter from staining them?* Vol. 45, No. 11, p6, November 2010.

X *I am having an extension built on to my 19th century limestone house and the currently quarried stone has a different appearance to the original material, which is apparently the same stone. I am thinking of getting a different stone that is a closer match in appearance. Do you foresee and problems?* Vol. 45, No. 10, p6, October 2010.

X *Stone-topped kitchen islands stand alone, so why do I need rear-edge battening for units installed against walls?* Vol. 45, No. 9, p6, September 2010.

X *More resins seem to be used in association with stone finishing all the time. What do you think of resins and their use with stone?* Vol. 45, No. 8, p6, August 2010.

X *We wish to erect a single block of limestone to commemorate an event and have it last several hundred years. What characteristics should we be looking for when identifying suitable limestone?* Vol. 45, No. 7, p6, July 2010.

- *I have a customer who wants a stone floor in his surgery but is worried about possible blood spillage. Can you get blood out of a stone?* Vol. 45, No. 5, p6, May 2010.
- *During the past cold winter a stone patio I laid using 20mm thick slabs cracked and the pavers lifted, even though I built it to the British Standard.* Can you explain? Vol. 45, No. 4, p6, April 2010.
- *I have been told granite worktops can give off radon gas. Is this true? And if it is, is it a problem? Part 2.* Vol. 45, No. 3, p6, March 2010.
- *I have been told granite worktops can give off radon gas. Is this true? And if it is, is it a problem? Part 1.* Vol. 45, No. 2, p6, February 2010.
- *A limestone shower tray has become slippery, what can I do to make it safe again?* Vol. 45, No. 1, p6, January 2010.
- *We have 90m² of Pakistani white onyx to install in a kitchen / utility / toilet and conservatory area. Are there any special requirements for fixing, sealing and maintaining onyx tiles? How does onyx differ from marble?* Vol. 44, No. 12, p6, December 2009.
- *I believe the granite I supply to be frost resistant, and certainly have never had any problems. Do I really need to have it tested?* Vol. 44, No. 11, p6, November 2009.
- *I am installing stone around a bath. Are there any problems I should be particularly aware of?* Vol. 44, No. 10, p6, October 2009.
- *Architects are always asking me if there is any way of avoiding movement joints. Is there?* Vol. 44, No. 9, p6, September 2009.
- *My granite worktop has slowly developed cracking but the support appears to be sound. What could have caused this?* Vol. 44, No. 8, p6, August 2009.
- *A lacquer I applied to my woodwork has turned the adjacent limestone a vivid blue colour. Can I get rid of this?* Vol. 44, No. 7, p6, July 2009.
- *I have been told not to use building sand to bed and joint setts. Is this correct?* Vol. 44, No. 6, p6., June 2009.
- *I want to use limestone in a toilet, am I asking for trouble?* Vol. 44, No. 5, p6, May 2009.
- *A customer wants a marble worktop rather than granite or engineered quartz. What do you think I should do?* Vol. 44, No. 4, p6, April 2009.
- *I am struggling with my levels on a job. What are the thinnest natural stone flooring tiles I can safely use?* Vol. 44, No. 3, p6, March 2009.
- *Is there a safe way to speed up screed drying when I'm laying floors?* Vol. 44, No. 2, p6, February 2009.
- *I am building a driveway using granite setts. Should I bed them in sand or fix them with mortar?* Vol. 44, No. 1, p6, January 2009.
- *Can I use limestone for lining a swimming pool?* Vol. 43, No. 12, p6, December 2008.
- *I am cleaning some marble sculptures, what can I use to help protect them in the future?* Vol. 43, No. 11, p6, November 2008.
- *I am installing disabled ramp access, what should the slip resistance of the stone finish be?* Vol. 43, No. 10, p6, October 2008.
- *What is the best way to get rid of chewing gum from stone surfaces?* Vol. 43, No. 9, p6, September 2008.
- *What amount of repair or fill to a stone is acceptable?* Vol. 43, No. 8, p6, August 2008.
- *Sandstone patios we have laid often need to be jet-washed every six months or so as they have become green and slippery. Is this a particular problem with sandstone and is there any way to prevent it?* Vol. 43, No. 7, p5, July 2008.
- *What is the best form of underfloor heating to use with stone?* Vol. 43, No. 6, p6, June 2008.
- *Was someone joking when they said you must be wary of mushrooms growing near paving stones?* Vol. 43, No. 5, p6, May 2008.
- *What are stone veins and are they really a problem?* Vol. 43, No. 4, p8, April 2008.
- *Limestone tiling in a shower enclosure.* Vol. 43, No. 3, p6, March 2008.
- *Using the term 'granite' when selling stone.* Vol. 43, No. 2, p89. February 2008.
- *Turmeric staining of kitchen worktop.* Vol. 43, No. 1, p6. January 2008.

Television Appearances

- *The Legalizer, BBC 1, first aired 27.11.2013.*
- *Horizon, BBC 2, The Great Court of the British Museum, first aired 2000.*

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Appendix 04 - Camden Response to Slate Report

From: **Christopher Cockrell** christopher@cockrelldesign.com
Subject: Re: Camden Council Planning Enforcement: EN23/0247 - 22 Montague Street
Date: 17 August 2023 at 16:44
To: Hassan Howlader hassan@sohoha.org.uk
Cc: Caroline James-Ford caroline@sohoha.org.uk, Mark Kapszewicz Mark.k@sohoha.org.uk

Hassan,

Let's discuss on site after reviewing the properties.

Kind regards

Christopher COCKRELL

Sent from my iPhone

> On 16 Aug 2023, at 15:33, Hassan Howlader <hassan@sohoha.org.uk> wrote:
>
> Hi Christopher
>
> Please see e-mail below.
>
> How would you advise to approach the response from us?
>
> Regards,
> **Hassan Howlader**
> Building Surveyor
>
> **020 7557 7423**
> **07917 725 621**
>
> Registered Office: 18 Hanway Street, London W1T 1UF
> 020 7557 7400 www.sohoha.org.uk @SohoHousing
>
> <image002.jpg> <image003.jpg>
>
> A registered society within the meaning of the Co-operative and Community Benefit Societies Act 2014. Register No 20784R. Registered with the Regulator of Social Housing as a registered provider of social housing, No LH1321.
>
> **From:** Joshua Cheung <Joshua.Cheung@camden.gov.uk>
> **Sent:** Wednesday, August 16, 2023 2:51 PM
> **To:** Hassan Howlader <hassan@sohoha.org.uk>
> **Cc:** Hassan Howlader <rubelh1@hotmail.co.uk>; Caroline James-Ford <caroline@sohoha.org.uk>; Niall Bramley <niall@sohoha.org.uk>; Mark Kapszewicz <Mark.k@sohoha.org.uk>
> **Subject:** RE: Camden Council Planning Enforcement: EN23/0247 - 22 Montague Street
> **Importance:** High
>
> Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.
>
> Dear Hassan,
>
> Thank you for your email.
>
> We are surprised that the lab report has stated Spanish Slates were in place before SHA's recent undertaking of works to the Listed Building. Our evidence indicates that it was Welsh Slates that were discarded.
>
> 1. See the attached email. Welsh slates have a typical purple hue and are thicker compared to Spanish which is generally grey/black and thinner. When requested for photos of the 'damaged roof' (before the works), you sent me three photos of the roof before the SHA works in the email dated 29th March 2023. The appearance of the tiles in the photos possess the characteristics typical to that of Welsh Slates. It is therefore likely Welsh Slates were under parts of the roof covered by weather proof membranes too.
>
> 2. Attached is an example of a Spanish and Welsh Slate from a left over job in an adjacent property to no 22. In line with our Principle Conservation Officer's comment, original natural Welsh slates which are to be found on the historic roof pitches of the early 19th century Bloomsbury townhouses.
>
> 3. On the site visit dated 19th June 2023, the resident of over 40 years for Flat G cited Welsh Slates to have been in position before the SHA works – to which he informed me the most notable works to the roof before SHA's acquisition of the property was the installation of those weather proof membranes.
>
> 4. Finally, we have concerns on the lab report – see attached pdf. On the site visit dated 31st March 2023, you explained to me that there was one damaged "original" slate remaining that would be sent to a lab for testing. There is no evidence that this slate was actually from the roof, to which it potentially appears to be a damaged unusable Spanish Slate from the SHA works. Further, the "original" slate that was claimed to be taken to the lab does not appear to be the slate that was tested. The slate that was actually tested also appears to be Spanish. Further comments from our Conservation Officer on the lab report are that Spanish Slates arrived for use in this country about 50 years ago, so if the previous slate covering definitely predated the 1970s it is unlikely that they are from Spain.
>
> **Do you have any evidence of when the roof slates were last changed? Or any other evidence that indicates it was Spanish slates beforehand?**
>
> Otherwise, in light of the above, the Council would maintain that Welsh Slates were in position before their removal and replacement with Spanish and our request to submit one Listed Building Consent Application would stand.
>
> Has there been any progress regarding this Application?
>
> Kind regards,
>
> Joshua Cheung
> Planning Enforcement Officer
> Supporting Communities
> London Borough of Camden
>
> Web: camden.gov.uk
>
> 5 Pancras Square
> London N1C 4AG
> <image001.png>
>
> **From:** Hassan Howlader <hassan@sohoha.org.uk>

Sent: 25 July 2023 12:13
To: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Cc: Hassan Howlader <rubelh1@hotmail.co.uk>; Caroline James-Ford <caroline@sohoha.org.uk>; Niall Bramley <niall@sohoha.org.uk>; Mark Kapszewicz <Mark.k@sohoha.org.uk>
Subject: RE: Camden Council Planning Enforcement: EN23/0247 - 22 Montague Street

Hi Joshua

I've attached a picture of the official listing made for Montague street before the amendment.

The plastic pipe is a boiler flu pipe which was installed roughly around December 2017 (picture is attached).

I've attached the lab test results for the previous existing slate. The credential of the Specialist who carried out the test is on page 9.

I am still gathering more in-depth details as possible from the roofing contractor as soon as I have this information, I will pass this on to you.

Kind regards,

Hassan Howlader
Building Surveyor

020 7557 7423
07917 725 621

Registered Office: 18 Hanway Street, London W1T 1UF
020 7557 7400 www.sohoha.org.uk @SohoHousing

<image002.jpg> <image003.jpg>

From: Joshua Cheung <Joshua.Cheung@camden.gov.uk>
Sent: Wednesday, June 28, 2023 3:05 PM
To: Hassan Howlader <hassan@sohoha.org.uk>
Cc: Hassan Howlader <rubelh1@hotmail.co.uk>; Niall Bramley <niall@sohoha.org.uk>
Subject: Camden Council Planning Enforcement: EN23/0247 - 22 Montague Street
Importance: High

Dear Hassan,

Thank you for facilitating the site visit last week. I have deliberated with our Principal Conservation Officer and would direct you our findings and requests document which is attached above. Please pass this to your planning agent.

I understand that you are currently awaiting a lab report for the slate. However, you are required within 5 weeks of the date of this email to fulfil the requirements of **SCHEDULE D** of the attached document. Should they not be fulfilled by this deadline, we will have to commence formal action to secure the regularisation of the breaches.

If you would like to discuss the contents of the document, please do not hesitate to contact me. I will however be unavailable for the rest of today and whole of next week.

Kind regards,

Joshua Cheung
Planning Enforcement Officer
Supporting Communities
London Borough of Camden

Web: camden.gov.uk
Telephone: 020 7974 3383 (Mon-Fri | 1000am – 1600pm)

5 Pancras Square
London N1C 4AG
<image001.png>

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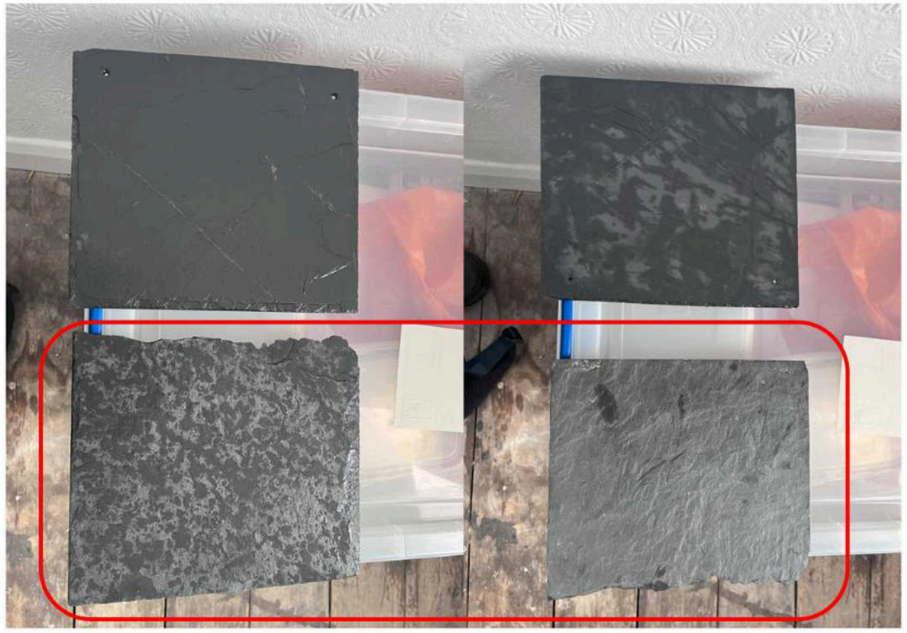
<mime-attachment>
<2 - Slates_Roof from adjacent property to no22.pdf>



[Top tile - New (Spanish) Slate. Bottom Tile – "Original" Slate that was claimed to be sent to the lab for testing (No evidence that it came from the roof)]

IBIS INDEPENDENT BUILDING INVESTIGATION SERVICES

Hassan Howlader / Soho Housing Association
2882-r1-230718-Report
18 July 2023
Page 6 of 8

Slate recovered from the roof that was then replaced

Sample taken for thin-sectioning.

Spots of opaque pyrite and other related iron-sulfide minerals scattered throughout the slate fabric, a feature typical of many slates found within Spain.

[Sample tested by IBIS does not match what was claimed to be the "Original" Slate, appears to be a new Spanish Slate that was tested]

Appendix 05 - UK Roofing (Contractor) Report

Roof Renewal Report

Property Information:

Property Address: 22 Montague Street, London WC1B5BH

Property Type: Terraced

Roof Type: Pitched Roof/Flat Roof

Client Name: Soho Housing

Date of Inspection: 25th January 2023

Executive Summary:

The purpose of this roof renewal report is to assess the current condition of the roof and provide recommendations for its renewal. The inspection was conducted on 25th January 2023, and this report presents the findings and necessary actions required to restore the roof to a functional and durable state.

Roof Inspection Findings:

2.1 General Observations:

Overall condition of the roof: Very poor, including slipped/cracked/flakey slates

Roof pitch: Pitched 30 Degrees

Number of stories: 5 Storey

2.2 Roof Covering Assessment:

Roof covering type: Pitched Roof/Flat Roof

Roof covering condition: Very poor with delaminated slates

Roof covering lifespan: This roof has reached the end of its useful working life

2.3 Felt Assessment:

Felt condition: very poor, complete replacement required

Felt maintenance/replacement: Complete Replacement required

2.4 Batten Assessment:

Batten condition: very poor and signs of rot

Batten maintenance/replacement: complete replacement

Recommendations: Complete replacement

Based on the roof inspection, the following recommendations are provided for the roof renewal:

3.1 Roof Covering Replacement:

We would recommend to strip off all the pitched and vertical roof coverings.

Overlay all the box gutters with new LP (Bauder system) and install new 9" cover flashings into the surrounding walls (grind and chase lead into walls).

Install new insulation into the loft spaces/between rafters on the verticals.

Install new eave ventilation, new breathable felt membrane and new treated battens , please note larf battens required on the eave coarses due to the eave ventilation will cause a sprocket.

Install new 20x10 natural Spanish roof slates , new hip irons , new universal hip and ridge tiles and new mono ridge tiles.

Renew the pipe slates to the roof penetrations x2 flexi pipe slate and 2x new bespoke custom made pipe slates around the boiler flue pipe and the larger duct pipe (lead welding required and gas engineer to check flue pipe when working around it).

Renew the skylight window on the pitched roof elevation with a new velux roof window , timber frame will need to be installed/altered , axis interior team to make good inside after.

Install new lead soakers and new 6" vertical step flashing where needed , new 12" lead detail over the door frames.

We would recommend on the flat pitched roof area above the stairwell/roof access landing to remove the lead flashings to enable us to overlay all the flat roof area and box gutter with new LP system bauder and then renew the lead flashings with new 6" lead flashing and renew the 12" lead drip detail that covers the vertical slating.

Conclusion:

In conclusion, the roof renewal is necessaryto addressthe identified issues,improve the performance and lifespan of the roof, and protect the property from water damage.The recommended actions outlined in this report will ensure a reliable and visually appealing roof system.

Pleasefeel free to contact us for any further inquiries or to discussthe next stepsin the renewal process.

Sincerely,

Mr James Roe MIoR
Director
UK Roofing & Scaffolding Specialist Ltd

M: 07941 468 879
E: james@ukroofingspecialist.co.uk
A: Park Farm Nursery, Sewardstone Road
Chingford, E4 7RG
W: www.ukroofingspecialist.co.uk

Appendix 06 - IBIS Commentary on Planners Response October 2023

From: **Barry Hunt** barryhuntibis@icloud.com
Subject: 2882-231004-e1-Camden Council Planning Enforcement: EN23/0247 - 22 Montague Street
Date: 4 October 2023 at 11:05
To: Christopher@cockrelldesign.com christopher@cockrelldesign.com
Cc: Hassan Howlader hassan@sohoha.org.uk, Caroline James-Ford caroline@sohoha.org.uk, Mark Kapszewicz Mark.k@sohoha.org.uk

Dear Christopher,

I have a number of comments to make following the additional information that has been provided and further researches.

I am not sure who took the photograph (Photo 1) of the adjacent building but it has been processed, there is an unnaturally blue sky, and the slate colours are unnatural. I took this image, albeit at very low resolution and reprocessed it trying to get the sky to be a more natural colour (see Photo 2), the slates now appear to be somewhere between grey and purple, which is not atypical of weathered slates from the Ffestiniog area in Wales. There is no great roughness to the slates so they do not appear to be from Cumbria or other locations in the British Isles.

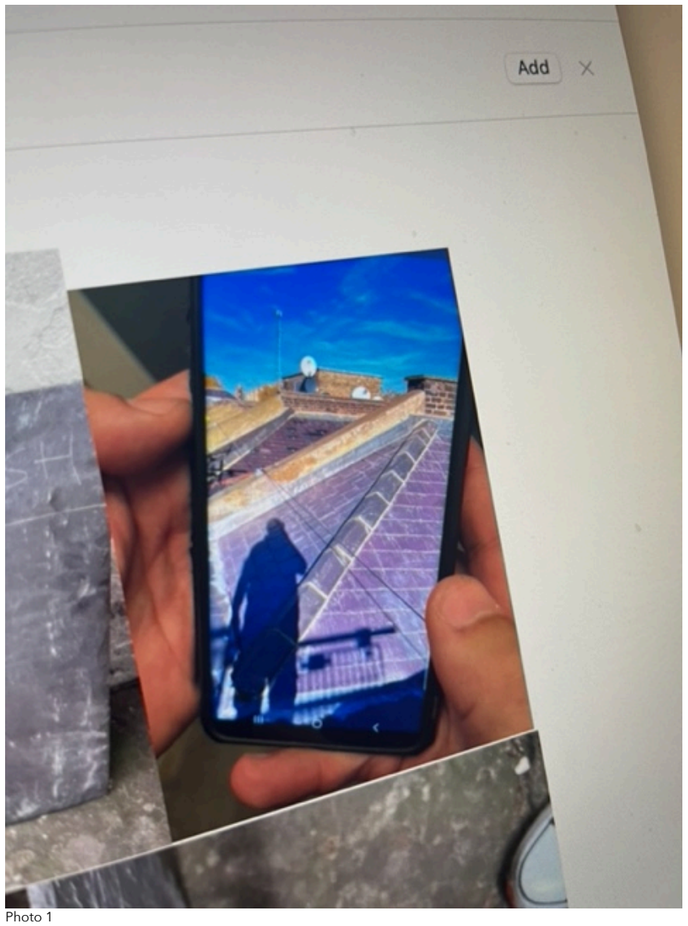


Photo 1

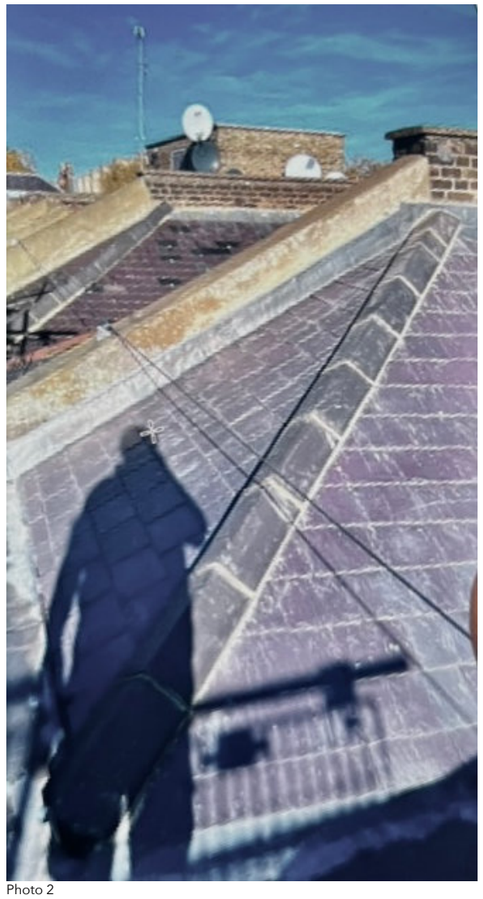


Photo 2

Now look at the attached GoogleEarth image (Photo 3) looking down at the roofs of the area and most are grey, in various shades. There are some that appear to be of a purplish grey colour in locations away from the area but these are few. This image was from September 2022 when the scaffolding was up and the slate very shiny and new and so stands out above and left of centre. Again, the overall suggesting its that the original slates were probably from the Ffestiniog area of Wales.

One thing I notice is the condition of the hips and ridges of many of the roofs, in addition to the general appearance of the slates, and the overall impression is that many of these roofs may have been replaced in the past. The second, fourth and fifth roofs up from the low right corner possibly are original, all others being replacement.

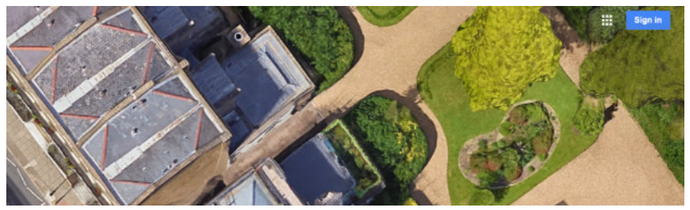


Photo 3

The satellite images from GoogleEarth showing different times in the past are not that helpful as they are much lower resolution than the images currently provided by GoogleEarth. These show the roofs changing colour at different times due to albedo and other natural lighting effects.

Now I turn to the images taken of the roof taken prior to the works and when it exhibited an applied coating over the non vertical sections. Nothing can be deduced from the covered areas. From the vertical sections it is clear that there has been replacement and re-use of slates. This would certainly fit with the recent advice that there was refurbishment carried out in 1978 that included the requirement to set aside and slates in good enough condition for re-use. Original slates certainly would be those with extremely heavy darkening and surface scaling visible in the photos. I have included one of the photos below as Photo 4.

Photo 4

It is possible that only a small number of slates were recovered during the 1978 works and the main sections were replaced with new materials and all recovered material used for the hidden vertical sections. This time period was also when Spanish Slates were being imported into the UK in large quantities and before the issues arising with certain Spanish Slates were actually known about.

Moving on to the sample advised to have been recovered from the roof prior to the replacement works. The comment that the material I was looking at was not the slate that was said to have been taken from the roof, I can demonstrate that this is clearly incorrect about the sample. Attached are photographs of the slate I looked at and it is clearly the same slate as shown in the report by others. They have failed to grasp that the sample I showed in my photograph was a sub-sample from the slate.

From the images I provide here you can clearly see the exact same broken edge profile and areas where the edge has been eaten away. Some of the slate features are also able to be compared and confirmed to be the same. The problem with the original photograph is it was taken of a partially damp and drying out slate using flash, which is a totally different set of viewing conditions. Those making the comparison have clearly not taken many factors into account. They were lacking in a lot of information, unfortunately.

I have taken two sets of photos, front and back, under different lighting conditions. The sub-sample I took was from one of the corners and the pieces remaining from this have been put back into position. The same peaks and troughs can be traced, even though a small amount of the right side of the broken edge has been lost. The right front edge is an exact match where the edge cuts inwards. This is despite taking the photos at different angles and lighting conditions.

Summary Conclusions

The surrounding roofs appeared to be variably grey with a number having been replaced, and a number obviously having had repairs carried out. There is actually minimal evidence to confirm that these roofs were formerly Welsh slate, as there are slates from many countries that match these. However, the original slating in this instance is likely to be Welsh. Slates from other locations around the British Isles can probably be ruled out as originally present.

The likelihood that there was replacement of the original slate is very high due to the clear evidence that slates have been relaid on the vertical pitched areas. This certainly fits with advice that refurbishment of the roofs was likely carried out around 1978.

At this point all I can say is that if the sample I received and investigated that was advised to be from the original roof, is accepted as being as such, then this was a Spanish slate replacement without a shadow of a doubt. The low quality of this apparent replacement slate explains its performance and why it needed to be later protected and ultimately replaced. The use of such a slate would not have been hindered at that time by the knowledge we now have concerning the rapid failure of some types of Spanish origin slates.

The one problem I have with the material advised to be taken from the roof, is that it does appear to be an unused sample of material that has been around for some time. And it will always be difficult to claim anything more than this about the provenance of the material unless there are photos/documentation tying it to the former replacement slate.

This is about as much as I can comment further on matters.

If you have any queries do not hesitate to contact me.

Kind regards, Barry

Barry J Hunt
Director, IBIS Limited

10 Clarendon Road, South Woodford, London, England, E18 2AW
T: 0044 (0) 20 8518 8646 M: 0044 (0) 7985 213321

Any reports or test data provided should be considered draft and subject to confirmation.

Appendix 07 - Technical Data on Installed Systems

CLIENT: UK ROOFING SPECIALISTS
REF NO: B230735
PROJECT NAME: MONTAGUE STREET, 22
ROOF AREA NAME: BOX GUTTER
DATE: 05/01/2023

'Safe2Torch' advice:

Follow LRWA Guidance Note No.13 for safe drying of damp substrates. Particular care should be taken in areas deemed to be "Torch Free"
It is always the responsibility of the contractor to carry out a risk assessment on all aspects of the contract. The 'Safe2Torch' checklist is solely to provide assistance in the assessment of the risks where the use of a gas torch is being considered.

Please note that core samples have not been taken. Unless core samples are taken prior to tender stage we cannot be held liable for any additional costs incurred as a result of the discovery of unsuitable materials or decking.

SYSTEM CONSTRUCTION

Waterproofing System: Bauder LiquiTEC Cold Roof – LiquiDEK System for Gutters
Substrate: Overlay Existing Liquid Waterproofing
Roof Fall: (1°) 1:60

It is imperative that should this information change for whatever reason, then **Bauder Limited** must be contacted so that the specification can be amended accordingly.

Always refer to the Bauder LiquiTEC System Installation Manual for preparation methods, storage requirements and the application of each product.

Where there are any doubts as to adhesion, carry out an adhesion test, in accordance with the instructions given or consult the Bauder Technical Department on 01473 257671.

TEMPERATURE LIMITATIONS

Product Storage: Bauder LiquiTEC products should not be stored in direct sunlight or in ambient temperatures above 25°C and must be protected from frost.

Product Application Temperatures: Please refer to the Bauder LiquiTEC Technical Installation Manual for details of ambient and substrate temperature limitations. All substrates to be tested with an appropriate Infrared non-contact digital temperature gauge before and during installation.

LIQUID OVERLAY

An adhesion test must be carried out prior to ordering materials, to ensure suitability for overlay.

If adhesion test is satisfactory, prepare the surface by scraping and sweeping away any detritus, gravel, sand, silt etc. then clean by power washing as required (with or without approved detergent) and allow to thoroughly dry. Rub down thoroughly with **Bauder PMMA Cleaner** (approx. consumption 0.1L/m^2) and abrade to achieve a roughened surface. Any upstands and details which are unsound or showing signs or degradation should be removed and/or repaired prior to any works being carried out. Areas that have been removed should be suitably primed (refer to **Bauder LiquiTEC** Installation Guide).

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Should the adhesion test be un-successful, a full strip of the area will be required. **Bauder** should be contacted first, to ensure the correct course of action is undertaken.

Falls:
A design fall of minimum 1:40 is recommended in order to achieve a constructed fall of minimum 1:80. However, the **Bauder LiquiTEC** system is suitable for application to zero pitch roofs. Any areas of backfalls or deflection must be levelled prior to installing the system.

PRIMER

Before application: All surfaces must be dry, clean and free from dust, laitance, dirt, oil, grease, loose material and any other contaminants.

DETAILS AND UPSTANDS – To be primed FIRST
All Details and Upstands receiving the new Cold Applied Liquid Waterproofing System are to be thoroughly primed with the relevant **Bauder LiquiTEC Primer.**
The following primers must be used as required:
- **Bauder LiquiPRIME 1**: For Timber, Plywood or OSB/3 or CLT, Asphalt, Exposed Bitumen, Bitumen Bleed
- **Bauder LiquiPRIME 2**: For Non-Porous Concrete, Screed, Blockwork
- **Cryl Primer 287:** For New/Porous Concrete, Screed, Blockwork
- **Special Primer 610:** For EPDM
- **No Primer Required:** For Metals, Hard Plastics, PVC-P and existing Liquid Waterproof coatings (Subject to adhesion testing).

Application: Add catalyst to the primer at the rate indicated on the container (except Pox R103 & Special Primer 610). Apply catalysed primer using a synthetic deep pile roller to upstands and details first, before applying to the main area. **Ensure that primer is applied into the joints between panels to fill the gaps.**
Note: When using **Bauder LiquiPRIME** on upstand details in excess of 250mm high, add 1% (by weight) Liquid Thixo to the catalysed resin and stir thoroughly prior to application.

For other substrates, consult the Bauder Technical Department on 01473 257671 for required preparation methods and priming.

SUBSTRATE REPAIRS AND FILLING

To be applied after priming:
- **Bauder LiquiPASTE:** Minor indentations, cracks and voids
- **Bauder LiquiPASTE Mortar:** Larger indentations
- **Cryl RS 240**: Cementitious substrates and Asphalt substrates

Application: Add catalyst at the rate indicated on the container (excluding RS 240). In the case of **Bauder LiquiPASTE Mortar**, catalyst must be added before adding the filler. Apply catalysed resin using a suitable smoothing trowel and allow to cure for a minimum of 1 hour.

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ROOF AREA NAME: BOX GUTTER
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WATERPROOFING TO GUTTER(S)

IMPORTANT NOTE

The minimum recommended height for constructing waterproofing details is 150mm from the top of the waterproofing. Special attention should be paid to all structures, such as rooflights, counter-flashings, window and door cills, etc. These may have to be raised to enable a 150mm high waterproofing detail to be formed. Bauder cannot take responsibility for water ingress over waterproofing details insufficiently high.

Bauder LiquiDETAIL incorporating **Bauder 110g Reinforcement Fleece** must be used wherever it is practical to incorporate a reinforcement fleece. **Bauder LiquiFIBRE** may only be used for waterproofing complex shapes or in areas where the use of a fleece is impractical.

GENERAL AREAS: Linear Upstands / Details

Bauder LiquiDETAIL, Blue grey (Approx. RAL 7031) two layer 'wet-on-wet' liquid applied cold roof covering system, with encapsulated **Bauder 110g Reinforcement Fleece**, to be used wherever it is practical to incorporate a reinforcement fleece.
Application: Add catalyst to the **Bauder LiquiDETAIL** at the rate indicated on the container. Apply catalysed **Bauder LiquiDETAIL** (2.0 kg/m² min.) with a synthetic deep pile roller. Roll a strip of **Bauder 110g Reinforcement Fleece** into the wet resin, pressing trapped air free using the synthetic deep pile roller, ensuring a minimum 50mm overlap between adjacent sections of **Bauder 110g Reinforcement Fleece**.
Ensure the **Bauder 110g Reinforcement Fleece** is always fully saturated before applying a further coat of catalysed **Bauder LiquiDETAIL** (1.0 kg/m² min.) wet on wet.
Rainproof Times: After approx. 30 minutes.
Next Coat / Subject to Stress: Can be walked on/next coat applied after approx. 45 minutes.

COMPLEX AREAS: Complex NON Linear Details ONLY

Bauder LiquiFIBRE, Blue grey (Approx. RAL 7031), may **ONLY** be used for waterproofing complex shapes or in areas where the use of a fleece is impractical.
Application: Add catalyst to the **Bauder LiquiFIBRE** at the rate indicated on the container. Apply catalysed **Bauder LiquiFIBRE** (1.5 kg/m² min.) with a brush and allow to cure for a minimum of 45 minutes.
Apply a further layer of catalysed **Bauder LiquiFIBRE** (1.5 kg/m² min.) by brush, using brush strokes at 90° to the first layer.
Rainproof Times: After approx. 30 minutes.
Next Coat / Subject to Stress: Can be walked on/next coat applied after approx. 45 minutes.

FINISH COAT TO WHOLE ROOF

Bauder LiquiFINISH Stone grey (approx. RAL 7030)
Application: Add catalyst to the **Bauder LiquiFINISH** at the rate indicated on the container and apply using a synthetic deep pile roller at the rates indicated below.

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Upstands & Details: Apply **Bauder LiquiFINISH** (0.5kg/m² min). For upstand details in excess of 250mm high, add 1% Liquid Thixo to the catalysed resin and stir thoroughly prior to application.
Main Area: Apply **Bauder LiquiFINISH** (0.65kg/m² min).
Rainproof Times: After Approx. 30 minutes.
Subject to Stress: Can be walked upon after approx. 1 hours. Able to withstand stress after approx. 3 hours.

TECHNICAL NOTES

[1] It is the Contractor's responsibility to ensure that the substrate is suitable and that the system is applied in all areas in accordance with Application Guidelines in force at the time.
[2] **Coverage Rates** given are guidelines based on smooth, level substrates. Allowances must be made if the substrate is uneven, rough or porous.
[3] **Drying times** stated are at +20°C and are dependent upon weather conditions.
[4] **Interruptions During Works** - If work is interrupted for more than 12 hours, use **Bauder PMMA Cleaner** to clean and reactivate the transition area. **Evaporation time:** at least 20 minutes - overlay within 60 minutes.
For details including **Bauder 110g Reinforcement Fleece**, the subsequent waterproofing layers must overlap by at least 100 mm, including the **Bauder 110g Reinforcement Fleece**.
[5] Any peculiarities or details discovered, which might affect the performance of the **Bauder** system, should be reported immediately to the specifier and **Bauder Limited** in order that they may assist in overcoming the problem.
[6] The contractor is to ensure water tightness of the roof at all times.
[7] Where building works are to be carried out by other trades, following completion of the waterproofing, the contractor must make adequate provision for supplying protection to prevent damage to the new system. The final inspection will not be carried out until all associated trades are complete and the roof areas are clear from all debris and protection layers.
[8] All mechanical and electrical work to plant and equipment should be carried out by competent mechanical and electrical qualified tradesmen. All plant is to be reinstated and recommissioned on completion of the roofing works in accordance with the client's detailed specification.
[9] If any items of plant/equipment are to be situated on the finished roof, suitable protection should be applied in accordance with this specification. In the case of heavy items it may be necessary to introduce a load spreading slab, please contact **Bauder** for further advice.

ADDITIONAL ITEMS

Provision should be made by the contractor to:-

- **New Chase & Suitable Flashing to Brickwork Upstand** (A01)
  Cut new chases into brickwork upstands, a minimum of 25mm deep, & 150mm above the finished surface level of the new waterproofing. The chase is to be brushed clean and primed with **Bauder LiquiPRIME 2** in accordance with the preparation and priming schedule. **Bauder LiquiDETAIL** is to be dressed into the

CLIENT: UK ROOFING SPECIALISTS
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new chase. Install suitable counter-flashing, this is to be base clipped and suitably plugged at 300mm centres. Lengths should not exceed 1.5 linear metres and laps should be not less than 150mm. All chases should be brushed clean and sealed using **Bauder Sealant Primer** prior to the application of **Bauder Sealant**. All work should be carried out by competent tradesmen in accordance with current British Codes of Practice and Lead Contractors Association.

- **Behind Slates/Tiles** (A15)
  Remove sufficient courses of slates/tiles to allow for the new waterproofing to be dressed up a minimum distance of 200mm (and a minimum vertical height of 150mm from the finished surface level) behind the slates/tiles. Should the existing support to the slope be insufficient, provide or extend the lay board as necessary. Tile battens should be temporarily removed for this purpose. Reinstate battens (taking care that any rotten or defective timbers are replaced) and tiles ensuring that the under slating felt laps over the new waterproofing and that any damaged or degraded under slating is renewed. Care should be taken on the replacement of the slates/tiles. Any broken, missing or damaged tiles/slates must be replaced.

- **New Bauder 100/60 GRP Trim Angle To Parapet Detail** (D05A)
  Carrier Membrane (where applicable):
  - Apply the specified primer to the detail and dress the carrier membrane up and over the perimeter detail.
    Please refer to Bauder standard detail drawings.

  GRP Trim Angle:
  - **Setting out:** This trim can be fitted either way round to suit the application. The new trim must cover any open joint, which may exist between the kerb and the top of the wall by a distance of minimum 20mm. All trims are to be bedded in **Bauder LiquiPASTE**.
  - **Fasteners:** Screw fasteners of type appropriate to kerb or deck substrate. Nail fixing is not permitted.
  - **Fixing:** 30mm from ends and at 300mm (maximum) centres, stagger fixed.
  - **Corner pieces:** Purpose made.

  Completion:
  - **Contact surfaces:** Remove dust or any other contamination from the trim surface.
  - **Waterproofing:** Dress the full **Bauder LiquiDETAIL** waterproofing either terminated on the horizontal, or taken all the way down to the bottom of the trim leg and trim to a neat edge.

- **Clean & Prepare Rainwater Outlet (Cast Iron)** (J12)
  Carefully remove the retaining bolt, clamping and grille from all cast iron outlets and prepare in accordance with the preparation and priming schedule. Treat and re-decorate all exposed parts of the outlets with a rust inhibitive paint in accordance with the client's detailed specification.

- **New Bauder Structural Rooflights** (L09)
  Supply new **Bauder Structural Rooflights**, as detailed on the forthcoming rooflight schedule. These items must be installed by Xtralite Ltd. Tel: 01670 354157.

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The following items will always be included for refurbishment projects:

1. Remove existing redundant rooflights and dispose of in accordance with the clients detailed instructions.
2. Carry out any making good that may be required internally as a result of the installation of the new rooflight.
3. All works must be carried out strictly in accordance with the client's detailed specifications.
4. If a lightning protection system exists on the roof, provision should be made to incorporate the new rooflight into the system in accordance with BS EN 62305.

WORKMANSHIP

[1] The **Bauder** System must only be laid by properly certified operatives, who have been trained by **Bauder Limited** or approved by **Bauder Limited** and hold the certificate of approval.

[2] The **Bauder LiquiTEC System** Installation Manual, Standard Details and project specific Details are to be read as an integral part of this specification.

[3] Workmanship that is incorrect will not be permitted, even if the system is watertight. The client will be told that all such faults must be remedied, before the Guarantee is issued.

[4] Any building work which is the responsibility of the roofing contractor and has a bearing on the life of the **Bauder LiquiTEC System** must be carried out by properly trained tradesmen.

[5] Consideration must be given by the contractor at all times to the aesthetic appearance of the roof.

HEALTH & SAFETY INFORMATION – ROOFING WORK

[1] Suitable precautions must be taken to prevent accidents occurring when roofing systems are being installed.

[2] The contractor must ensure that adequate measures are taken to effectively prevent injury to members of the public, contractors and any other persons who may be affected by the works including the public

[3] Where microwave equipment is installed at roof level, care must be taken to prevent persons working on the roof from being exposed to large doses of microwave radiation.

[4] Similarly, the contractor must liaise with the client to ensure that there are no extract outlets situated on the roof where noxious or harmful emissions could affect persons working. Suitable precautions will be necessary to prevent exposure where this situation arises.

[5] The contractor is responsible for providing adequate firefighting equipment in the form of extinguishers during work on the roof. These must be kept in easily accessible locations and be suitably signed.

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[6] Whenever possible, access to the roof must be made via internal staircases rather than by temporary means. Where this is not available, it is the responsibility of the contractor to ensure a safe means of access, egress and a safe workplace.

As far as roofs are concerned, edge protection in the form of scaffolding or a fixed structure must be in place to a height of 1.1 metres in accordance with the Workplace (Health, Safety and Welfare) Regulations 1992.

Failing this, the hierarchy of controls must be applied from the Work at Height Regulations 2005. Means of access must be by fixed ladder, passenger hoist or scaffolding.

[7] The contractor must ensure that suitable written method statements and risk assessments are available for the work being undertaken. In particular, it is essential that manual handling methods be fully assessed as roofing materials are heavy and can cause serious injury.

[8] The contractor must ensure that suitable information about the roof covering is provided to the Client at the end of the work to ensure that work in future can be carried out safely. This information will form part of the Safety File.

[9] All persons working on the roof must be provided with, and wear, suitable personal protective equipment and wet weather gear. Training must be provided to all contract staff on the safe use of the equipment.

[10] The installer must observe Product Safety Datasheets, relevant to the materials being used as well as completing and complying with COSHH risk assessments

[11] We draw your attention to your duties under the Construction (Design and Management) Regulations 2015. Regulation 4, Client's duties in relation to managing projects states that the client must make suitable arrangements for managing a project, including the allocation of sufficient time and other resources. Regulation 5, Appointment of the Principal Designer and the Principal Contractor states that where more than one contractor will be working on a project at any time, the client must appoint a Principal Designer and a Principal Contractor.

Please note that although **Bauder** will assist with the roof waterproofing system design, we will not undertake the role of Principal Designer.

[12] No work must be carried out on fragile roofs or where there are skylights unless suitable precautions have been taken to prevent persons falling through fragile roofs and openings. In particular, the following are likely to be fragile:

- Non reinforced fibre cement sheets e.g. asbestos
- Corroded metal decking
- Woodwool slabs
- Rotten chipboard or similar
- Stramit
- Slates or tiles
- Old roof lights

CLIENT: UK ROOFING SPECIALISTS
REF NO: B230735
PROJECT NAME: MONTAGUE STREET, 22
ROOF AREA NAME: BOX GUTTER
DATE: 05/01/2023

- Glass (including wired)

Specifying non fragile rooflights will help reduce the risk of falls from height. A non-fragility rating is required by the HSE (Health and Safety Executive) in order to comply with CDM (Construction Design and Management) Regulations 2015.

[13] HSE guidance must be followed when carrying out any work involving interference with asbestos.

***IMPORTANT NOTE:**
On sites where asbestos has or has possibly been detected, it is to be treated in accordance with the **Control of Asbestos Regulations 2012.**
Bauder specification documentation is subject to any revisions necessary pending the findings from the above.

GUARANTEE

A 20 year **Bauder LiquiTEC** system product and workmanship guarantee is to be provided upon completion following a satisfactory Final Inspection by **Bauder**. Details regarding the full terms and conditions are available separately from **Bauder Ltd** upon request. This system must installed by a **Bauder** Approved Contractor, to be eligible for guarantee.

CONTACT INFORMATION

For further information contact Bauder Limited.

Head office: T: 01473 257671 E: technical@bauder.co.uk

Area Technical Manager: Tom Pugh – T: 07740 922128

Site Technician: Toby Spayne – T: 07469 858610

Bauder reserves the right to amend information and product specifications without prior notice. All reasonable care has been taken to ensure that the information is current and correct at the time of issue. Please note that any future regulation changes could result in this specification requiring an update. In the case of a previous roof survey a new survey will be necessary to establish if the condition has further deteriorated and therefore if the specification requires amendment. The specifier is responsible for ensuring that this specification information is still current prior to issue, as Bauder Ltd can accept no liability for any resulting errors or omissions. Any deviation or modification to this specification without Bauder's consent may result in the system not achieving the stated Fire Performance or Guarantee Requirements.

Technical Data Sheet

VENT 3 CLASSIC – BREATHABLE MEMBRANE

Issue 4 - January 2010

Description:

Vent3 Classic is a triple layer fabric, high performance breather membrane, made from high tensile spun bonded polypropylene layers, around a micro-porous polypropylene film. Designed for use in a fully supported or unsupported tiled, slated or metal roof system.

The high vapour permeability and waterproof nature of the membrane, combined with excellent tensile/tear strength and high wind uplift resistance make Vent3 Classic the professional's choice as the ultimate breather membrane. It is equally suitable whether draped unsupported over rafters or laid directly over insulation.
The outer layer forms the functional waterproof surface, the middle layer is the breathable waterproof membrane, and the inner layer protects the membrane from abrasion and damage, also giving additional strength. This enables the fabric to allow moisture vapour to pass through, whilst remaining fully waterproof. The upper surface is Grey, printed with the trade name and head lap lines. Available in 1.0m and 1.5m widths as standard to conform easily to any typical roof configuration or the individual working practices of the installer.

Benefits:

- Three Layer Membrane
- Clean and easy to use
- Lightweight and Flexible
- Excellent tensile and tear strength
- Waterproof Membrane
- Long Term Durability
- UV Stable (4 months exposure)
- Warm and Cold Roof Application
- No additional ventilation required

Product Details:

Roll Weight kg	1.8, 3.0, 5.8,8.7
Weight g/m²	115
Roll Length m	15, 25, 50
Roll Width m	1 & 1.5
Roll Area m²	15, 25, 50, 75
Colour	Light Grey Upper/White Lower

Performance Details:

Tensile Strength (EN12311-1)	MD	195N/50mm
	TD	130N/50mm
Elongation (EN12311-1)	MD	51%
	TD	65%
Nail Tear (EN12310-1)	MD	99N
	TD	110N
Hydrostatic Head (BS EN 20811)		281cm
Water (Moisture) Vapour Transmission (BS 3177)		1258g/m²/24h
Reaction to Fire (EN 13501-1)		Class E
Resistance to streaming water (MOAT69:4.2.2)		Pass
Resistance to water penetration (EN 13859-1)		Class W1
Water Vapour Resistance (BS 3177)		0.16 MNs/g
UV Resistance		4 months

CROMAR Building Products
Unit 3,
The Maltings Industrial Estate
Whitley Bridge
DN14 0HH
t: 01977 663 133 f: 01977 662 186
e: sales@cromar.uk.com

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Issue 4 - January 2010

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Weight g/m²	115
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Roll Width m	1 & 1.5
Roll Area m²	15, 25, 50, 75
Colour	Light Grey Upper/White Lower

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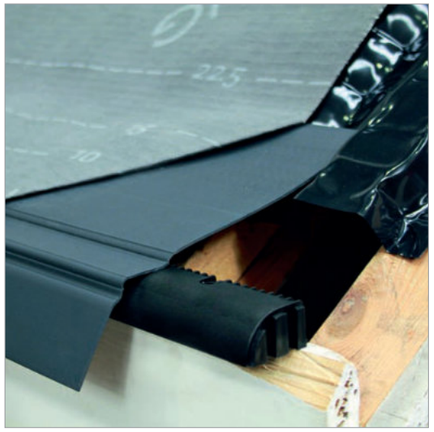
Fascia Vent



Fascia Vents provide unobtrusive continuous eaves ventilation. This easily installed unit provides eaves ventilation over the fascia in new build or re-roofing applications. The 10mm vent is suitable for conventional cold roofs and the 25mm vent is suitable for warm roofs, flat roofs and for roof pitches below 15°.

Product features & benefits

- Discreet method of roof void ventilation
- Prevents entry of birds and large insects
- Lightweight and durable

Area of application

Suitable for:

- New build or re-roofing applications
- Conventional cold roofs (10mm vent)
- Warm roofs, flat roofs and pitched roofs below 15° (25mm vent)

Material

Polypropylene

Colour

Black

Product codes

10mm Vent KP965200
25mm Vent KP964300

Dimensions/Weight (per carton)

10mm Vent 1m long x 42mm wide x 25mm deep / 6kg
25mm Vent 1m long x 48mm wide x 38mm deep / 16 kg

Packaging (per carton)

50 pcs (50m)

Related products

- Roll out Rafter Trays
- Rafter Trays
- Underlay Support Trays

Regulations and certifications

Complies with British Standards

Installation

The Fascia Vents are positioned directly on top of the fascia board with the stop section firmly against the vertical edge of the fascia board. The Fascia Vents are then fixed into the top of the fascia board through the nail holes using 50mm x 3.35mm corrosion resistant nails and then subsequent units fixed continuously along the eaves.

For fascia board heights, please contact the Technical Department.

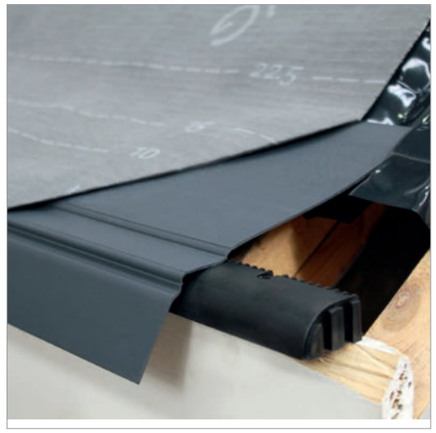
PERFORMANCE/ TECHNICAL DATA

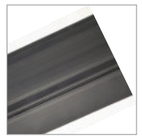
Available in two ventilation capacities. When installed along the whole length of eaves,
a 10mm vent provides the equivalent of a continuous 10mm opening (10,000mm² per metre run).
A 25mm vent provides the equivalent of a continuous 25mm opening (25,000mm² per metre run).

Klober Ltd
Unit 6F · East Midlands Distribution Centre · Short Lane · Castle Donington · Derbyshire · DE74 2HA
Tel. +44 (0)1332 813 050 · Fax +44 (0)1332 814 033 · info@klober.co.uk · www.klober.co.uk

KLÖBER

Underlay Support Tray





A simple and effective product to prevent the exposure of the roofing underlay at the eaves, which leads to long-term degradation of the underlay. The Underlay Support Tray, due to it's rigid nature, prevent ponding behind the back of the fascia board.

Product features & benefits

- Provides clear drainage point into gutter, directing water away from the underlay
- Protects the roofing underlay from UV degradation
- Highly recommended when existing fascia boards are being replaced
- Easy to install and economic replacement for rotting underlay at eaves
- Prevents ponding behind the fascia and the underlay sagging between rafters

Area of application

Suitable for:

- New build and re-roofing applications

Material

PVC

Colour

Black

Dimensions

1.5m long x 190mm wide with 55mm overhang

Weight

24kg per pack

Packaging (per pack)

Without flexi hinge	20 x 1.5m lengths

Product codes

Without flexi hinge	KP973910

Related products

- Fascia Vents
- Roll Out Rafter Trays

Installation

The Underlay Support Trays are placed over the fascia board and directly nailed into the rafters using corrosion resistant nails. Adjoining lengths are overlapped by a minimum of 100mm. The roofing underlay is then laid onto the Underlay Support Tray ensuring the bottom edge does not go over the line of the fascia board and into the gutters. Fascia vents need to be fitted directly to the top of the fascia board prior to the Underlay Support Tray being fitted.

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Tel. +44 (0)1332 813 050 · Fax +44 (0)1332 814 033 · info@klober.co.uk · www.klober.co.uk

KLÖBER

WonderBuilds Inc. Ltd
Unit 3, Streakes Field Road
London, NW2 7GD
Company No. 8566722
VAT No. 170915900

www.wonderbuilds.co.uk

WonderBUILDS

RIDGE ROLL DATA SHEET

Description	Hip and ridge sealing tape
Material	Fabric, 20 cm black/white. Aluminium 75 mm x 0,14 Butyl 20 mm x 1mm
Characteristics and properties	Hip and ridge roof tape made of two strips of pleated aluminium and double polypropylene fabric, with very high resistance to UV-rays. With the butyl self-adhesive, 20mm-wide strips and flexible profiled edges, the tape is easy to assemble. Resistant to mechanical damage, weather conditions and UV-rays.
Application	Expert roof tape to be used under the roof peak lines, ridges and ridge caps, with extended useful life obtained owing to the use of high quality anti-UV stabilising components.
Advantages	• sealing and ventilation of the roof ridge space • protection against precipitation • improved water evacuation from crucial sites • versatility – suitable for all kinds of roof coverings • resistance to UV radiation • easy to use

Technical data

Length [m]	6
Width [mm]	320
Package	4 rol + accesories
Number on pallet [pc.]	
Pallet dimensions	120 x 80 x max 210 cm

Assembly and storage

How to use/ assembly instructions	Intended for roof plane ventilation and roof ridge protection against insects or blown in snow and water. The tapes are placed on ridge battens on roofs covered with roof tiles or roofing sheet, under ridge caps. Suitable for sloping ridge battens. Assembly in accordance with the instruction.

International Industrial Metals Ltd

Envirowales Limited
Plateaux 1& 2
Rassau Industrial Estate
Ebbw Vale
NP23 5SD

1. IDENTIFICATION OF SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

PRODUCT NAME: Lead Metal

USE: Supplied as motifs, domes, slates and sheet for roofing applications in the construction industry, as foil for noise attenuation purposes and as burning wire for joint formation.

SUPPLIER

Associated Lead Mills Ltd 01992 444100
Jamestown Metals Ltd 01992 801910

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	EC N°	CAS N°	CONTENTS	SYMBOL LETTERS	R PHRASE N°
Lead		7439-92-1	>99%	NC	NC

3. HAZARDS IDENTIFICATION

MAIN HAZARDS: The product in solid, metallic form is unlikely to be hazardous.

OTHER HAZARDS: Lead is a toxic metal. Hazardous fumes and oxidic compounds (drosses) of lead may be produced when the metal is melted. During storage, a surface film of lead compounds can form on the surface of the product, due to oxidic corrosion.
Where exposure to lead compounds is significant, medical examination prior to and after such exposure is a statutory requirement.

4 FIRST AID MEASURES

NOTE: Inhalation, skin contact and eye contact measures will not be relevant to the product in its solid, metallic form. They could however apply to fumes and drosses derived from melting and to corrosion products formed on the metal surface.

INHALATION: Move exposed person to fresh air at once. Get medical attention promptly.

INGESTION: Do not induce vomiting. If person is conscious, rinse mouth thoroughly and encourage the drinking of large quantity of water. Get medical attention immediately.

SKIN CONTACT: Remove all contaminated clothing and footwear immediately, unless it is stuck to the skin. Wash the affected skin immediately with soap and water. Get medical attention if irritation persists.

EYE CONTACT: Make sure that any contact lenses are removed from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eyelids. Get medical attention immediately.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: The product is not flammable. However, hot, liquid metal may cause other materials in its vicinity to ignite. Use dry foam, sand or carbon dioxide. Do not use water near liquid metal.

EXPOSURE HAZARDS: In a fire, toxic fumes may be produced.

PROTECTION OF FIRE-FIGHTERS Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: No special measures necessary with solid metal.

ENVIRONMENTAL PRECAUTION: Do not disperse lead compounds in the atmosphere or allow to enter drains and rivers.

CLEAN-UP PROCEDURES: Pick up small pieces carefully. Wet mop or vacuum and dispose of as hazardous waste.

Revision No. 1 LEAD METAL SAFETY DATA SHEET Date: 01/11/10

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Page 1 of 3

2iM International Industrial Metals Ltd

enviro LEAD

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Certificate of Conformity

CPC Construction Products Certification

Responsible Sourcing of Construction Products

Construction Products Certification certifies that

Concrete roofing tiles

produced and supplied by

Marley Limited

Lichfield Road, Branston, Burton-on-Trent DE14 3HD

from its production plants listed on the attached schedule conform to the following standard:

BES 6001:Issue 3.1
Framework Standard for Responsible Sourcing

with a Performance Rating of

Excellent
★★★★

Certificate No: CPRS 00048 Issue 3

Colin Head
Chief Executive

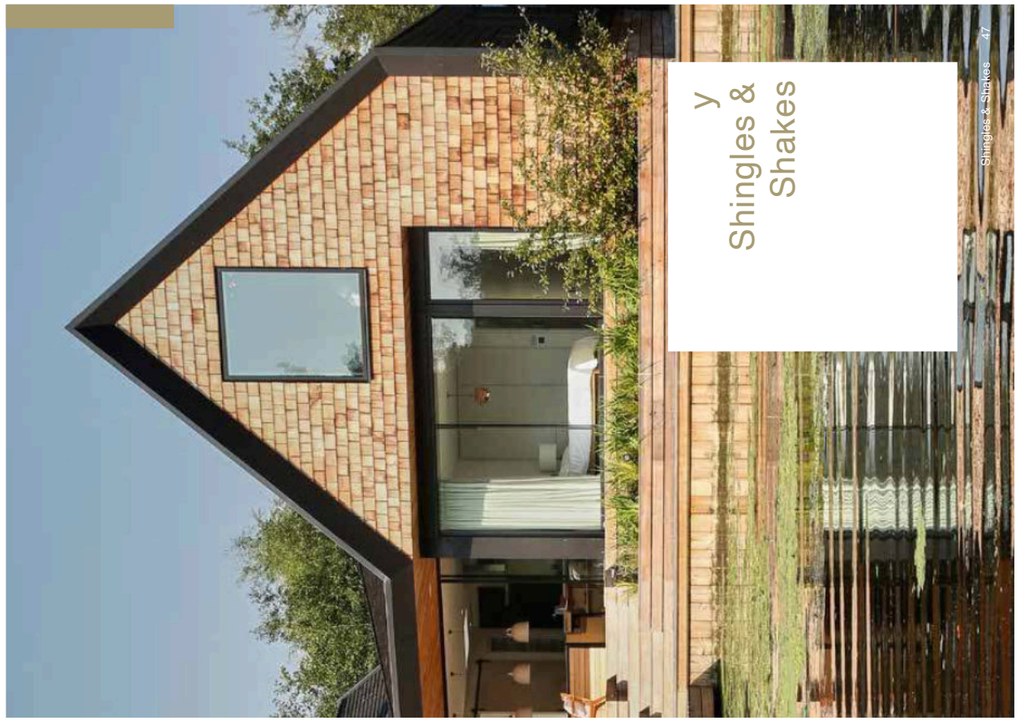
Date Authorised: 13 December 2018

THIS CERTIFICATE IS VALID FROM 1 JANUARY 2019 TO 17 MAY 2020

subject to continued compliance with the above standard as confirmed by routine surveillance. Confirmation of the current validity status of Certification may be obtained by enquiry to the CPC Central Records Office or by reference to BRE's Green Book Live website: www.greenbooklive.com

This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology, scheme documentation and underpinning processes

1 Mount Mews
High Street, Hampton
Middlesex TW12 2SH
Telephone: 020 8481 9640
Facsimile: 020 8979 4558
www.qsrmc.co.uk



CONCRETE FITTINGS

VERGES, RIDGES AND HIPS

Available in a range of colours to match main tiles. Recommended roof pitch may vary depending on product and system used, please contact the Technical Advisory Service.

Description	Cloak verge (Modern, Mendip and Double Roman, see page 57)	Modern ridge §†‡*	Modern security ridge	Segmental ridge†*	Modern mono ridge
Pitch range	n/a	15-55°dry ridge	15-45°bedded	15-55°dry ridge	15-45°bedded

Description	Segmental securityridge	Segmental mono ridge†	Segmental mono block end ridge	Modern mono block end ridge	Third round hip tile†§
Pitch range	15-50°bedded	15-55°dry ridge	15-55°dry ridge	15-45°bedded	17.5-45°dry ridge

Description	Segmental block end ridge*	Modern block end ridge*	90°Angle ridge/hip (Security 90°Angle also available)	125°Angle ridge/hip (Security 125°Angle also available)†*	Pascoll roll baby ridge
Pitch range	15-55°dry ridge	15-55°dry ridge	45-50°bedded	15-25°	15-45°

Description	Half round baby ridge	Ridge vent terminal	Gas vent ridge terminal (Also available: Gas vent ridge for condensing boilers)
Pitch range	15-55°	15-55°dry ridge	15-55°dry ridge

§ Compatible with Marley Universal HipFast.
* Compatible with Marley Universal RidgeFast.
** Also available – 145° Angle ridge/hip

† Compatible with Marley ventilated dry ridge system.
‡ Compatible with Marley dry hip system.
Note: All measurements in mm.

Nordic Forest (UK) Ltd., 124 Broadway, Bexleyheath, DA6 7NQ

Phone 0208 304 1016 Fax 0208 304 1017 email sales@nordicforest.co.uk

DATA SHEET

'NORDIC BLUE' TREATED ROOFING BATTEN

NORDICBLUE treated roofing battens have been graded to all aspects of BS5534 and carry an independent accreditation from BM TRADA. They also meet the requirements of the NHBC.

NORDICBLUE roofing battens are produced from sideboard material only. We do not allow the use of centre cut material which can give rise to distortion and unsuitable knot configurations.

NORDICBLUE roofing battens are produced through planers to ensure consistency in width and thickness.

NORDICBLUE roofing battens are treated to BS8417 : 2011 and carry a 70 year in situ lifetime guarantee when fixed inside the building above DPC level.

NORDICBLUE roofing battens are produced from responsibly sourced timber and are supplied with either FSC or PEFC chain of custody certification.

NORDICBLUE roofing battens are individually stamped to show supplier / specie / grade / size / treatment.

NORDICBLUE roofing battens are packed in one length packs only. All batten sizes are packed ten pieces per bundle. Pack sizes are as below :-

SIZE	PIECES PER BUNDLE	BUNDLES PER PACK
25 x 38	**10**	**56**
25 x 50	**10**	**40**

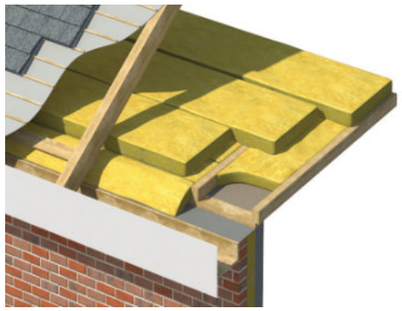
MAY 2015

Intelligent Environments Superglass

June 2019 | Data Sheet

Multi-Roll 44

Typical applications: Lofts and cold roofs



Description

SuperglassMulti-Roll 44 is lightweight, non-combustible glassmineral woolinsulation roll. Theflexible roll is perforated to allow easyinstallation betweencommon joist spacingsand minimum on-site cutting and waste.

Application

SuperglassMulti-Roll 44 is primarily usedasthermal insulation in new and existing lofts/cold roofs. However,it can beusedin a number of other applications including suspendedtimber ground floors. Whenusedin the loft/cold roof it can beinstalled between and overthe joists.

A+

BRE Green Guide Rating

Multi-Roll 44 hasa generic BREGreen Guide Rating of A+.

Fire Performance

Multi-Roll 44 hasa fire classification of A1 (the highest possiblerating) when tested to BSEN 13501-1 Reaction to Fire.

Thermal Insulation

Multi-Roll 44 has a thermal conductivity of 0.044W/mK.

up to 84%

Recycled Content

Multi-Roll 44 is manufactured from up to 84% recycled glass.

Easy & Quick To Install

Manufactured to allow for quick and easy installation.

Intelligent Environments Superglass

Intelligent Environments Superglass

Multi-Roll 44 | Characteristics

Product dimensions and information						
Thickness (mm)	Length (m)	Width (mm)	Pack Area (m^2)	R-Value (m^2KW)	Packs per pallet	Code
100	10.10	1200/2x600/3x400	12.12	2.25	24	5774
150	6.65	1160/2x580/3x386	7.71	3.40	24	5773
170	5.80	1160/2x580/3x386	6.73	3.85	24	5772
200	4.85	1160/2x580/3x386	5.63	4.50	24	5771

Thermal Performance

Multi-Roll 44 hasa declaredthermal conductivity of 0.044W/mK.

Fire Performance

All Superglassproducts are deemed non-combustible and have a fire classification of A1 (the highest possiblerating) when tested to BSEN13501-1 Reaction to Fire.

Environment

- Manufactured in accordancewith ISO14001:2015 - Environmental Management Systems (EMS).
- ZeroOzoneDepletion Potential (ODP)& zero Global Warming Potential (GWP).
- Generic BREGreenGuide Rating of A+.

Recycled Content

All Superglassproducts are manufactured from up to 84% recycled glasswhich would otherwise go to landfill.

Standards

Manufactured in accordancewith:

- BSEN13162:2012(+A1:2015)Thermal insulation products for buildings - Factory made mineral wool (MW)products
- BSEN13172: 2012 Thermal insulation products - Evaluation of conformity.

Quality

All Superglassproducts are manufactured in accordance with BS ENISO9001:2015 - Quality Management Systems (QMS).

Durability

All Superglassproducts are non-hygroscopic, will not rot, degrade or sustain vermin and will not encouragethe growth of mould, bacteria or fungi.

Vapour Resistance

All Superglassproducts offer negligible vapour resistance allowing vapourto passfreely through the insulation.

Handling & Storage

All Superglassproducts are easy to handle, cut and install. Theproducts are supplied compression packed in polythene to provide short term protection only. Forlong term protection, the product must be stored indoors or under a waterproof covering in order to protect from weather damage. Theproducts should not be left permanently exposedto the elements.

Certification

- CEMarked to BSEN13162:2012(+A1:2015).
- Designation Code= MW-13162-T1.
- A copy of the Multi-Roll 44 Declaration of Performance (DoP) ref: DOP0009can be downloaded from the Superglass website.

Associated Products

Multi-Roll 40 | Handy Pack44

Building Information Modelling (BIM)

BIM objects for this product can be downloaded from www.bimstore.co.uk or www.superglass.co.uk

bsi. ISO 14001:2015 Environmental Management

bsi. ISO 9001 Quality Management

CE

SuperglassInsulation Limited. Thistle Industrial Estate, KerseRoad,Stirling, Scotland FK77QQ

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www.twitter.com/superglassins
www.linkedin.com/company/superglass-insulation-ltd

REF:29667

bim Available on bimstore.co.uk

Declaration of Performance

EC Construction Products Regulation
EN 12326 Roofing & Cladding Slate
CE 22

PRIMERA
FINEST NATURAL SLATE

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Huntingdon
Cambridgeshire
PE28 2RW
Tel: +44 (0)1487 825 222
Fax: +44 (0)1487 825 240
info@primeraslate.co.uk
www.primeraslate.co.uk

DOP Number:				22/09
1. Unique identification code of the product-type:				Estella 25
2. Type, batch or serial number or any other element allowing identification of the construction product:				500x250
3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:				Slate for discontinuous roofing and cladding
4. Name, registered trade name or registered trademark and contact address of the manufacturer:				Pizarras Castrelos 32300 O'Barco de Valdeorras (Ourense) Spain
5. Where applicable, name and contact address of the authorised representative:				N/A
6. System or systems of assessment and verification of consistency of performance of the construction product:				System 4
7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:				The manufacturer has carried out factory production control and determination of product type based upon System 4 within the Assessment of Conformity Tasks.
8. In case of the declaration of performance concerning a construction product covered by a European Technical Assessment:				N/A
9. Declared Performance:				
Essential Characteristic for Pitched Roof Coverings:	Performance:			Harmonized Technical Specification:
Mechanical Resistance:	Mean Failure Load: Transverse: 51.4/mm2	Longitudinal: 72/mm2		EN12326-2:2011
	Characteristic MOR: Transverse: 37.2 N/mm2	Longitudinal: 57.4N/mm2		
External Fire Performance:	Deemed to satisfy			EC Decision 2000/553/EC
Reaction to Fire:	Deemed to satisfy Class A1			EC Decision 96/603/EC as amended
Dimensional Variation:				EN12326-2:2011
Slate Type:	*Very Smooth*	*Smooth*	*Normal*	*Textured*
Deviation from flatness:		*<1.5%*		
Nominal thickness and variation:		*5mm +/- 35%*		
Deviation from declared width:	*+/- 5mm*			
Deviation from declared length:	*+/- 5mm*			
Deviation from straightness of edges:	*+/- 5 mm*			
Deviation from rectangularity:	*+/- 1%*			
Durability:				
Water absorption:	*Code W1 (0.23%)*			EN12326-2:2011
Freeze thaw:	*Not Required*			
Thermal cycle test:	*Code T1*			
Carbonate content:	*<20% (0.1%)*			
Sulphur dioxide exposure tests:	*Code S1*			
Non-carbonate carbon content:	*<20% (0.5%)*			
Release of dangerous substances:	None in conditions of use as roofing or external cladding			EN12326-2:2011

10. Declaration:
The product(s) identified in Points 1 and 2 is in conformity with the declared performance under point 9. This declaration of performance is the sole responsibility of the manufacturer identified in point 4.

Place & Date of Issue:
PRIMERA SLATE COMPANY LIMITED
86 Ramsey Road, Warboys,
Huntingdon,
Cambs PE28 2RW
July 2022

Name: Mr Stephen Harding
Position: Managing Director
Signature:

Edition 2.0 – 13.09.2017

VELUX®

Product information

Centre-pivot white-painted roof window GGL

Product description

- High quality natural pinewood coated with impregnation and layers of water-based acrylic white paint or clear lacquer
- Top control bar for easy operation even with furniture under the window
- Ventilation flap and integrated dust and insect filter
- Maintenance-free exterior covers

Roof pitch

- Can be installed in roof pitches between 15° and 90°

Materials

- Laminated pinewood
- Glass
- Lacquered aluminium
- VELUX ThermoTechnology™ insulation

Downloads

For installation instructions, CAD drawings, 3D BIM objects, 3D GDL objects, SketchUp objects etc, please visit www.velux.co.uk

Certifications

10 YEARS GUARANTEE

The VELUX product factories guarantee quality systems implementation process and environmental management systems through appropriate accreditations ISO 9001 and ISO 14001

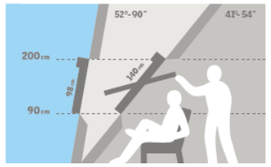
EUTR In compliance with the EU Timber Regulation (EUTR), EU regulation 995/2010

REACH We are aware of the REACH regulation and acknowledge the obligations. No products are obliged to be registered in accordance to REACH and none of our products contain any Substances of Very High Concern.

Available sizes and daylight area

	472 mm	550 mm	660 mm	780 mm	942 mm	1140 mm	1340 mm
778 mm		**GGL CK02** (0.22)					
978 mm	**GGL BK04** (0.29)	**GGL CK04** (0.29)	**GGL FK04** (0.38)	**GGL MK04** (0.47)	**GGL PK04** (0.60)		**GGL UK04** (0.91)
1178 mm		**GGL CK06** (0.37)	**GGL FK06** (0.47)	**GGL MK06** (0.59)	**GGL PK06** (0.75)	**GGL SK06** (0.95)	
1398 mm			**GGL FK08** (0.58)	**GGL MK08** (0.72)	**GGL PK08** (0.92)	**GGL SK08** (1.16)	**GGL UK08** (1.40)
1600 mm				**GGL MK10** (0.85)	**GGL PK10** (1.07)	**GGL SK10** (1.35)	**GGL UK10** (1.63)

( ) = Effective daylight area, m^2



Centre-pivot roof windows make it possible to place furniture directly below the window without obstructing operation of the window.

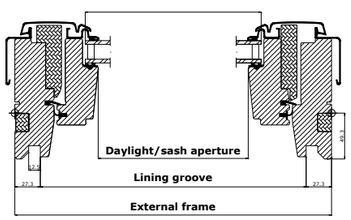
For windows to be placed within reach, try to allow for a clear view when standing and when seated. Note that the optimum window height depends on the roof pitch.

Lining measurements

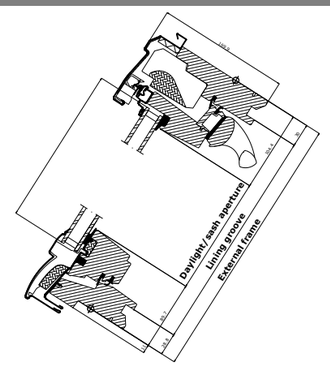
Size	Width (mm)
BK--	417
CK--	495
FK--	605
MK--	725
PK--	887
SK--	1085
UK--	1285

Size	Height (mm)
--02	719
--04	919
--06	1119
--08	1339
--10	1549

Width



Height



Technical values

	--70	--60	--66	--62
U_w [W/m²K]	1.3	1.3	1.0	0.83
U_g [W/m²K]	1.0	1.0	0.5	0.5
R_w [dB]	35	37	37	42
g [ ]	0.46	0.30	0.51	0.52
□v [ ]	0.68	0.62	0.71	0.70
□uv [ ]	0.05	0.05	0.05	0.05
Air permeability [class]	4	4	4	4

Thermal improvements such as lower U-value (U_w) and lower linear heat loss coefficient (φ) can, for some variants, be obtained with frame insulation collar and/or recessed installation.

Glazing structure

	--70	--60	--66	--62
Inner glass pane	2 x 3 mm laminated float with low ε coating	2 x 3 mm laminated float with low ε coating	2 x 3 mm laminated float with low ε coating	2 x 3 mm laminated float with low ε coating
Middle glass pane	-	-	3 mm heat strengthened float with low ε coating	3 mm heat strengthened float with low ε coating
Outer glass pane	4 mm toughened	6 mm toughened with coatings	4 mm toughened with coatings	8 mm toughened with coating
Cavity	15 mm	15 mm	2 x 12 mm	2 x 10 mm
Glass panes	Double	Double	Triple	Triple
Gas filling	Argon	Argon	Krypton	Krypton

Glazing features

		--70	--60	--66	--62
	Heat insulation Low energy glazing provides reduced heat loss through the window and enhanced indoor comfort.	●	●●	●●●	●●●
	Solar gain In the wintertime, the heat from the sun entering through the windows is a usable solar gain.	●●●	●	●●	●●
	Solar protection In warm climates and in rooms with large window areas, a sun protective coating provides a better indoor climate during summer periods. Alternatively, exterior sunscreening can be installed.		●●●		
	Sound insulation A combination of laminated glass and optimal glass thickness provides better sound insulation. Frame/sash construction and gaskets are equally important.	●●	●●●	●●●	●●●
	Security Thicker laminated inner glass pane designed to increase resistance to manual attack (burglary).	●	●	●	●
	Energy balance The energy balance represents the ability of the roof window to utilise the passive solar gain and keep in the heat during winter and its ability to protect against the risk of overheating during summer. Sunscreening products can further improve indoor summer comfort.	✓	✓	✓	✓
	Safety Laminated inner glass is designed to hold the fragments together if the glass breaks. We recommend that you consider using glass units with laminated glass on the inside for windows placed above areas where people sleep, play or work.	✓	✓	✓	✓
	Outside strength Toughened outer glass pane makes your glazing more resistant to hail, heavy wind and snow loads.	✓	✓	✓	✓
	Delayed fading of materials Inner laminated glass protects materials behind the glass against UV radiation and therefore delays fading of the materials.	✓	✓	✓	✓
	Rain noise reduction The combination of laminated glass and extra thick glass helps provide a significant, audible reduction of rainfall sound. Frame/sash construction and gaskets are equally important.		✓	✓	✓
	Easy-to-clean The easy-to-clean coating minimises the cleaning frequency of the outer glass pane and gives you a clearer view in case of rain.		✓	✓	
	Anti-dew The anti-dew coating significantly reduces the days with dew on the outer glass pane and thus gives you a clear view.			✓	✓

● **Good** ●● **Better** ●●● **Best** ✓ **Feature included in glazing variant**

Technical values, ventilation through ventilation flap

Property	Windows with double glazing					
	Width					
	CK--	FK--	MK--	PK--	SK--	UK--
Air flow characteristics [l/s]	1.9	2.3	2.8	3.4	4.1	4.8
Air flow exponent [-]	0.53	0.53	0.53	0.53	0.53	0.53
Ventilation capacity at 4 Pa [l/s]	4.0	4.8	5.8	7.1	8.5	10.0
Ventilation capacity at 8 Pa [l/s]	5.7	6.9	8.4	10.2	12.3	14.5
Ventilation capacity at 10 Pa [l/s]	6.4	7.8	9.5	11.5	13.9	16.3
Ventilation capacity at 20 Pa [l/s]	9.3	11.3	13.7	16.6	20.1	23.5
Equivalent area through ventilation flap [mm2]	2600	3100	3700	4600	5600	6600
Geometrical free area [mm2]	2800	3700	4500	6100	7200	10600

Property	Windows with triple glazing					
	Width					
	CK--	FK--	MK--	PK--	SK--	UK--
Air flow characteristics [l/s]	1.2	1.3	1.5	1.7	2.1	2.4
Air flow exponent [-]	0.63	0.63	0.63	0.63	0.63	0.63
Ventilation capacity at 4 Pa [l/s]	2.8	3.1	3.5	4.1	4.9	5.7
Ventilation capacity at 8 Pa [l/s]	4.3	4.8	5.4	6.3	7.6	8.9
Ventilation capacity at 10 Pa [l/s]	4.9	5.5	6.2	7.3	8.2	10.2
Ventilation capacity at 20 Pa [l/s]	5.5	6.2	6.9	8.1	9.8	11.5
Equivalent area through ventilation flap [mm2]	2000	2200	2500	2900	3500	4100
Geometrical free area [mm2]	2800	3700	4500	6100	7200	10600

Cleaning and maintenance

To clean the outer pane from the inside, rotate sash and secure in cleaning position with barrel bolt.

VELUX repair and maintenance kits are available.

Exterior covers

Material	NCS standard colour	RAL nearest standard colour
Lacquered aluminium (-0--) grey	S 7500-N	7043
Lacquered aluminium (-5--) black	S 9000-N	9005
Copper (-1--)	-	-
Titanium zinc (-3--)	-	-

Special colour requests, please contact enquiries@velux.co.uk

Interior finish

Clear lacquer	Impregnation and layers of water-based acrylic lacquer
White paint	Impregnation and layers of water-based acrylic lacquer and paint, NCS standard colour: S 0500-N, nearest RAL standard colour: 9003.

Special colour requests, please contact enquiries@velux.co.uk

Blinds, awnings and shutters

Interior sun screening
Blackout blind ●●●
Roller blind ●●●
Pleated blind ●●
Flying pleated blind ●
Double pleated energy blind ●●
Venetian blind ●●
Duo blackout blind ●

Exterior sun screening
Awning blind ●●●
Roller shutter ●●●

Additional accessories
Insect roller screen ●

●●● Available in manual and mains/solar powered versions
●● Available in manual and mains powered versions
● Available in manual version
The mains and solar powered versions are part of the VELUX INTEGRA® product range.

Flashings and installation products

Flashings:
- ED- for single installation
- EB- for twin installation
- EK- for combi installation

Available for standard and recessed installation

Installation products:
- Installation set BDX 2000 (incl BFX)
- Underfelt collar BFX 1000 incl transverse drainage gutter
- Vapour barrier collar BBX 0000
- Linings LS- (incl BBX)
- Kit for lining LSG 1000 (incl BBX)

Control options

VELUX INTEGRA®
- Solar upgrade kit KSX 100K can be fitted to upgrade manual windows to obtain a series of benefits
- Touch screen control pad

- Telescopic rod

Note

We reserve the right to make technical changes.

For more information on roof window GGL and other VELUX products, please visit www.velux.co.uk

Cockrell Design

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