



www.sustainablelifestyles.co.uk
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6/3/2016

Thermal Imaging Survey

A thermal imaging photograph of a building facade, showing various temperatures represented by colors from yellow (hot) to purple (cold). The text 'www.sustainablelifestyles.co.uk' is overlaid in white.

www.sustainablelifestyles.co.uk

Address

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Date 6/3/2016

Thermal imaging report for;

Address

Images.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
 Address 2 Benson Road,
 Abingdon, Oxon, OX14
 1LN.

Customer
 Site Address

Thermographer Paul Buckingham

Contact Person

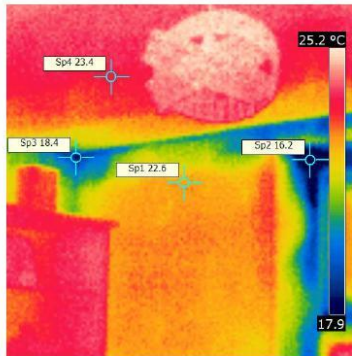


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:26:22
Image Name	IR_4392.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Dining room bay window. Considerable air leakage behind the dry lining, this is most likely coming from the roof of the bay window.

Inspection Report

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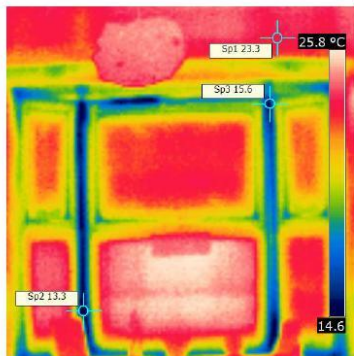


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:27:38
Image Name	IR_4393.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

View of the bay window, there is considerable air leakage and cold evident around the window frame at the junction where the window returns into the house from the bay.

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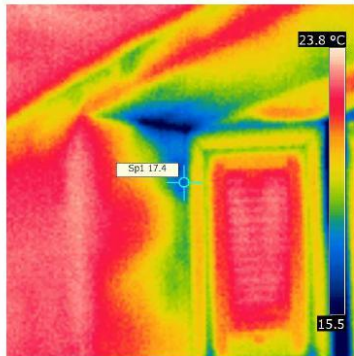


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:27:53
Image Name	IR_4394.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Another view of the bay window.

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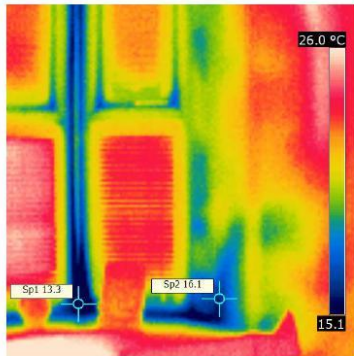


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:28:19
Image Name	IR_4396.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The bay window again, the bottom r/h corner shows significant heat loss in this area with cold air leaking behind the plasterboard dry lining.

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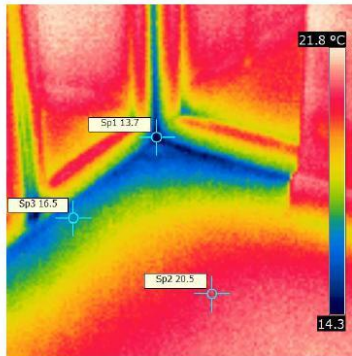


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:30:17
Image Name	IR_4399.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The rear bay window of the kitchen, this shows cold areas around the bottom of the window progressing into the kitchen, also air leakage on the window frame.

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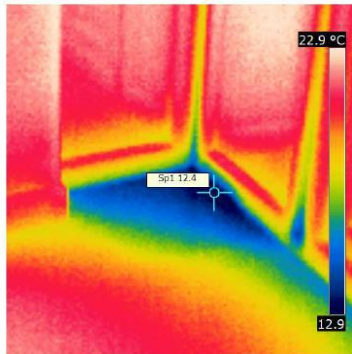


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:30:49
Image Name	IR_4401.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The opposite corner of the rear kitchen bay window. Again, significant cold in this area of the floor.

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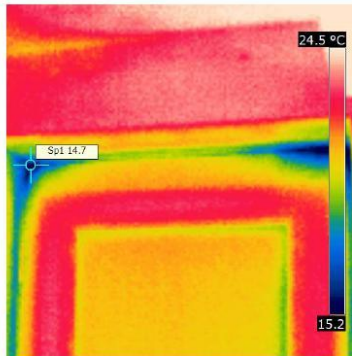


Image and Object Parameters

Text Comments

Camera Model Flir b50
Image Date 06/03/2016 11:32:41
Image Name IR_4402.jpg
Emissivity 0.97
Reflected apparent temperature 21.4 °C
Object Distance 1.0 m

Description

Back door to the utility room, air leakage/ draughts around the door frame.

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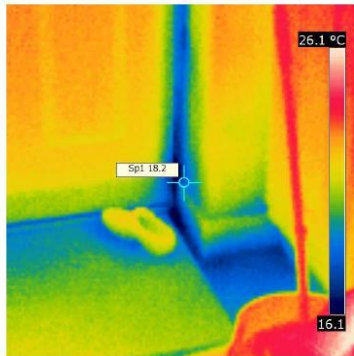


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:33:01
Image Name	IR_4403.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Draughts around the bottom of the back door.

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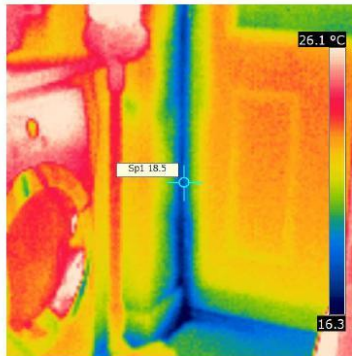


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:33:16
Image Name	IR_4404.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The hinge side of the back door showing air leakage/ draughts.

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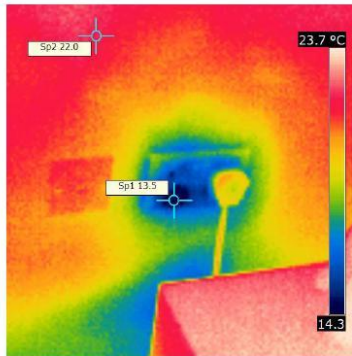


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:40:00
Image Name	IR_4405.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

This is the socket to the right of the front dining room bay window, there was a significant draught coming from this socket outlet.

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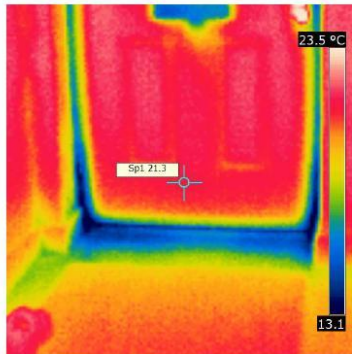


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:45:03
Image Name	IR_4406.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The front door, there was a significant draught around the bottom of the door.

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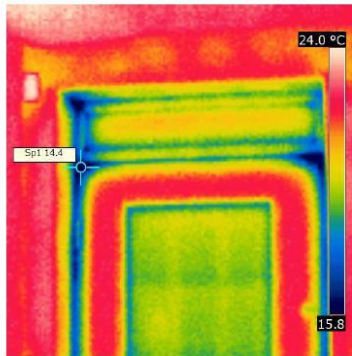


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:45:09
Image Name	IR_4407.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The top of the front door, again, significant draughts in the corners of the frame.

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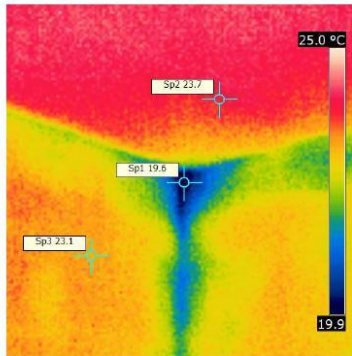


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:47:17
Image Name	IR_4411.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Left hand corner of the study showing some air leakage behind the dry lining causing cooling of the wall.

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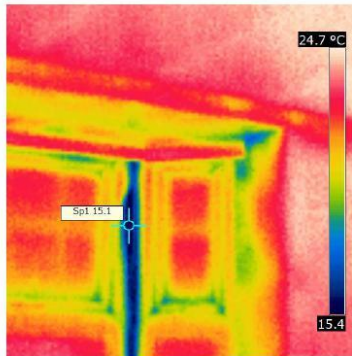


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:47:58
Image Name	IR_4412.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Lounge bay window showing the same cold along the angled corner as seen in the dining room.

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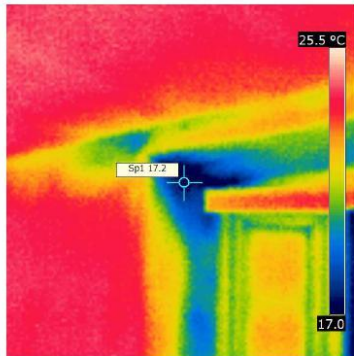


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:48:21
Image Name	IR_4414.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Top left hand corner of the lounge bay window showing significant air leakage behind the dry lining, likely coming from the bay window roof.

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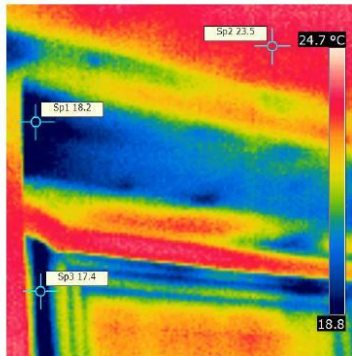


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:48:56
Image Name	IR_4416.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Ceiling of the lounge bay window, this shows poor or missing insulation above the ceiling with likely air leakage around/ under the insulation.

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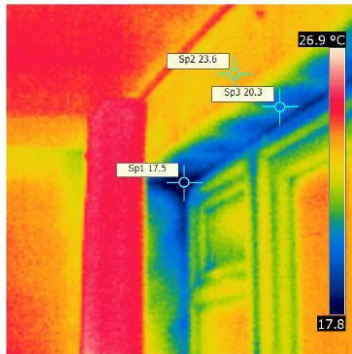


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:50:02
Image Name	IR_4417.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Lounge patio doors, left hand corner. There is significant thermal bridging around the aperture and some air leakage behind the dry lining.

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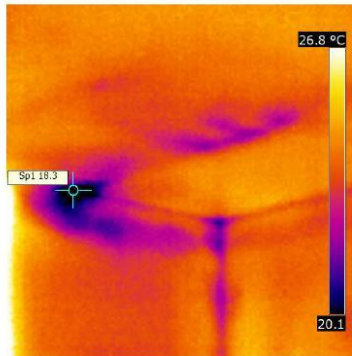


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:52:25
Image Name	IR_4422.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

External corner of bedroom 3 showing air leakage behind the dry lining and missing insulation.

Inspection Report

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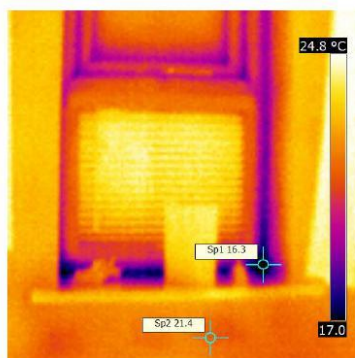


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:52:51
Image Name	IR_4423.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 3 front window, cold areas in the comers.

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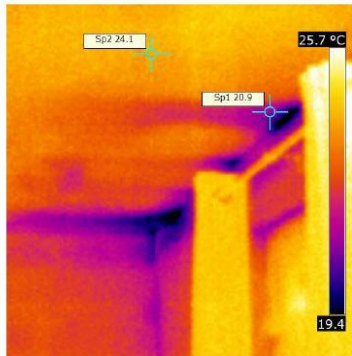


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:53:59
Image Name	IR_4424.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 1 rear right hand corner, this shows air flowing above the ceiling from the roof eaves.

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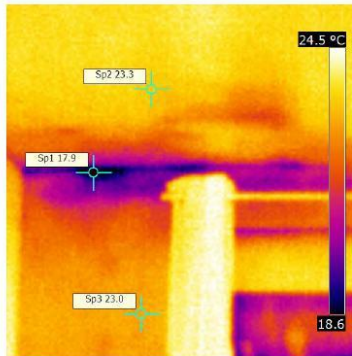


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:54:50
Image Name	IR_4426.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 1 external corner adjacent to the ensuit bathroom, air leakage behind the dry lining and air flow above the ceiling.

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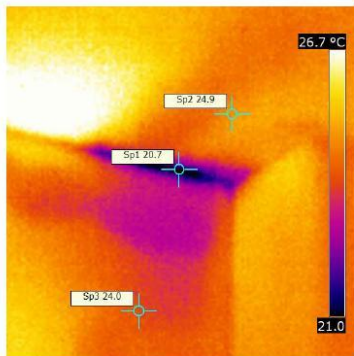


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:55:16
Image Name	IR_4427.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

External l/h corner of bedroom 1, air leakage above the ceiling.

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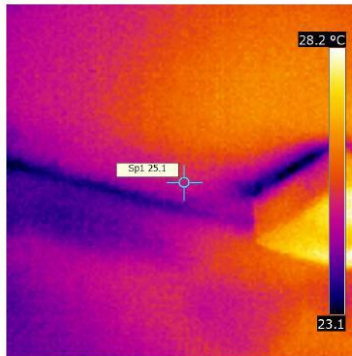


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:56:26
Image Name	IR_4428.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 1 ensuit bathroom, air leakage around the extractor fan, above the ceiling.

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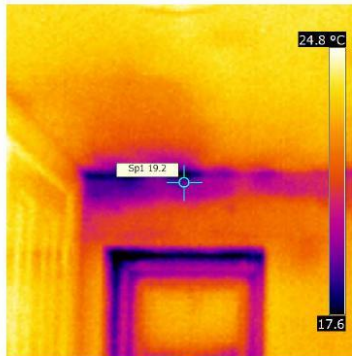


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Camera Model	Flir b50
Image Date	06/03/2016 11:56:50
Image Name	IR_4429.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 1 ensuit bathroom above the window, air leakage onto the ceiling above and behind the dry lining.

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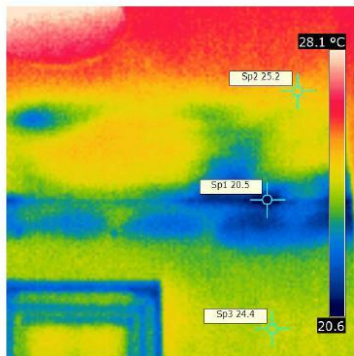


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:57:02
Image Name	IR_4430.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bathroom, air leakage above the ceiling and behind the dry lining.

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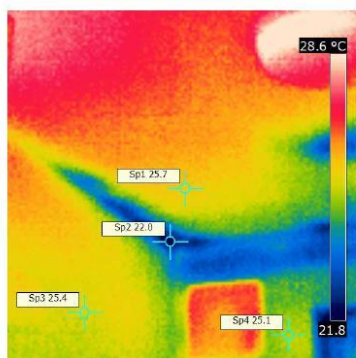


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:57:36
Image Name	IR_4431.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bathroom l/h corner, air leakage above ceiling and behind dry lining.

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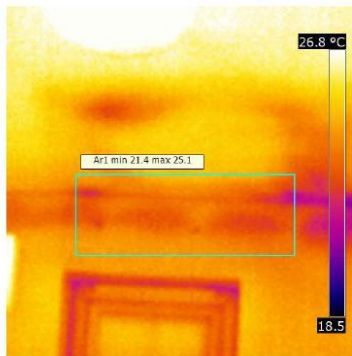
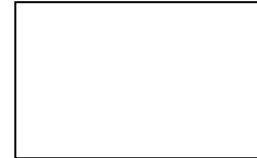


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:57:45
Image Name	IR_4432.jpg
Emissivity	0.97
Reflected apparent temperature	20.0 °C
Object Distance	1.0 m

Description

Above the window of the bathroom, within the highlighted box there are dark patches visible, these are the plaster dabs behind the dry lining, as can be seen these dabs have gaps between them showing the dry lining is not solid dabbed around the top.

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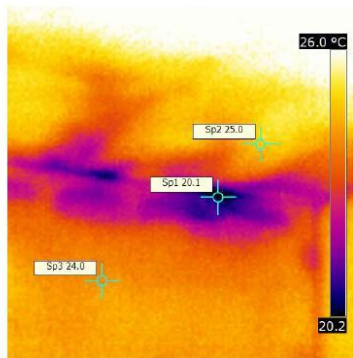


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:57:53
Image Name	IR_4433.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Right hand corner of bedroom 5, significant air leakage behind the dry lining and air flow above the ceiling from the roof eaves.

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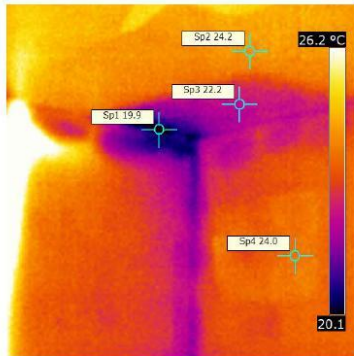


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:58:09
Image Name	IR_4435.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

External corner of bedroom 5, again significant air leakage behind dry lining and air flow above ceiling.

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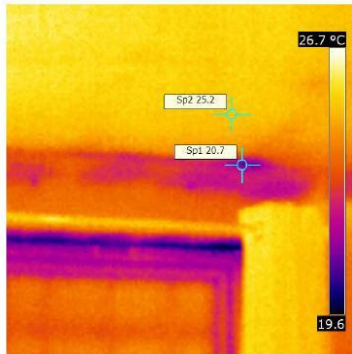


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:58:22
Image Name	IR_4436.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 5 above the window, air leakage behind dry lining.

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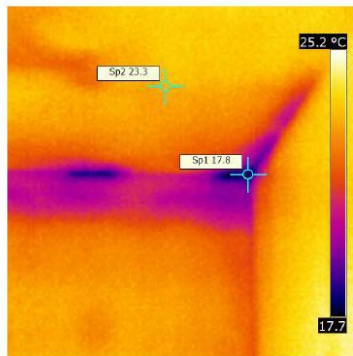


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:58:35
Image Name	IR_4437.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 4 right hand corner, air leakage behind the dry lining and air flow over the ceiling.

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Customer
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Contact Person

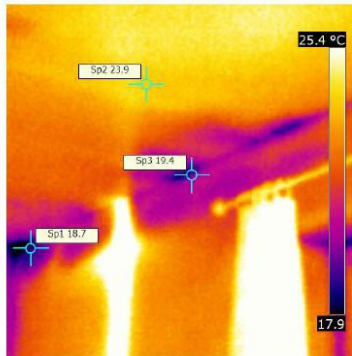


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:59:08
Image Name	IR_4439.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 4, significant air leakage behind dry lining and and air flow over ceiling.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

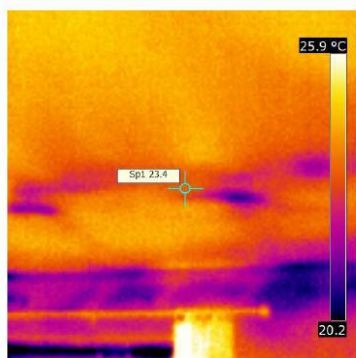


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 11:59:33
Image Name	IR_4441.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 4, cold spots on the ceiling along the line of the top floor knee wall.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

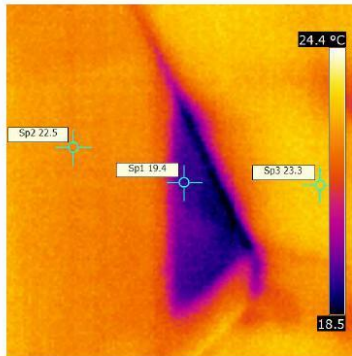


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:01:20
Image Name	IR_4443.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Top floor, left hand side of the stairwell, this area has no insulation on the roof void side.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

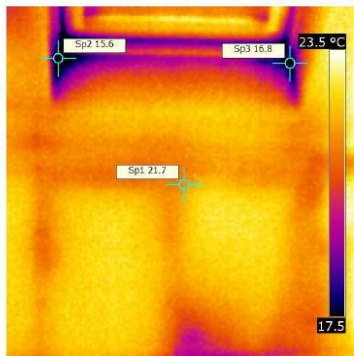


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:01:55
Image Name	IR_4444.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Top floor landing, bottom of the roof light window, there is air leakage behind the plasterboard in the bottom corners of the window aperture.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

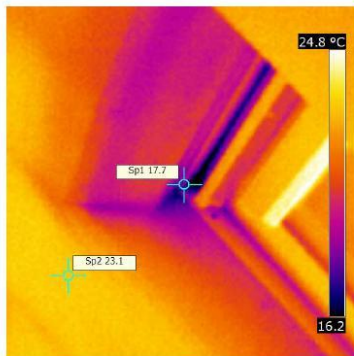


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:02:45
Image Name	IR_4445.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Top of the landing roof light with air leakage from the window.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

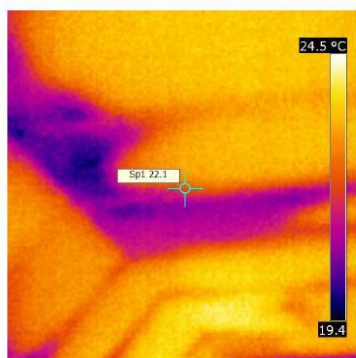


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:03:34
Image Name	IR_4448.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Landing ceiling showing poorly installed/ missing insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

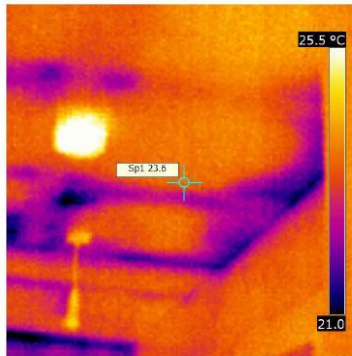


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:04:56
Image Name	IR_4449.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Landing ceiling again showing poorly installed and missing insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

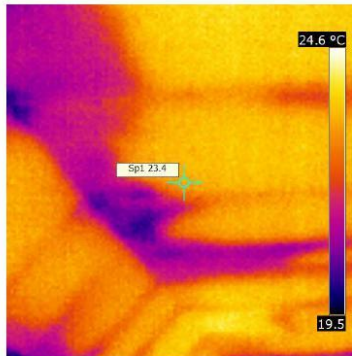


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:05:01
Image Name	IR_4450.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Another view of the landing ceiling.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
 Address 2 Benson Road,
 Abingdon, Oxon, OX14
 1LN.

Customer
 Site Address

Thermographer Paul Buckingham

Contact Person

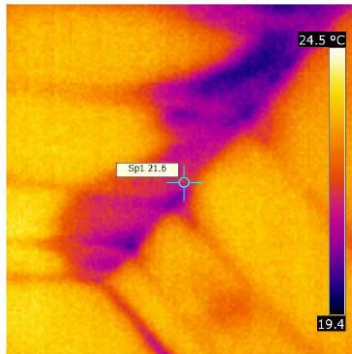


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:05:16
Image Name	IR_4452.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Landing ceiling again, above the stairwell, poorly installed insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

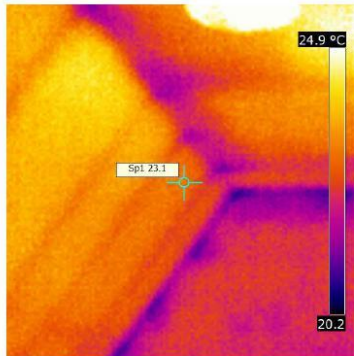


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:06:34
Image Name	IR_4453.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The den ceiling, again poorly installed insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

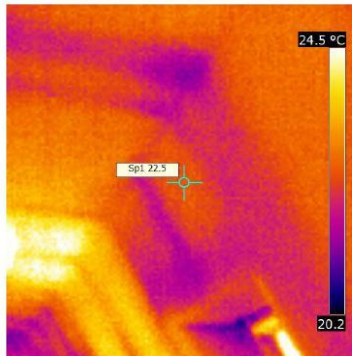


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:07:00
Image Name	IR_4455.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Another view of the den ceiling, again signs of poor insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

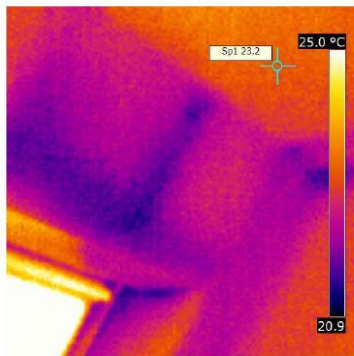


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:07:16
Image Name	IR_4456.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

The den ceiling again.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

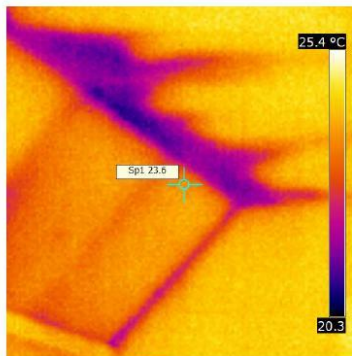


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:21:41
Image Name	IR_4464.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 2, again poorly installed and missing insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

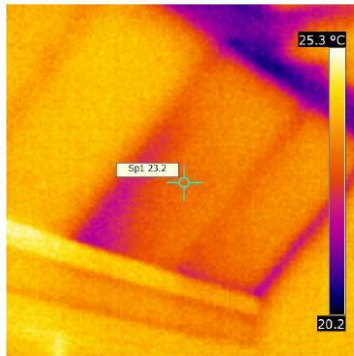


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:21:48
Image Name	IR_4465.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 2 again, air leakage behind the plasterboard ceiling.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

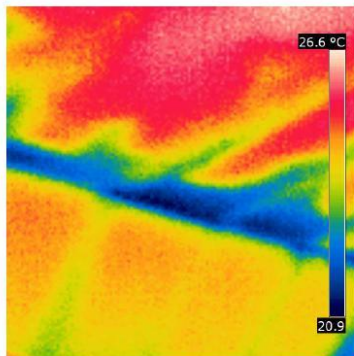


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:22:01
Image Name	IR_4466.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 2 again.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

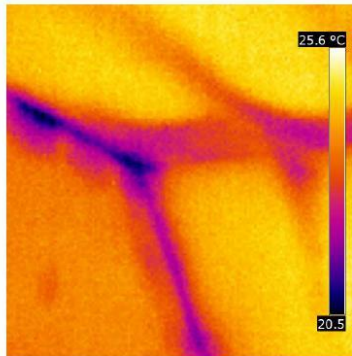


Image and Object Parameters

Text Comments

Camera Model Flir b50
Image Date 06/03/2016 12:22:20
Image Name IR_4468.jpg
Emissivity 0.97
Reflected apparent temperature 21.4 °C
Object Distance 1.0 m

Description

Bedroom 2, poor insulation and air leakage behind dry lining on gable end wall.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

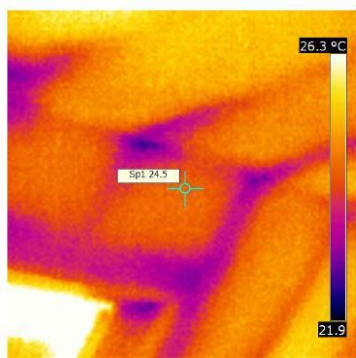


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:23:10
Image Name	IR_4471.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Bedroom 2, air leakage around roof joists and rafters, poorly installed insulation.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

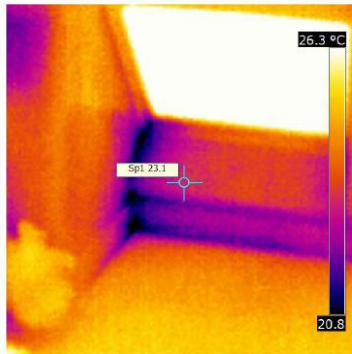


Image and Object Parameters

Text Comments

Camera Model	Flir b50
Image Date	06/03/2016 12:23:56
Image Name	IR_4473.jpg
Emissivity	0.97
Reflected apparent temperature	21.4 °C
Object Distance	1.0 m

Description

Below the bottom roof lights, this boarding below the windows appears to be uninsulated and directly into the eaves with external airflow into the area.

Inspection Report

Report Date 06/03/2016

Company Sustainable Lifestyles
Address 2 Benson Road,
Abingdon, Oxon, OX14
1LN.

Customer
Site Address

Thermographer Paul Buckingham

Contact Person

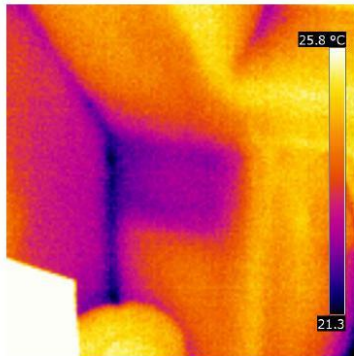


Image and Object Parameters

Text Comments

Camera Model Flir b50
Image Date 06/03/2016 12:24:06
Image Name IR_4474.jpg
Emissivity 0.97
Reflected apparent
temperature 21.4 °C
Object Distance 1.0 m

Description

Uninsulated area to the left of the lower roof lights in bedroom 2.

Findings.

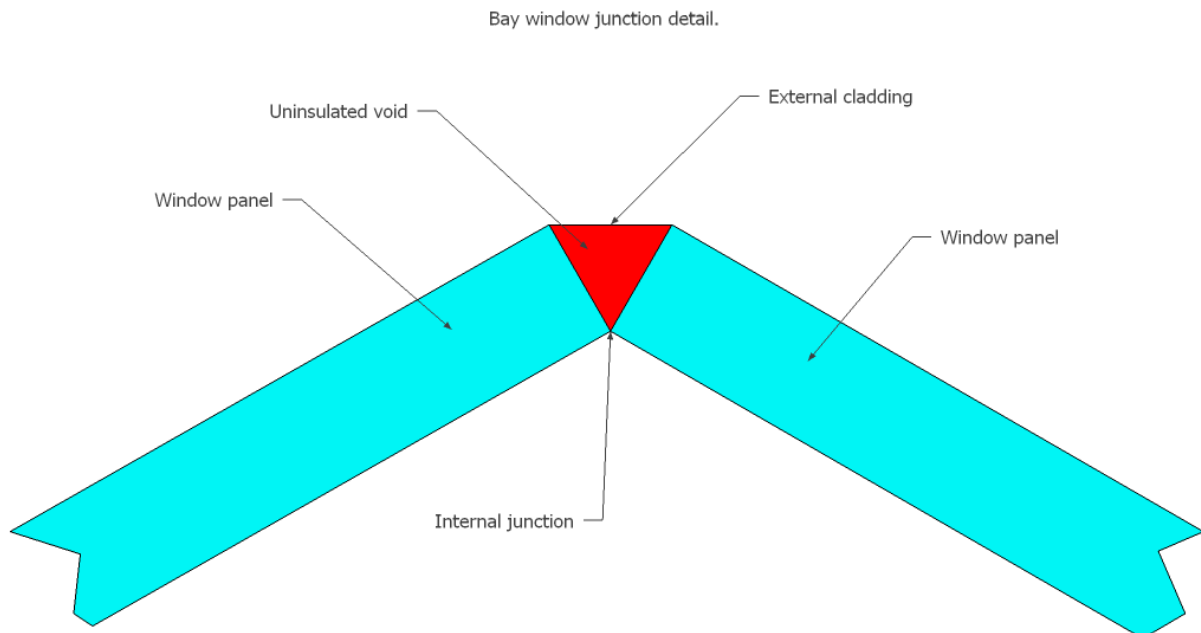
Ground floor.

1) Kitchen/ dining room.

Front bay window.

There was considerable air leakage behind the dry lining along the front wall adjacent to the bay window, this is likely to be air penetration from the bay window roof. This area around the window should be fully air sealed to prevent this kind of air infiltration. (See images 1,3 and 4).

The front bay window itself has considerable air leakage and cold along the junction of the angled front and side panels. This junction has cladding on the external corner creating an uninsulated void with a poor seal along the internal joint. This void should be fully air sealed and there should be thermal insulation within this void to maintain the thermal integrity of the whole



window. (See detail below and images 2 and 4 above).

Rear bay window/ patio doors.

There is considerable cold evident on the floor adjacent to these windows indicating thermal bridging under the windows. There is also similar detailing, as seen in the front bay window, along the angled junction where there is air leakage. (See images 5 and 6 above).

2) Back and front doors.

There are poor seals around the front and back doors and draughts were seen around them with the thermal imaging. Multiple attempts to resolve this issue have already been attempted which includes adjusting the original door, replacing the door and further adjustments to the new door. The doors should

be replaced with A+ rated doors and frames by Rational, Internorm or similar and all air gaps correctly sealed.

3) Electrical sockets.

Draughts were seen flowing from many of the sockets, image 10 above shows the socket adjacent to the right hand side of the front bay window. The dry lining may be fully fire sealed all around each board to improve the integrity of the lining to prevent air movement through the cavity. (See BS8212:1995 Code of practice for dry lining and partitioning using gypsum plasterboard: Section 3.11). This sealing is essential to maximise the thermal integrity of the lining. Air leakage behind the plasterboard and through sockets is an indication that the boards have not been adequately sealed as per best practice.

4) Living room.

The living room has a similar bay window to that seen in the dining room, the same issues were identified on and around this window construction. (see images 14, 15 and 16 above). In addition the bay window ceiling was cold indicating missing or poorly installed insulation. (See image 16).


The living room patio door showed signs of thermal bridging and air leakage behind the dry lining along the top of the window aperture. (See image 17).

First floor.

- 1) The external corner of bedroom 3 had a significant cold spot behind the top of the dry lining and above the ceiling (see image 18) which indicates air leakage from the eaves into the roof void and behind the dry lining and across the ceiling.
- 2) Bedroom 1 had cold streaks from the eaves area across the ceiling which is indicative of air flowing into the roof void from the eaves ventilators and flowing across the uninsulated ceiling. There were also a number of areas of the ceiling and top of the dry lining that showed similar air infiltration. (See images 20,21 and 22).
- 3) The family bathroom had significant cold areas around the top of the dry lining and on the ceiling, again air penetrating the roof void. (See images 25 and 26).
- 4) Image 26 shows the area above the bathroom window, the highlighted box on the image clearly shows individual dabs behind the plasterboard at the top of the dry lining confirming that the dry lining has not been fully sealed as per the code of practice for dry lining.

5) EPC Certificate. Below is the EPC certificate produced for the property.

Energy Performance Certificate



Dwelling type:	Detached house	Reference number:	
Date of assessment:	10 December 2014	Type of assessment:	SAP, new dwelling
Date of certificate:	10 December 2014	Total floor area:	220 m ²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years:
£ 1,977

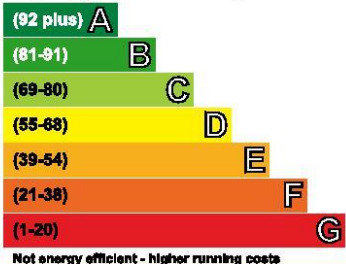
Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£ 270 over 3 years	£ 270 over 3 years	Not applicable
Heating	£ 1,365 over 3 years	£ 1,365 over 3 years	
Hot Water	£ 342 over 3 years	£ 342 over 3 years	
Totals	£ 1,977	£ 1,977	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating

Very energy efficient - lower running costs



Not energy efficient - higher running costs

Current	Potential
86	91

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years
1 Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£ 798

Energy Performance Certificate

Summary of this home's energy performance related features

Element	Description	Energy Efficiency
Walls	Average thermal transmittance 0.25 W/m ² K	★★★★★
Roof	Average thermal transmittance 0.14 W/m ² K	★★★★★
Floor	Average thermal transmittance 0.16 W/m ² K	★★★★★
Windows	High performance glazing	★★★★★
Main heating	Boiler and radiators, mains gas	★★★★☆
Main heating controls	Time and temperature zone control	★★★★★
Secondary heating	None	—
Hot water	From main system	★★★★☆
Lighting	Low energy lighting in all fixed outlets	★★★★★
Air tightness	Air permeability 3.8 m ³ /h.m ² (as tested)	★★★★☆

Thermal transmittance is a measure of the rate of heat loss through a building element; the lower the value the better the energy performance.

Air permeability is a measure of the air tightness of a building; the lower the value the better the air tightness.

Current primary energy use per square metre of floor area: 71 kWh/m² per year

Low and zero carbon energy sources

Low and zero carbon energy sources are sources of energy that release either very little or no carbon dioxide into the atmosphere when they are used. Installing these sources may help reduce energy bills as well as cutting carbon. There are none provided for this home.

Energy Performance Certificate

Recommendations

The measures below will improve the energy performance of your dwelling. The performance ratings after improvements listed below are cumulative; that is, they assume the improvements have been installed in the order that they appear in the table. Further information about the recommended measures and other simple actions you could take today to save money is available at www.direct.gov.uk/savingenergy. Before installing measures, you should make sure you have secured the appropriate permissions, where necessary. Such permissions might include permission from your landlord (if you are a tenant) or approval under Building Regulations for certain types of work.

Recommended measures	Indicative cost	Typical savings per year	Rating after improvement
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£ 266	 B91

Energy Performance Certificate

About this document

The Energy Performance Certificate for this dwelling was produced following an energy assessment undertaken by a qualified assessor, accredited by NES. You can get contact details of the accreditation scheme at www.nesltd.co.uk, together with details of their procedures for confirming authenticity of a certificate and for making a complaint. A copy of this EPC has been lodged on a national register. It will be publicly available and some of the underlying data may be shared with others for compliance and marketing of relevant energy efficiency information. The Government may use some of this data for research or statistical purposes. Green Deal financial details that are obtained by the Government for these purposes will not be disclosed to non-authorised recipients. The current property owner and/or tenant may opt out of having their information shared for marketing purposes.

Assessor's accreditation number:

Assessor's name:

Phone number:

E-mail address:

Related party disclosure:

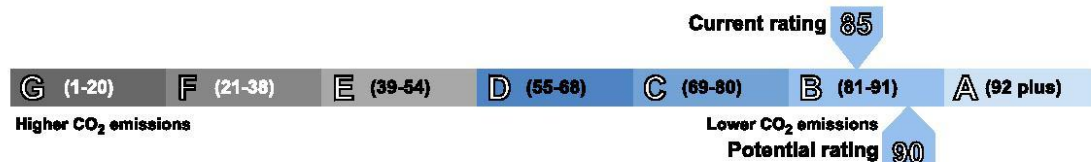
Further information about Energy Performance Certificates can be found under Frequently Asked Questions at www.epcregister.com.

About the impact of buildings on the environment

One of the biggest contributors to global warming is carbon dioxide. The energy we use for heating, lighting and power in homes produces over a quarter of the UK's carbon dioxide emissions.

The average household causes about 6 tonnes of carbon dioxide every year. Based on this assessment, your home currently produces approximately 2.7 tonnes of carbon dioxide every year. Adopting the recommendations in this report can reduce emissions and protect the environment. If you were to install these recommendations you could reduce this amount by 0.9 tonnes per year. You could reduce emissions even more by switching to renewable energy sources.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.



Your home's heat demand

This table shows the energy used for space and water heating by an average household in this property.

Heat demand

Space heating (kWh per year)	7,422
Water heating (kWh per year)	2,399

If the top of the dry lining is not fully sealed air can penetrate behind the plasterboard causing cold spots on the wall which can be prone to condensation and moulding.

Unsealed dry lining is effectively a void within the wall structure of brick, block and insulated cavity which has free air flowing within it. Heat from the heated interior space of the building will conduct through the plasterboard into the void and through convection will rise through the free flowing air and out into the roof void above effectively sucking the heat from the building. Construction using dry lining will give an improved U value to the build up of the wall structure but only if the air is fully sealed behind the dry lining. If it is not sealed it effectively bypasses the insulation of the cavity wall making it ineffective. In this building the dry lining is clearly not fully sealed making the whole building considerable less energy efficient than it should be according to the supplied EPC. (See above). Page 2 of the EPC gives the thermal transmittance of the walls as 5 star, this is not indicative of what is actually present.

Images 28 – 33 above are all further examples of air penetration behind the top of the dry lining and above the ceiling around the perimeter of the 1st floor.

Top Floor.

Ceiling insulation.

Images 34 – 50 are of the walls and ceiling of the top floor of the building. All of them show significant areas of heat loss. There are numerous areas of the ceiling where the insulation is missing through very poor detailing of the loft space leaving an estimated 15 – 20% of the ceiling area uninsulated. Again the supplied EPC gives the thermal transmittance of the roof a 5 star rating, this is clearly not the case.

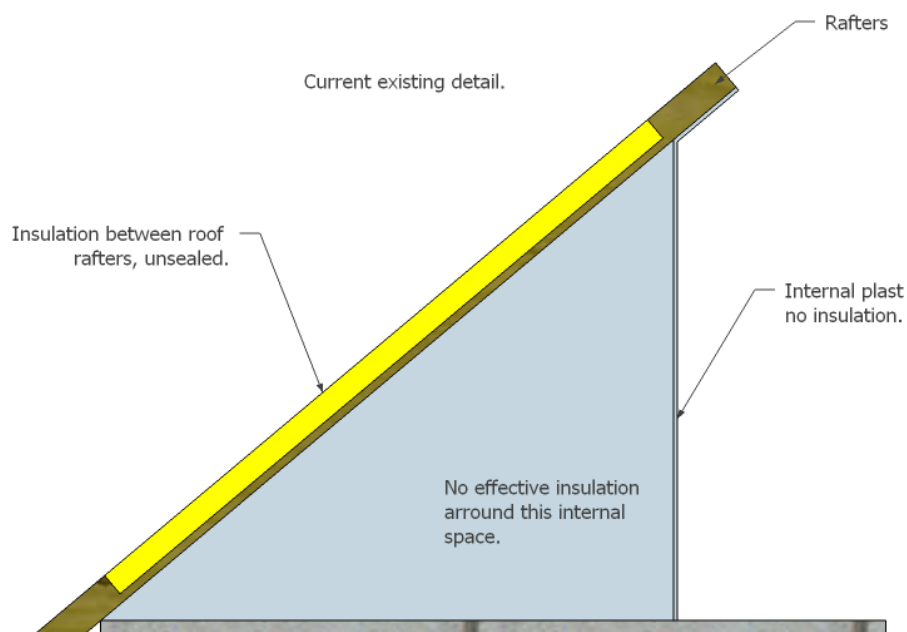
Roof void insulation.

The roof void has been insulated between the rafters, its integrity and position between the rafters is solely reliant on the insulation remaining in place on its own. It has not been fixed in any way and is liable to fall out of its position due to natural expansion of the building due to atmospheric temperature variation. I have seen, in similar cases, all the insulation fall out of position and become totally ineffective.

With the insulation on the outside of the roof void, this space should be treated as heated internal space, which it has not. The roof void should be fully air sealed, for insulation installed in this way, to be effective and should be within the air seal line of the building when an air test is carried out. There was a significant draught within the roof void and several areas were seen to be fully open to external air movement, with free air flowing through the roof void the insulation is bypassed and ineffective.



The photograph above shows a piece of the rafter insulation that has actually fallen out of position, it is actually being prevented from fully falling out by an electrical cable which is supporting it! Above this piece of insulation is the underside of the roofing felt allowing free external air to flow into the roof void.



The detail drawing above shows a basic version of the insulation detailing within the roof void. Free flowing external air is passing through and around the current insulation effectively making the 12.5mm plasterboard internal knee wall the only effective thermal resistance for the walls of the top floor. The roof does need to be ventilated but this is generally a 50mm air gap between the top of the insulation and the underside of the roofing felt, not within the roof void itself.



This photograph shows clearly that the insulation has not been fixed in any way within the rafters, some of the insulation can be seen to have moved, none of the joints have been sealed or taped to prevent air flow around them. Cables can be seen threaded through an open joint.



This photograph shows insulation falling out of position, fibre glass insulation has been stuffed into some of the gaps between the solid insulation board, it is poorly installed and likely to fall out over time and looks like a 'bodge job', not what you would expect to see produced by a professional builder.

The photograph below shows the top of the soil pipe with the air admittance valve, this valve should have an insulating cap fitted. It also shows a gap in the insulation and the roofing felt can be seen above, this gap will allow free flowing external air to enter the roof void, it will also allow heat to escape through the roof.

The studwork of the knee wall is clearly visible with the single skin of the 12.5mm plasterboard fixed to the inside, this is the only effective thermal resistance for the walls between internal heated space and external air flow. The EPC states that the average thermal transmittance of the walls is $0.25\text{W/m}^2\text{k}$ and is given a 5 star rating, the thermal transmittance of 12.5mm of plasterboard alone is $4.9\text{W/m}^2\text{k}$ which is well below building regulations of $0.35\text{W/m}^2\text{k}$.

Within the roof void air will also be able to flow freely underneath the floor of the loft rooms because there is no insulation between the 1st floor ceilings and the flooring, this will draw heat out of these rooms.



Conclusion.

This house is 14 months old and subject to the 2010 building regulations, it has been given an EPC rating of B86 with an estimated energy consumption of £1977 over 3 years which equates to £659 per year. The owners have so far paid around £2400 in energy bills over the last 12 months, which equates to approximately 4 years energy consumption according to the EPC rating.

The insulation and thermal integrity of the building is very poor and well below current standards, there is considerable heat loss and air leakage around all of the windows around the building as illustrated in some of the thermal images above. There are numerous areas where air leakage is present behind the dry lining which is due to poor sealing, mainly around the windows, prior to installing the dry lining. The dry lining has not been fully sealed around the top of the walls allowing air penetration behind the lining and allowing heat to escape freely through conduction and convection within the cavity behind the dry lining.

The windows, particularly the bay windows, are of very poor standard with air leakage along the angled joints and no thermal integrity on these junctions. These should be replaced with A+ rated windows and frames by Rational, Internorm or similar and all air gaps correctly sealed by a reputable Window company. This

specification of windows and doors should be installed as standard for a house of this cost.

The loft insulation has been poorly detailed and around 15 – 20% of the top floor ceiling is uninsulated which will account for considerable heat loss. The 1st floor ceiling insulation is also the insulation for the top floor knee walls which has been installed between the roof rafters. This is poorly installed and very ineffective with free external air flowing within the roof void and allowing heat to escape. As an estimate the effectiveness of the insulation around the building is considerably less than 50% of the buildings potential.

Remedial work will require significant invasive measures such as stripping out all the dry lining, both on the ground and 1st floors, and removing the knee walls of the loft rooms to gain access.

Remedial work will then need to be carried out on the exposed block work walls around all the areas identified on both the ground and first floors where air is penetrating behind the dry lining and above the ceilings. When this has been fully independently inspected and approved, the dry lining will need to be installed ensuring all the individual boards are fully sealed in line with the original specification and again independently inspected before final finishing.

The roof insulation will need fully installing and sealing and again independently inspected before reinstating the walls and finishing.

This remedial work will bring the building up to current building regulation standard *Part L1A Conservation of fuel and power in new dwellings* which should have been achieved during the original build.

Once the works are started to resolve the documented issues, further Thermal Imaging should be performed before making good the walls/ ceilings to ensure the insulation is installed correctly, proper roof insulation installed and detailed correctly and all issues are resolved before making good to avoid further disruption to the family and additional costs later.