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THERMAL PERFORMANCE REPORT

1700ft² Dormer Type House
Co. Kilkenny

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Brief:

This report is carried out in order to access the overall thermal performance of the property with a view to increasing this performance and reducing energy bills.

This involves a thermal imaging survey of the property in order to identify any areas of excessive heat loss or ingress of moisture and outside air.

It also involves an assessment of existing space and water heating installations, insulation levels etc. and any recommendations as to areas which may be open to improvement. The house was surveyed and the details entered into the DEAP software which is used to calculate the Building Energy Rating for domestic type buildings. Different options for improving the performance were investigated using the DEAP software along with budget costs for each and potential energy bill savings.

Description:

The property is a two storey dormer type construction with an overall floor area of approximately 1,700 ft^2. It is an insulated cavity block construction built circa 1997. The main heating is provided by an oil fired low pressure hot water boiler which also provides the water heating

Findings:

(Please refer to Figures 1-18 below)

1. There is evidence cold spots/dampness on the internal face of external walls particularly along the southwest facing walls.

2. There is evidence of a leak in the roof around the dormer window in the master bedroom.

3. There are areas where insulation is missing on external roofs.

4. There is significant draughts occurring around the front door allowing cold outside air into the house.

5. There is a lot of condensation occurring on the rear patio door.

6. The existing boiler is a standard non-condensing boiler and has a design efficiency of 85% when operating correctly.

7. The boiler is operated by means of a timeclock only. There are no room thermostats or thermostatic radiator valves.

8. There is no cylinder thermostat on the domestic hot water storage cylinder and there is no separate time control of hot water and space heating circuits.

9. First floor areas are significantly warmer than ground floor (on average 2ºc on measurements taken).

On entering the building into the 'DEAP' software, the Building Energy Rating was given as a **C2** with an overall energy consumption of **182.19kWh/m²/yr.**

A number of potential energy saving measures were then investigated and assessed in terms of capital outlay and potential energy cost savings per year. The results were as follows:

Over..

Findings: *(contd)*

Measure	Estimated Cost	Potential Savings
Install additional 150mm insulation in attic.	€300.00	c. €25.00 per annum **(c)**
Install cavity fill bead insulation in external walls	€800.00	c. €60 per annum **(c)**
Install Solar water heating system **(a)**	€5,000.00	c. €160.00 per annum **(c)**
Upgrade Heating Controls **(b)**	€1,200.00	c. €160.00 per annum **(c)**

Notes:

(a) Results based on the analysis of a specific manufacturer's system. Different systems will give slightly varying results.

(b) Upgrade would involve installing a programmer, 1No. Room thermostat, 1No. cylinder thermostat, thermostatic radiator valves and a delayed start thermostat.

(c) Cost savings are based of fuel prices as of Oct. 2009.

Conclusions & Recommendations:

1. Where there are cold spots on external walls this may be either due to bridging across the cavity allowing moisture across from the outer block leaf to the inner or it may be due to condensation caused by lack of insulation in the cavity.

   A certified building contractor should be employed to remove a section of blockwork in these areas to confirm. Any bridges should be removed and if there is a lack of insulation this should be installed.

2. Any leaks evident in external roofs should be investigated and repaired.

3. Any areas where insulation is missing within roof spaces should be fitted with adequate insulation.

4. The front door should either be properly sealed all around or replaced with an insulated door with proper draught seals.

5. The condensation on the patio door in the kitchen is due to the aluminium construction of the door and subsequent poor thermal properties. Although it may be difficult to alleviate this problem altogether, it could be improved by replacing the door with a modern PVC door with better thermal properties.

6. The existing boiler should be capable of providing heat for another 10 years approximately. As the system contains radiators a condensing boiler would not provide much greater efficiency than is available with the current boiler. We would recommend the boiler be serviced to ensure it is operating at full efficiency.

7. We would recommend that the heating system and water heating controls be upgraded as per note **(c)** above.

8. First floor areas are warmer because of the warm air rising from heated ground floor areas while the first floor radiators are still operating at full capacity. It may be feasible, depending on the layout of existing pipework, to split the ground and first floor heating circuits and to operate each on a separate thermostat. This would mean that no heat will be called for on the first floor once it reaches the desired temperature.

9. We would recommend the upgrading of the attic insulation and installing cavity fill insulation to external walls (refer also pt.1 above). There are grants available from Sustainable Energy Ireland for this and we would be available for any consultation as required.

10. We would not see the installation of a solar water heating system as a viable option from the point of view as reducing energy costs.

Definitions:

Room Thermostat:

A sensing device to measure air temperature within the building and switch on/off the space heating. A single target temperature may be set by the user.

Thermostatic Radiator Valve:

A radiator valve with an air temperature sensor used to control the heat output from the radiator by adjusting the water flow.

Cylinder Thermostat:

A sensing device to measure the temperature of the hot water cylinder and switch on and off the water heating. A single target temperature may be set by the user.

Programmer:

Two switches operated by a clock to control both space heating and hot water.

Delayed Start Thermostat:

A device to delay the chosen starting time for space heating according to the temperature measured inside or outside the building.

FIG 5. Master Bedroom End Wall (South West Facing)

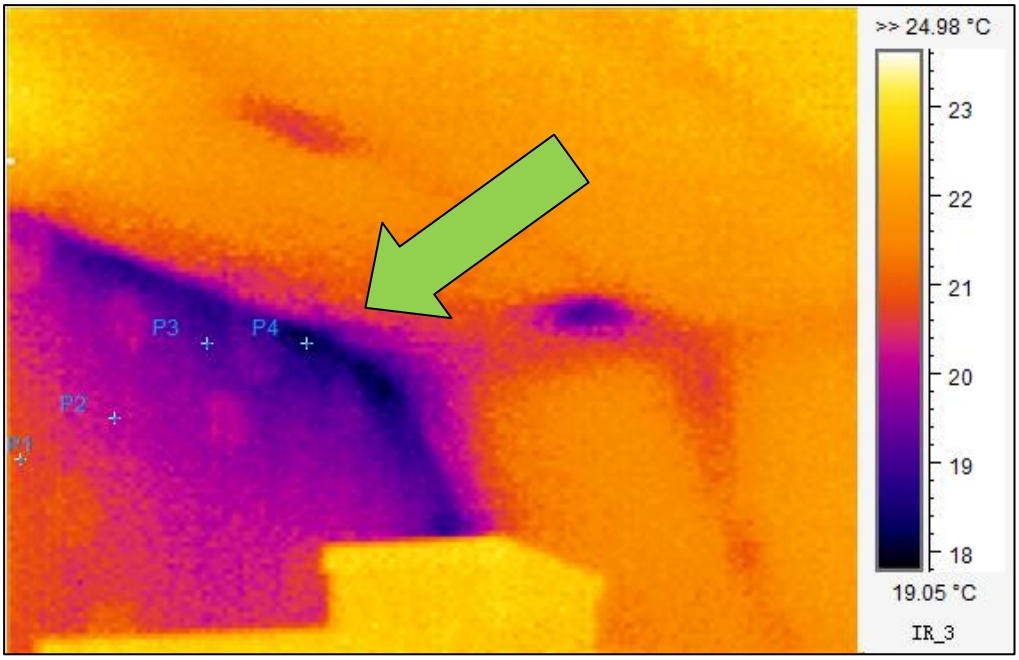


Image Info	Value
Rel Hum	70%
Amb Temp	20.1 °C
Chart	Value
P1:Temp	22.00 °C
P2:Temp	21.22 °C
P3:Temp	20.27 °C
P4:Temp	19.35 °C

FIG 5(a)

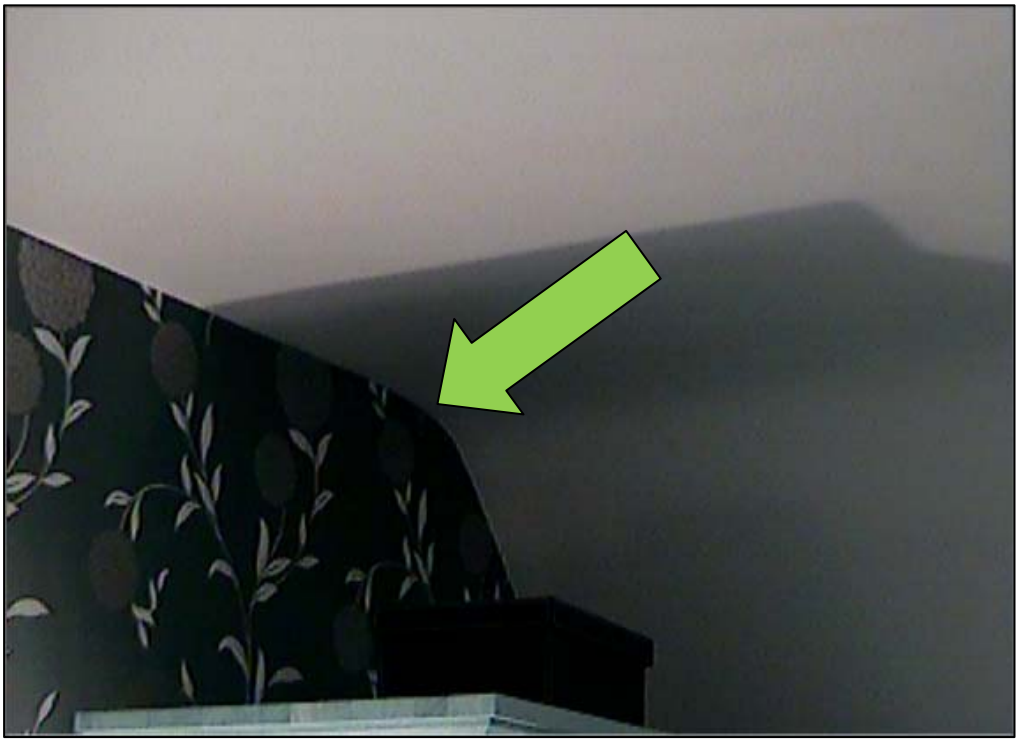


FIG 5(b)

Cold patches on wall may be indicative of damp caused by bridging across the cavity of the wall.
As the wall is facing the South West it will bear the brunt of wet weather. If the construction is such that masonry forms a bridge across the cavity, any water which ingresses through the outer block will have a route across the bridge to the inner block and in to the internal face of the wall.
A section of wall at the colder areas should be removed and investigated for evidence of bridging and water ingress. Refer also FIGS 6 & 7.

FIG 6. Master Bedroom End Wall (South West Facing)

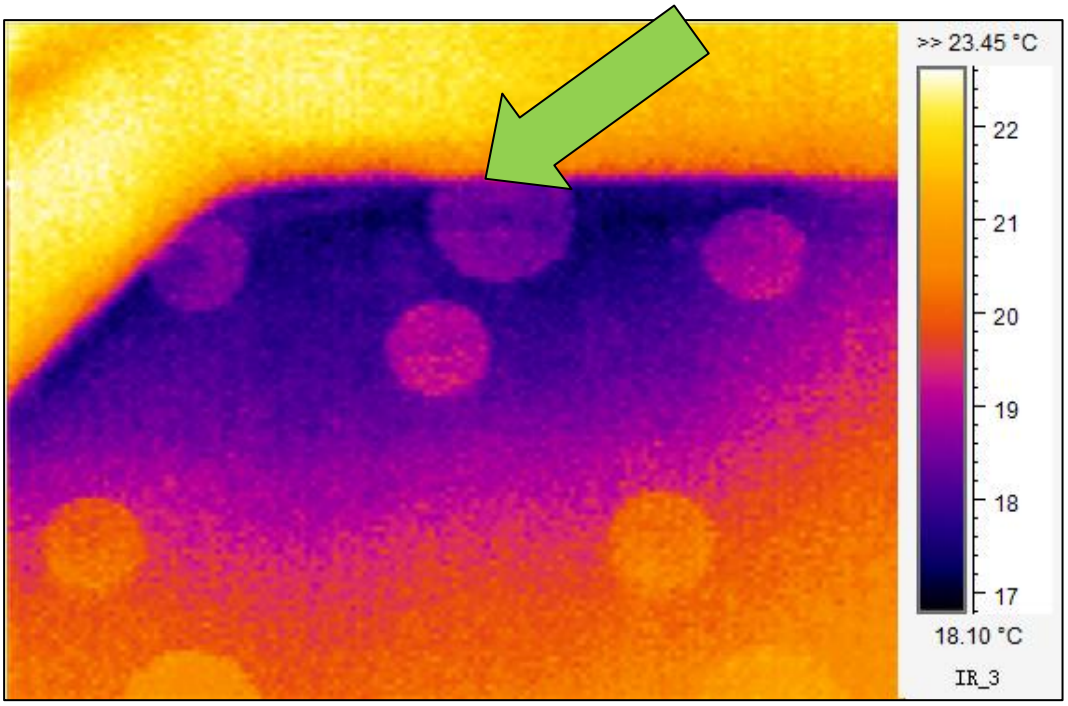


FIG 6(a)

FIG 6(b) Cold patches on wall. Refer FIG 5

FIG 7. Master Bedroom End Wall (South West Facing)

FIG 7(a)

FIG 7(b)

Cold patches on South West facing wall at low level.
This is also indicative of bridging across the cavity.
Refer FIG 5

FIG 9. First Floor Bathroom

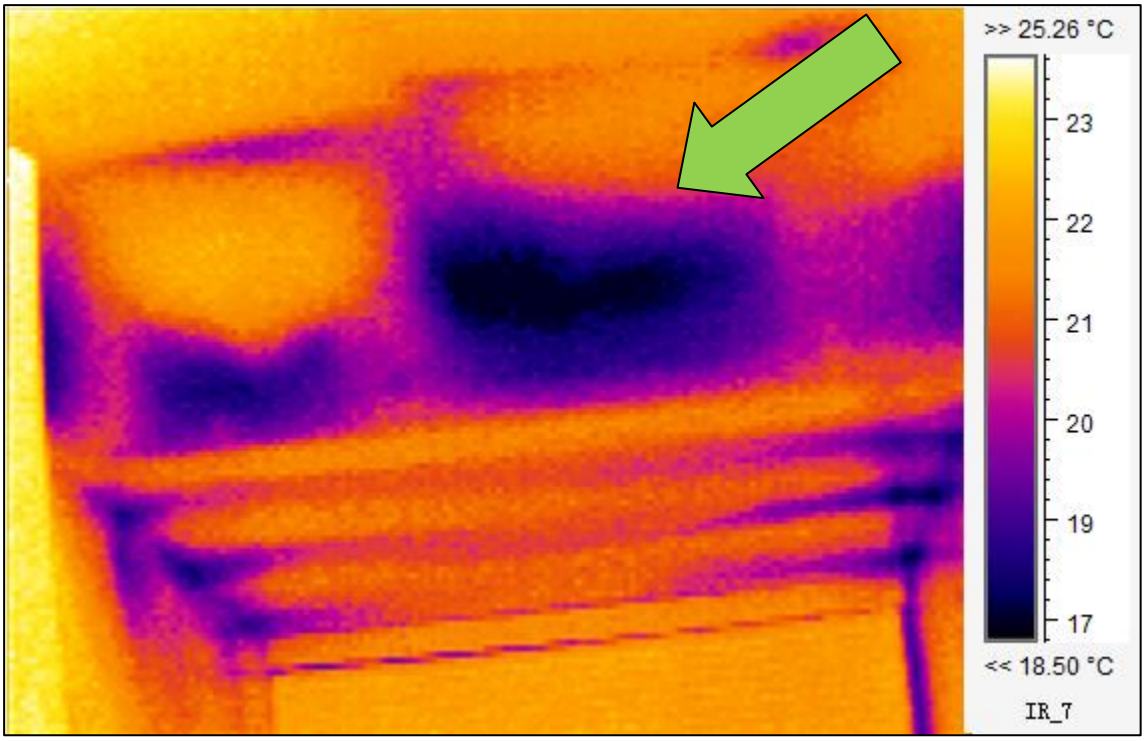


FIG 9(a)

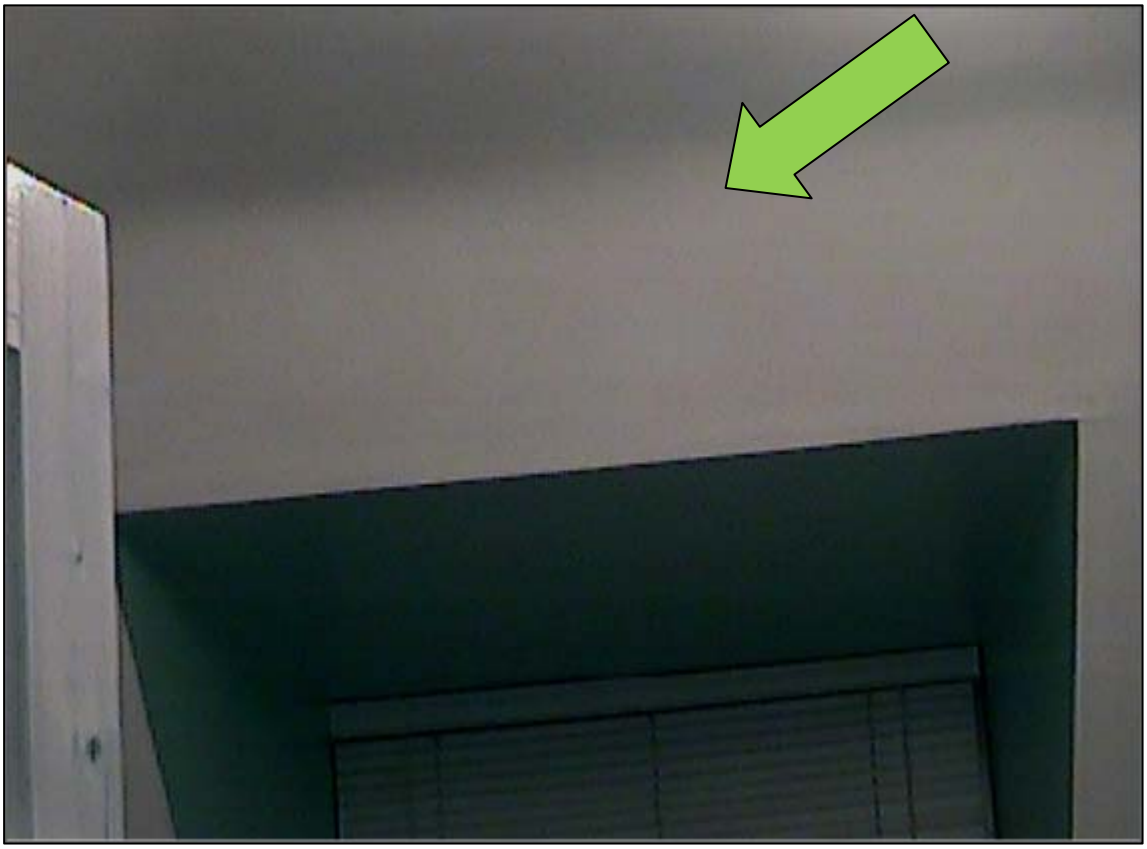


FIG 9(b) Cold points in Dormer Window where insulation is missing.

FIG 13. Main Front Door

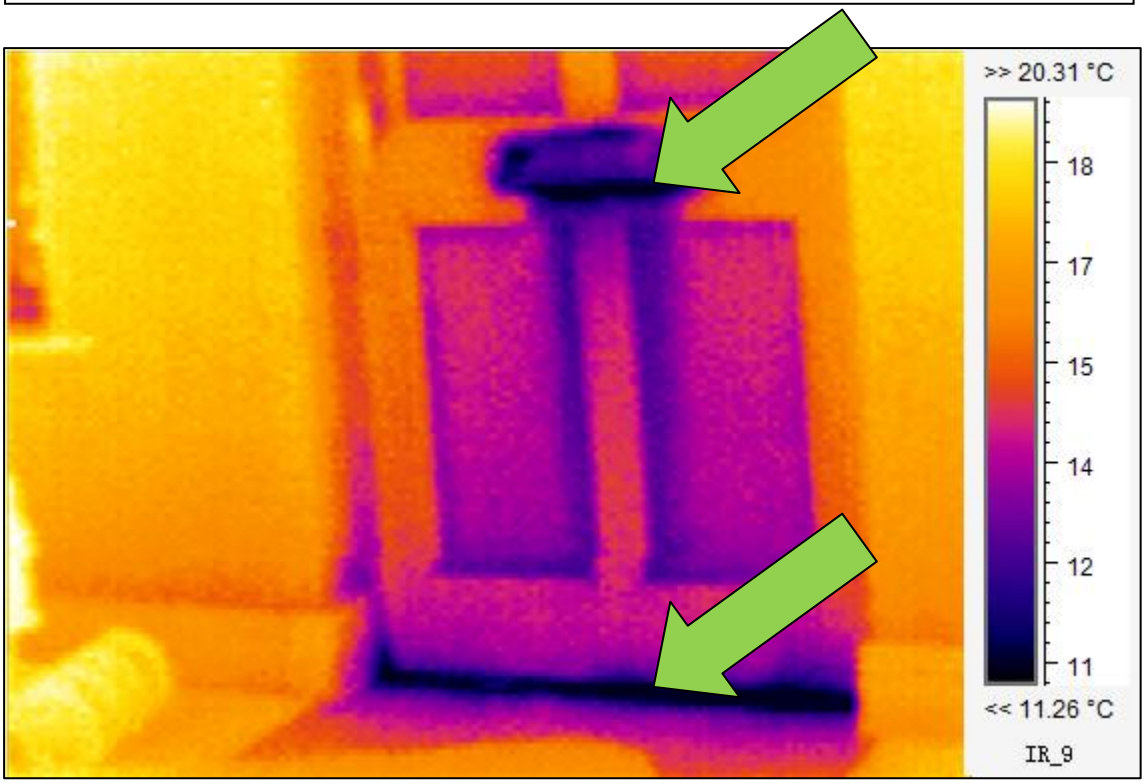
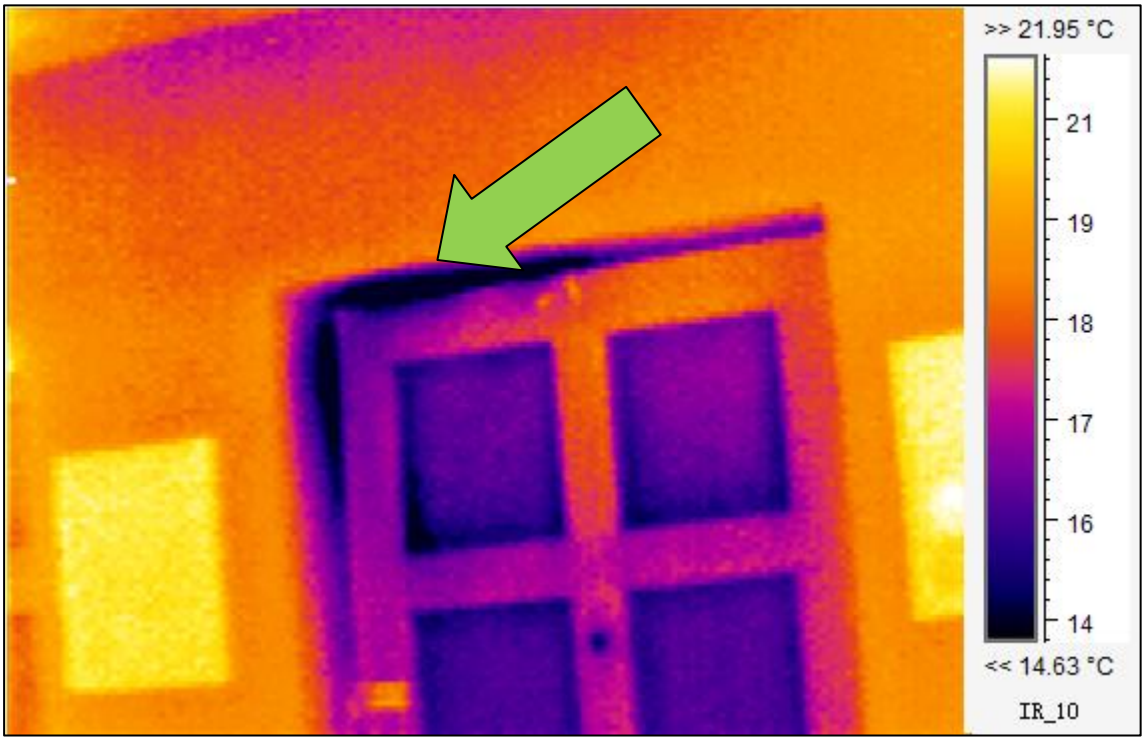


FIG 13(a)



FIG

Draught ingress around front door.
Door should be fully draught stripped or replaced with insulated door.

FIG 17. Ground Floor Rear Bedroom

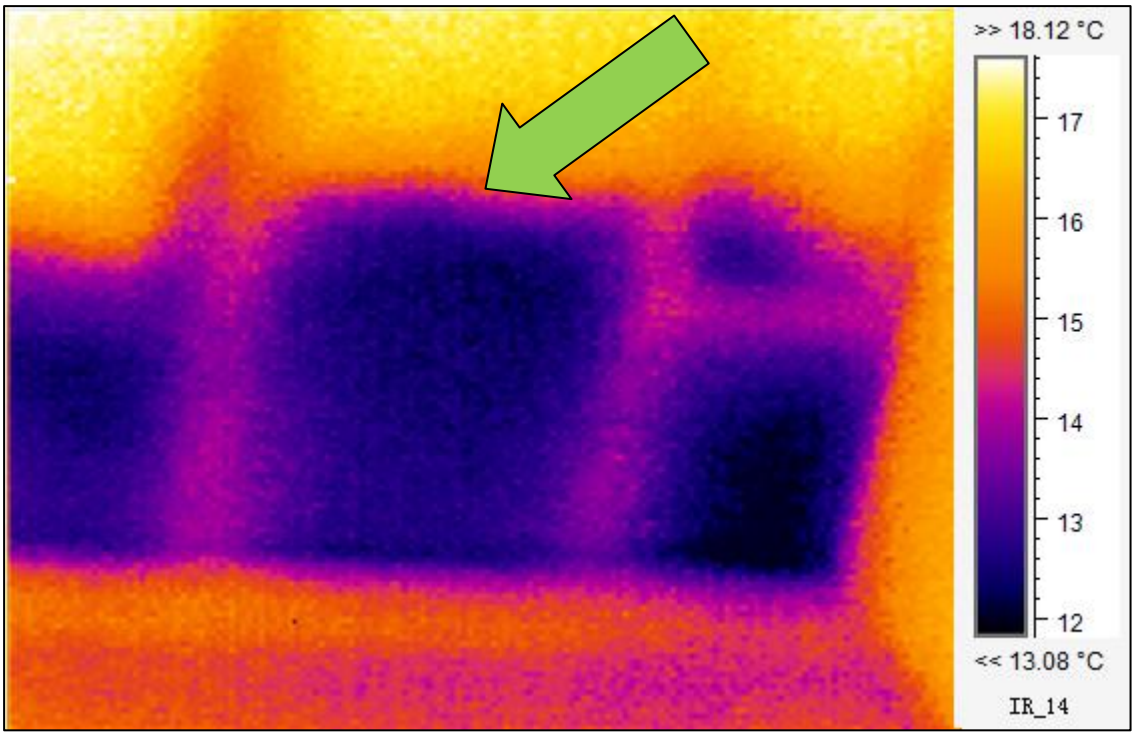


FIG 17(a)

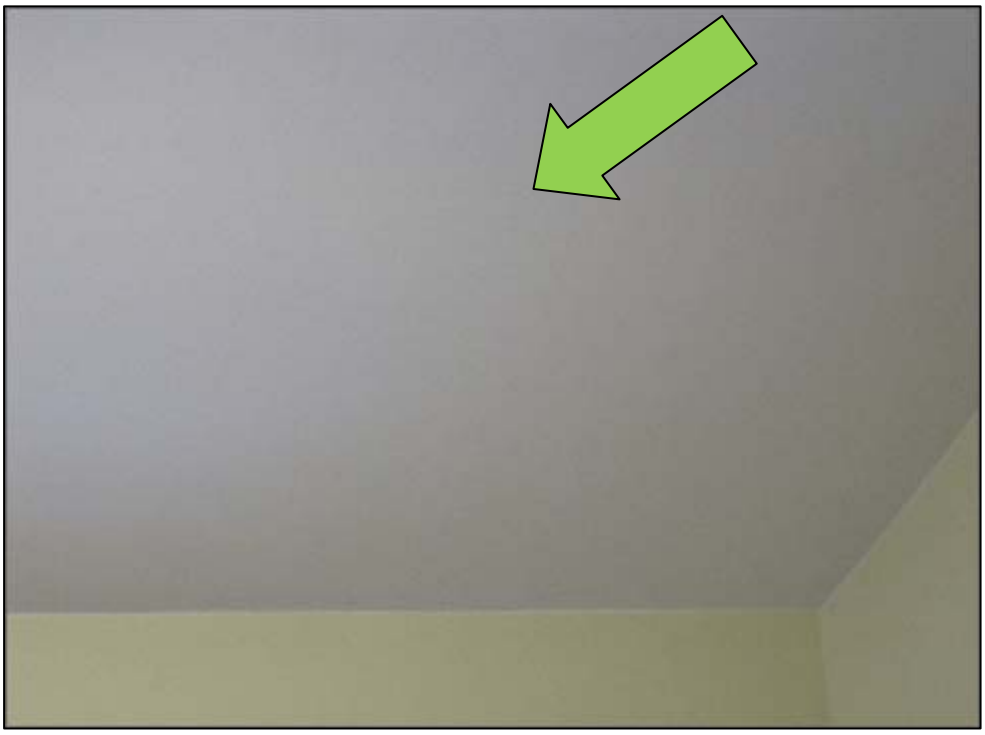


FIG Insulation missing above ceiling at corner of room with exposed roof over.

Notes: