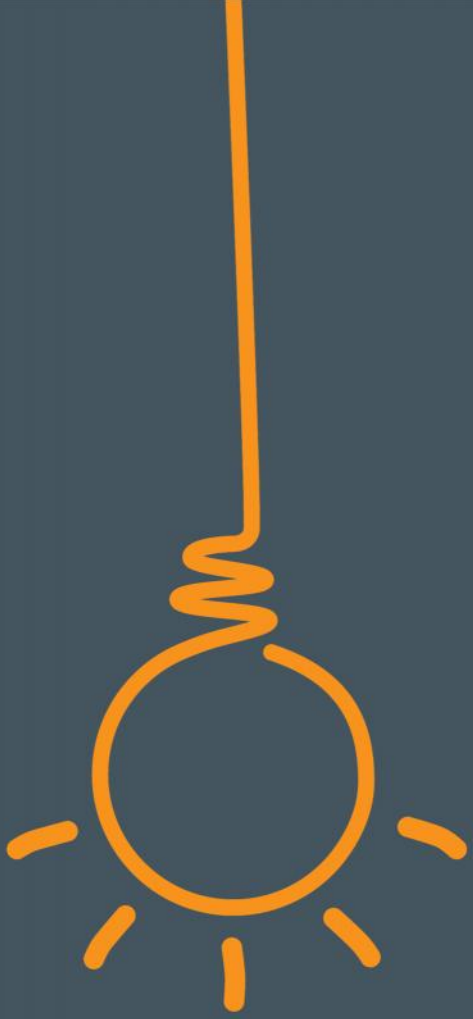

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SOUTH DOWNS NATIONAL PARK AUTHORITY SUTAINABILITY STATEMENT

For

63 Princes Road, Petersfield, Hampshire, GU32 3BH

1. Project Introduction

BEAT Solutions were instructed by Mr James Pollard to prepare SAP calculations and an energy Statement based on the project drawings and specification provided, together with the confirmed project particulars set out below:-

Client Name: Mr James Pollard

Dwelling Address: 63 Princes Road, Petersfield, Hampshire, GU32 3BH

B'Regs Version: 2013

SAP Version: SAP2012

Project Stage: Pre Planning

2. Revision Schedule

Revision	Rev A	Rev B	Rev C
Date	5th November 2021		
Prepared By	SS		
Checked By	DP		
Issue Date	8th November 2021		
Notes	First Issue		
Report Reference	SAP-1255 - Sustainability Statement - 63 Princes Road, Petersfield		

The figures within this report have been based on indicative modelling and may not represent the as built emission or energy use of the proposed development. Please contact BEAT Solutions should you have any questions about this report.

3. Introduction

This energy statement has been prepared by BEAT Solutions to support the planning application for the construction of a new dwelling on land to the north of 63 Princes Road, Petersfield. The application consists of the construction of a new dwelling at the aforementioned site. BEAT Solutions have been instructed by Mr James Pollard to produce this report. This report has been produced using SAP2012 methodology to ascertain the relevant performances of DER/TER and the BRE Water Efficiency calculation methodology in order to calculate the internal water usage for the properties.

Site Description

A desktop survey confirms that the dwelling is located within a low rise residential area in outer Petersfield just off the A3.

Planning Policy Requirements

The project is required to demonstrate where possible compliance of the South Downs National Park's Local Plan and Sustainable Construction Supplementary Planning Document Checklist (*Appendix 2*: Single Dwelling), which in summary includes:-

- **Energy Efficiency**:

  19% improvement of CO2 emissions through energy efficiency of the building, measured using SAP 2012 DER over TER data. (or 39% overall improvement)

- **Green Energy**:

  A further 20% improvement of CO2 emissions through low/zero carbon technologies, measured using SAP 2012 DER over TER data. (or 39% overall improvement)

- **Electric Vehicle Charging:**

  All homes with on-plot or other suitable car parking to have EV charge point where feasible.

- **Waste:**

  Separate internal bins in line with the recycling and waste collection policy of the local authority.
  Provide compost bin where private garden is available.

- **Water Use**:

  No more than 110 litres/person/day predicted mains water consumption.

4. Minimum Energy Efficiency Measures

(used to meet a 19% improvement over DER/TER)

Fabric Approach:-

One of the first steps and the most important of a sustainable energy strategy is to reduce the energy demand.

The approaches detailed in this section form the basecase of performance for the property. It is therefore intended to incorporate the measures detailed below into the design and build of the proposed development.

Insulation Standards

The development will incorporate enhanced insulation U-Values in the building envelope (walls, roofs, floors and glazing) and will generally achieve average U-Values close to those required by Part L1a (2013) Building Regulations – table 4. Further improvement on these U-Values is limited due to project constraints detailed later on in this report.

Element	Notional (TER)	Actual (DER)
Walls - W/(m²K)	0.18	0.15
Party Walls - W/(m²K)	0.00	N/A
Floors - W/(m²K)	0.13	0.13
Roofs - W/(m²K)	0.13	0.12
Windows & Glazed Doors - W/(m²K)	1.40	1.22
Opaque Doors - W/(m²K)	1.00	1.40

Ventilation & Airtightness

It is confirmed that the dwelling will be mechanically ventilated using a whole house ventilation system with heat recovery. This is known as System 4 under Approved Document F and generally referred to MVHR.

Air tightness standards will exceed Approved Document Part L requirements. By reducing the air leakage rate within the dwelling to 3.00 m³/(h.m²) @ 50 Pa, instead of a default 15 m³/(h.m²) @ 50 Pa, an improvement will therefore be seen in the DER/TER. With a reduction in the air leakage rate of the property a reduced space heating demand will be sought, therefore reducing overall carbon emissions.

The ventilation system will meet the performance requirements set out in Part F of the Building Regulations (2013).

Thermal Bridging

In well insulated buildings, as much as 30% of heat loss can occur through thermal bridges, which occur when highly conductive elements (such as metal and plastic) enable a low resistance escape route for heat. It is proposed that the development will be constructed using masonry construction methods. It is proposed that the use Accredited Construction thermal bridging details along with Xtratherm enhanced details. These have been implemented into the SAP Calculations and have made an improvement over the default ψ values from

0.15 to 0.052 on the project. A copy of the implemented thermal bridges can be found in Appendix 3.

Limiting the Risk of Summer Overheating

It is not proposed to provide any mechanical cooling to the dwelling on the proposed development. Thermal comfort will be achieved through the specification measures such as good thermal insulation, air tightness and ventilation via the proposed mechanical ventilation system.

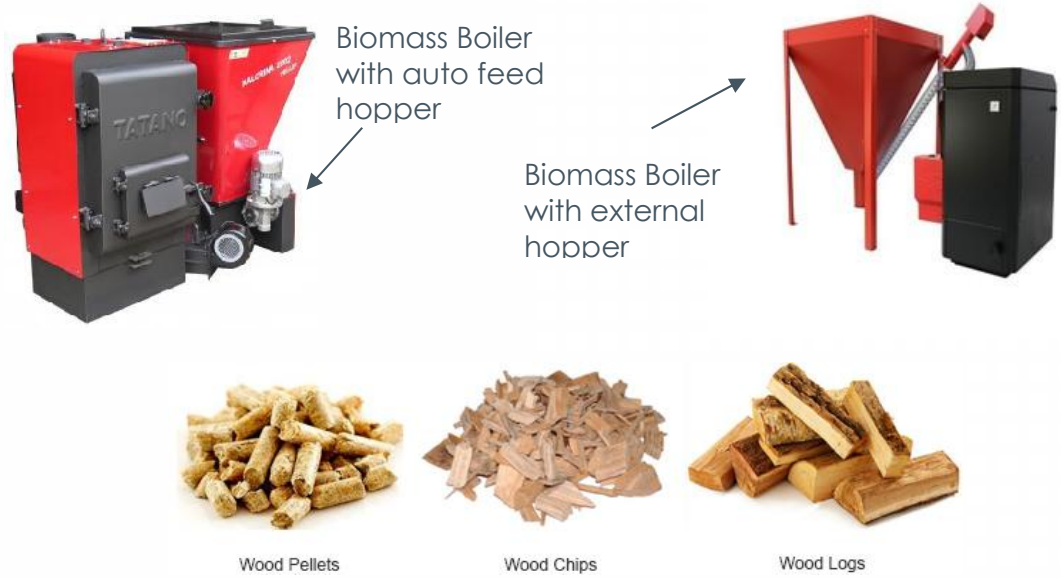
5. Possible Low/Zero Carbon Technologies

(used to achieve a further 20% improvement over DER/TER and 39% improvement overall)

In arriving at the project specification, a selection of low/zero carbon and renewable technologies were considered for implementation:-

Biomass Boiler:-

Biomass boilers could be used for the production of heat in buildings through combustion of bio fuels such as wood chips or pellets. Common types of biomass fuels include wood from forests, urban tree pruning, farmed coppices, farm wastes and wood waste from timber processing. For domestic heating systems, the most common fuel types are wood pellets, wood chips or logs. Wood chips can be readily available and relatively cheap with new supply routes coming into the market. Pellets are the most expensive of the fuel types but also more energy dense and therefore are less bulky to store. Pellets are also much easier to handle, simplifying the boiler and fuel handling system and potentially improving reliability for smaller scale systems. Logs are less suitable for social housing and flats because they require manual handling of fuel which is difficult to co-ordinate. One of the most appropriate uses for pelleted fuel is communal heating, although for off-gas dwellings individual boilers or room heaters could be considered (but require occupants to handle the fuel).

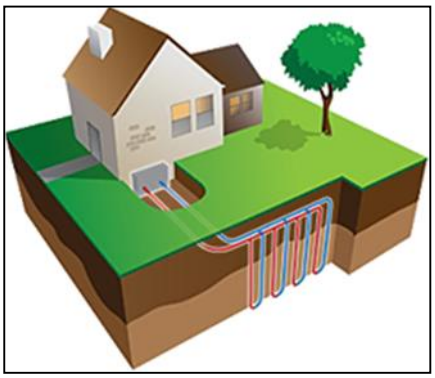


Fuel Types

Ground Source Heat Pump:-

Ground source heat pumps (GSHPs) concentrate the heat of the sun's rays stored naturally at low temperature in the ground. The system circulates fluid through a long loop of pipe (called a 'ground loop'), which in UK housing will normally be via a vertical borehole, though there are other options, such as trenches which requires large open spaces. Heat is extracted from the water in the ground loop via the heat exchange pump, and circulated to the home using a network of radiators or under floor heating. Because heat pumps work most efficiently when providing lower temperature heat (40-50°C), slightly larger radiators are used to ensure sufficient heat transfer within rooms.

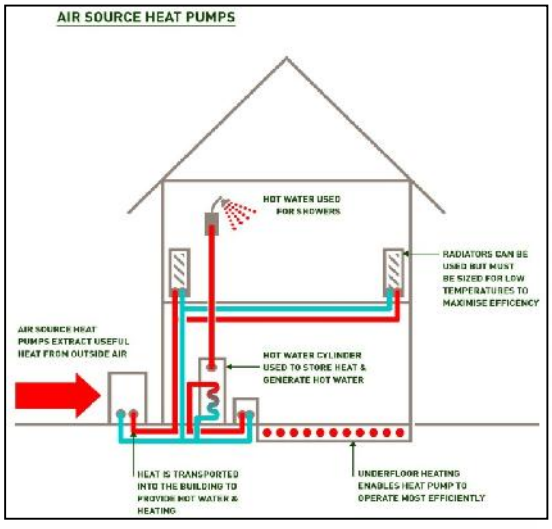
Horizontal Loop System



Vertical Loop System

Air Source Heat Pump:-

Air source heat pumps (ASHPs) use the ambient air temperature as their heat source, and thus avoid the 'ground loop' and associated drilling costs of GSHP's. However, because the temperature of air is less stable throughout the year they operate at a lower efficiency than GSHPs due to seasonal efficiencies. ASHP's could be useful in some off-gas situations where ground conditions or access issues prevent borehole drilling or trenches. Careful consideration should be given in urban areas to consider neighbouring properties as ASHP's can generate some noise and can be considered a nuisance by neighbouring properties. This can be overcome by siting the heat pumps away from nearby properties or conducting environmental noise surveys to establish acceptable levels and locations for the heat pumps.



Principles of designing an ASHP

ASHP Installed on a new dwelling

Solar Photovoltaic:-

Solar photovoltaic (PV) systems generate electricity from sunlight. The direct current (DC) power that is produced via the panels is converted via an inverter into alternating current (AC) power, which can be used to power the normal range of domestic appliances and/or be exported to the local electricity network to offset electricity costs. A range of systems are available, from roof-mounted panels to PV tiles which look similar to conventional tiles. The amount of power that a PV panel will deliver is proportional to the amount of sunlight that falls upon it; therefore PV panels are best placed so that they face broadly south and are unshaded for the major part of the day. The cost of installation has been driven down in the last year due to the government lowering the feed-in-tariff (FIT) which pays property owners who generate electric for a fixed 25 year period.

Photovoltaic Panels (in roof system)

Solar Hot Water:-

Solar hot water systems (SHW) use the sun's energy to heat domestic hot water. The heat from the solar collector is used to heat water in a cylinder, where it can be stored until it is needed. A secondary heating source (such as an electric immersion heater, or a heating coil from a gas boiler) is usually used to bring the water up to the required temperature (typically 60°C) when necessary. In summer, SHW systems can provide most of a household's hot water demand, subject to the correct sizing of the solar thermal store. In winter this proportion is considerably less but averaged over the year the typical contribution to annual hot water demand is around 50%.

Solar Evacuated Tubes

Flat Panel System

Wind Turbines:-

A wind turbine is a machine for converting the kinetic energy in the wind into mechanical energy which is then converted into electrical energy. Wind turbines are usually 'horizontal axis' machines with a tower, nacelle (the enclosure for the workings), hub and three blades, although any number of blades are possible, as are 'vertical axis' turbines (which can also look visually impressive). It is generally considered that three bladed turbines are the most aesthetically pleasing horizontal axis turbine and they are usually coloured a white grey colour. Turbines are often categorised as small, medium and large, with small usually referring to turbines with rated power up to 50kW. Medium turbines range from around 250-300kW, but with the size of turbines having increased dramatically in the last ten years, a medium turbine could be referred to as anything below 800kW. The largest onshore turbines currently in the UK are 3MW (3,000kW). Large turbines in exposed areas are cost effective. The smaller the turbine, the more turbulent the airflow (such as in urban areas), the lower the economic benefit and the longer the 'payback'.

Horizontal Wind Turbine

Vertical Wind Turbine

6. Proposed Project Specification – Energy Efficiency

(used to achieve both 19% and a further 20% improvement over DER/TER)

The table below details the proposed specification against the notional specification used in calculating the DER and TER. Using a traffic light system we have highlighted the main changes when compared to the notional values, as below:-

Worse Than Notional
Same as Notional
Better Than Notional

Element	Notional (TER)	Proposed (DER)
External Walls (W/m²K)	0.18	0.14
Garage Wall (W/m²K)	0.18	0.20
Ashlar Walls (W/m²K)	0.18	0.16
Flat Roof (W/m²K)	0.13	0.15
Pitched Cold Roof (W/m²K)	0.13	0.09
Skilling Ceilings (W/m²K)	0.13	0.15
Ground Floor (W/m²K)	0.13	0.12
Exposed Floor (W/m²K)	0.13	0.16
Front Door (W/m²K)	1.00	1.00
Windows (W/m²K)	1.40	0.80 (Triple Glazed)
Bi-Fold Doors (W/m²K)	1.40	1.50
Garage Personnel Door (W/m²K)	1.00	1.80
Roof Lantern (W/m²K)	1.40	1.30
Velux Windows (W/m²K)	1.40	1.30
Utility Door (W/m²K)	1.20	1.40
Other Opaque Doors (W/m²K)	1.00	1.40
Rooflights (W/m²K)	1.40	1.30
Air Tightness - m³/(hr/m²) @ 50pa	5.00	3.00
Thermal Bridging	0.15 W/(m²K)	Calculated at 0.052
Ventilation Type	Intermittent Extract Fans	System 4 – Mechanical Ventilation with Heat Recovery
Air-Conditioning	None	None
Heating System	Mains Gas Boiler 89.5% Efficient via Radiators (room sealed & fan assisted)	Mains Gas Boiler 89.7% Efficient via Underfloor Heating & Radiators (room sealed & fan assisted)
Heating Controls	Time & Temperature Zone Control w/c Weather Compensation	Full Time & Temperature Zonal Controls with a delayed start stat.
Hot Water	Via Main Heating System	Via Main Heating System
Secondary Heating	None	None

Low Energy Lighting	100%	100%
Thermal Mass Parameter	Medium = 250	Calculated at 134.54
Renewables	None	1.800kW Solar PV Array To West Elevation

7. Proposed Energy Strategy – Green Energy

After considering the above technologies, a choice has been made to use a Mains Gas Boilers for the heating and hot water along with a supplementation of Solar Photovoltaic (PV) Panels to meet the requirement of South Downs National Park's local plan and Sustainable Construction SPD checklist.

A Solar PV array will be added to being added to the west roof elevation for the new dwelling. The gas boiler will serve underfloor heating to the ground floor with radiators to the first & top floor. Intelligent time and temperature zonal controls will be used for the heating. An ErP "A Rated" cylinder will be used to satisfy the domestic hot water storage requirement.

Please see Appendix 1 for a full schedule of the DER/TER improvement for the property.

Renewables

A 1.80kW Solar PV array will be added to being added to the west roof elevation for the new dwelling. The Solar PV panels have been assumed to be located on the West elevation. A full overshading appraisal is to be conducted by an appropriate specialist to confirm the best elevation for the panels to be located on.

8. Electric Vehicle Charging

The client has committed to provide EV charging to the dwelling. The specification of the charger is currently unknown, however, it is likely to be installed within the new garage.

9. Waste

Within the kitchen, an internal bin will be provided to ensure waste segregation and collection can be provided in accordance with the local authorities requirements.

A compost bin is be provided within the garden.

10. Materials

The proposed development will strive to use high quality, low impact materials that will minimise the overall impact on the environment. All timber will be either FSC or PEFC sourced.

Best practice for sourcing insulations is to procure insulation with Zero Ozone Depletion Potential (ODP) and a Global Warming Potential (GWP) of <5. This will ensure the development reduce all possible risks the environment and atmosphere.

Other measuring ensuring where possible full chain of custody for materials and recognised Environment Management Systems (EMS) such as ISO14001 and BS8555 or BES6001 are included.

11. Water Usage Strategy

South Downs National Park's Local Plan requires that all new residential developments achieve a water consumption rate of less than 110 litres/person/day.

Water Efficient Measures

Internal water consumption will be significantly reduced from the national average of 125 litres per person per day set by building regulations. This will be done through the use of practical and hygienic water saving measures.

The client has committed to achieve a maximum water usage of 110 litres/person/day for this project in order to comply with the local authorities' requirements. A Part G Water Calculation has been produced for the dwelling. A copy of the Part G Water Calculation for this development can be found within Appendix 2. However it can be confirmed that the developer has committed to meet the specification detailed below which meets the water efficiency requirements set within the SPD:-

All Taps: 5 litres/minute
All Baths: 185 litres to overflow
All Showers (including over baths): 8 litres/minute
All Dishwashers: 1.25 litres/place/setting
All Washing Machines: 8.17 litres/kg dry load
All W/C's: 4/3 litres flushes
All Kitchen & Utility Taps: 8 litres/minute
No Waste Disposal Equipment Installed
No Water Softeners Installed

The proposed specification above will deliver 109.70 litres/person/day as seen in Appendix 2.

12. Adaption to Climate Change

It is understood that the developer is proposing SUD's for draining the hard surface area, please refer the engineers report for further information.

The inclusion of water efficient measure detailed in section 11, will reduce the mains water consumption for the development.

13. Conclusion

It can be seen from the results of Appendix 1, that the proposed specification detailed in Section 6 has the dwelling achieving a 19% improvement in DER/TER through energy efficiency measures as well as an additional 20% from low or zero carbon technologies.

We consider the proposed specification detailed in Appendix 1 and Section 6 of this report to be sufficient evidence that the development has incorporated a comprehensive set of energy efficiency and green energy measures.

This report accurately identifies the proposed construction and mechanical specification along with its performance for the scheme. This development will offer an energy efficient home in compliance with the South Downs National Park Sustainable Constriction SPD requirements.

In forming the project specification and this conclusion, most of the other renewable or low carbon technologies detailed within section 5 would be unfeasible for this site due to space requirements or large supply and install costs. Namely; Biomass Boilers, Ground Source Heat Pumps and Wind Turbines. Solar Hot Water panels would be viable however have been discounted due to Solar PV being a more efficient carbon reduction method. An Air Source Heat Pump was also considered but has been discounted at this point in time until a value engineering process from the client has been undertaken.

As detailed above, the client has committed to achieve a maximum water usage 110 litres/person/day. A copy of a Part G Water Calculation for this development can be found within Appendix 2.

Finally, detailed below is summary table of the issues detailed within Appendix 2 of the Sustainable Construction Supplementary Planning Document and how the client is evidencing the design stage requirements.

Issue	Requirement	Client Design Stage Evidence
Energy Efficiency	19% improvement of CO2 emissions: DER over TER in SAP data (or 39% overall)	BEAT Solutions Sustainability Statement Appendix 1 – SAP Calculation Summary
Green Energy	A further 20% improvement of CO2 emissions: DER over TER in SAP data (or 39% overall)	BEAT Solutions Sustainability Statement Appendix 1 – SAP Calculation Summary
Electric Vehicle Charging	All homes with on-plot or other suitable car parking to have EV charge point	EV chargers will be provided. Client & Architect to provide plan showing location and specification.

Waste	Separate internal bins in line with the recycling and waste collection policy of the local authority	Client & Architect to provide plan showing location and specification.
	Provide compost bin where private garden is in excess of 50m²	Client & Architect to provide plan showing location and specification.
Water Use	No more than 110 litres/person/day predicted mains water consumption	Water usage strategy provided within this report. See Appendix 2 for a copy of a water calculation for this development.

This report has been produced by:

Scott Spearing | Energy & Sustainability Specialist | BEAT Solutions
Accredited OCDEA Assessor

Other Services Include:-

Air Permeability Testing
Acoustic Testing
Ventilation Extract Testing & Commissioning (Part F)
SBEM Calculations
Renewables Statements
Daylight Calculations
Water Efficiency Calculations (Part G)

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APPENDIX 1: SAP Calculation Specification & Performance Summary

Appendix 1 - South Downs National Park - SAP Calculation Summary

Client Name: James Pollard

Project Name: 63 Princes Road, Petersfield

SAP Ref: SAP-1255

SAP Version: SAP 2012

DER/TER % Improvement Required: 19.0 %

Target FEE Score: None

Plot No.	SAP 2012						EPC Rating	Special Features		Solar PV*			Air Permeability Rating
	19% Improvement prior to L/ZCT		%	Add. 20% Improvement with L/ZCT		%		Wood Burner	Ventilation Type	No. Panels	kW Peak	Proposed Facing	
	DER	TER		DER	TER								
1	12.59	15.56	19.09	9.24	15.56	40.62	91B	✕	MVHR	6	1.80	West	3.00
-													
-													
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-													
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-													
-													
-													

Revision Date	04/11/2021
Revision Reference	Rev -
Revision Comments	Revisions for client and architects comment.

Fabric	External Walls	U-Value = 0.14	102.5 mm Brickwork, 125mm Xtratherm Cavity Therm Full Fill, 100mm Thermalite Shield Blockwork, 12.5mm plasterboard on dabs with skim finish.
	Garage Wall	U-Value = 0.20	Construction currently unknown, U-Value not to exceed 0.20 W/m²K.
	Ashlar Walls	U-Value = 0.16	100mm Celotex GA4000 between studs with 50mm Celotex GA4000 internally, 12.5mm plasterboard with skim finish.
	Ground Floor	U-Value = 0.12	Block & Beam Floor, 150mm Celotex XR4000, 75mm Screed.
	Exposed Floor	U-Value = 0.16	22mm Chipboard, 100mm Mineral Wool Insulation between joists, 25mm Celotex fixed to the underside, battens, finish to fire regs requirements.
	Pitched Cold Roof	U-Value = 0.09	450mm Mineral Wool Insulation to loft space.
	Flat Roof	U-Value = 0.15	130mm PIR insulation to flat warm roof scenario.
	Skilling Ceilings	U-Value = 0.15	120mm Celotex XR4000 between rafters, 50mm Celotex GA4000 fixed to the underside, 12.5mm plasterboard with skim finish.
Openings	Front Door	U-Value = 1.00	U-Value not exceed 1.00 Wm²K.
	Windows	U-Value = 0.80	U-Value not exceed 0.80 Wm²K. Based on Triple Glazed.
	Bi-Fold Doors	U-Value = 1.50	U-Value not exceed 1.50 Wm²K. Based on Double Glazed.
	Garage Personnel Door	U-Value = 1.80	U-Value not exceed 1.80 Wm²K.
	Roof Lantern	U-Value = 1.30	U-Value not exceed 1.30 Wm²K. Based on Double Glazed.
	Velux Windows	U-Value = 1.30	U-Value not exceed 1.30 Wm²K. Based on Double Glazed.
	Utility Door	U-Value = 1.40	U-Value not exceed 1.40 Wm²K. Based on Double Glazed.
HW & Heating	Heating System		Currently based on a Worcester Greenstar 18i Mains Gas System Boiler (PCDB Number: 17485). ***Any change to this system is to be run by BEAT Solutions to ensure compliance with the project requirements is still met.***
	Emitter Type		Underfloor hearing to the ground floor with radiators to the first & top floor.
	Controls		Full time and temperature zone controls with delay start stat.
	Cylinder Size		Full Specification to be confirmed by a specialist. Assumed a 250 litre cylinder. ***Specialist to confirm this before any design is finalised.***
	Standing Loss		Full Specification to be confirmed by a specialist. Assumed a loss of 2.25 kwh\day. ***Specialist to confirm this before any design is finalised.***
	Secondary Heating		None currently specified.
Misc.	Thermal Bridging		Calculated using Accredited Construction Details with the use of Xtratherm Enhanced Thermal Bridging Details.
	Ventilation Type		System 4 - Continuous mechanical supply and extract with heat recovery (MVHR). Currently based on a Zehnder ComfoAir Q350 system (PCDB Number: 500480).
	Renewables*		1.80kW Solar PV to be installed on the front roof elevation.
	Lighting		100% low energy lighting throughout.
	Showers		Non Electric only.
	Water Usage		Water usage not to exceed 110 litres/person/day.
	Other		-

* kW Peak from proposed PV tiles/panels to be confirmed by specialist engineer taking into account site specific facings, overshading and elevations.

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APPENDIX 2: Part G Water Efficiency Calculation

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DESIGN STAGE WATER EFFICIENCY CALCULATION REPORT

FOR

JAMES POLLARD

AT

PLOT 1
63 PRINCES ROAD
PETERSFIELD
HAMPSHIRE
GU32 3BH

1. Executive Summary

This report has been produced by BEAT Solutions Ltd on 3rd November 2021 for James Pollard to demonstrate compliance with Building Regulation Part G Regulation 17K. This report confirms the water usage for the dwelling to be 109.7 litres/person/day.

2. Introduction

BEAT Solutions have been instructed to calculate the predicted water usage for the dwelling based on the proposed specification. This report has been produced by Sophie Pinnick.

The methodology used to calculate the water usage is the national approved BRE water efficiency calculation procedure.

A copy of this report should be submitted to the Building Control Officer within 24hrs.

3. Proposed Water Fittings Specification

James Pollard hasn't completed a schedule to confirm the water usage fixtures and fittings. Therefore this calculation is based on an assumed water usgae target for each of the fitting types.

4. Compliance Summary

BEAT Solutions Ltd hasn't received sufficient information from the client to enable the internal water usage to be calculated. Therefore this calculation is based on an assumed water usgae target for each of the fitting types. The schedule below confirms these target figures would achieve the followina:-

Plot Type:	Detached House
Targeted Water Usage:	110.00 litres/person/day
Proposed Water Usage:	109.70 litres/person/day
Building Reg Compliant:	Yes
Planning Requirement:	110.00 litres/person/day
Planning Compliant:	Yes

5. Note To Developer/Builder

Please ensure a copy of this specification is given to your architect, kitchen and bathroom designers and the specified flow rates / capacities detailed within this report are included on all drawings and specifications. It is the clients responsibility to ensure these flow rates & capacities aren't exceeded when purchasing any fixtures, fittings or appliances. IF IN DOUBT ASK!

Plot / Address	Plot 1, 63 Princes Road, Petersfield, Hampshire, GU32 3BH,					Our Reference	WAT-0420/PLOT 1
No. of Bedrooms	4	**Plot/House No.**	Plot 1	**Plot Type**	Detached House	Occupancy rate for Calculation Purposes	5

Basin Taps	**Flow Rate**	**Quantity**
Fitting Type	**Litres/Min**	**(No.)**
Flow Rate Not to Exceed (5l/min)	5.00	3
Total No. of Fittings (No.)		**3**
Total Flow (l/s)		15.00
Maximum Flow (l/s)		5.00
Average Flow (l/s)		5.00
Weighted Average Flow (l/s)		3.50
Flow for Calculation (l/s)		**5.00**

Showers	**Flow Rate**	**Quantity**
Fitting Type	**Litres/Min**	**(No.)**
Flow Rate Not to Exceed (8l/	8.00	1
Total No. of Fittings (No.)		**1**
Total Flow (l/s)		8.00
Maximum Flow (l/s)		8.00
Average Flow (l/s)		8.00
Weighted Average Flow (l/s)		5.60
Flow for Calculation (l/s)		**8.00**

Bath	**Capacity to**	**Quantity**
Type	**Overflow**	**(No.)**
Capacity Not to Exceed (185L)	185.00	1
Total No. of Fittings (No.)		**1**
Total Capacity (l)		185.00
Maximum Capacity (l)		185.00
Average Capacity (l)		185.00
Weighted Average Capacity (l)		129.50
Capacity for Calculation (l)		**185.00**

W/C	**Full Flush**	**Part Flush**	
Type	**Volume**	**Volume**	**Quantity (No)**
Flow Rate Not to Exceed (4/3	4.00	3.00	3
Total number of fittings			**3**
Average effective flushing volume			**3.33**

Dishwasher	**L per Place**	**Quantity**
Type	**Setting**	**(No.)**
l/p/s		
Total No. of Fittings (No.)		**0**
Total Consumption (l)		1.25
Maximum Consumption (l)		1.25
Average Consumption (l/s)		1.25
Weighted Average Consumption (l)		0.88
Consumption for Calculation (l/s)		**1.25**

Washing Machine	**L per Kg**	**Quantity**
Type	**Dry Load**	**(No.)**
(l/kg)		
Total No. of Fittings (No.)		**0**
Total Consumption (l)		8.17
Maximum Consumption (l)		8.17
Average Consumption (l/s)		8.17
Weighted Average Consumption (l)		5.72
Consumption for Calculation (l/s)		**8.17**

Kitchen & Utility Taps	**Flow Rate**	**Quantity**
Type	**Litres/Min**	**(No.)**
Flow Rate Not to Exceed (8l/min)	8.00	2
Total No. of Fittings (No.)		**2**
Total Flow (l/s)		16.00
Maximum Flow (l/s)		8.00
Average Flow (l/s)		8.00
Weighted Average Flow (l/s)		5.60
Flow for Calculation (l/s)		**8.00**

Waste Disposal Y/N	N
Water Softner	
Consumption beyond 4% l/p/d	
Grey water and harvested rainwater	
Total Grey water from WHB taps (l)	
Total Availble Grey Water Supply (l)	276.55
Possible Demand (l)	159.45
Grey/Rain Installed Capacity (l)	
Figure for Calculation lit/person/day	0.00

Water Use Assessment

Installation Type	Unit	Capacity/ Flow Rate	Use Factor	Fixed use (l/p/day)	**Total Use (l/p/day)**	
WC Single Flush	Volume (l)	0.00	4.42	0.00	0.00	
WC Dual Flush	Full Flush (l)	0.00	1.46	0.00	0.00	
	Pt Flush (l)	0.00	2.96	0.00	0.00	
WC's (Multiple)	Volume (l)	3.33	4.42	0.00	14.73	
Taps Exc. Kitchen	Flow Rate	5.00	1.58	1.58	9.48	
Bath (shower present)	(l/s)	185.00	0.11	0.00	20.35	
Shower (bath present)	(l/s)	8.00	4.37	0.00	34.96	
Bath Only	(l)	0.00	0.50	0.00	0.00	
Shower Only	(l/s)	0.00	5.60	0.00	0.00	
Kitchen Taps	(l/s)	8.00	0.44	10.36	13.88	
Washing Machines	(l/kgdry)	8.17	2.10	0.00	17.16	<< Note - these are default values.
Dishwashers	(l/place)	1.25	3.60	0.00	4.50	<< Note - these are defualt values.
Waste Disposal	(l/s)	0.00	3.08	0.00	0.00	
Water Softner	(l/s)	0.00	1.00	0.00	0.00	
				Total Calculated Water Use (l/p/day)	**115.06**	
				Grey/RainWater Reused (l)	0.00	
				Normalisation Factor	0.91	
				Total Consumption CSH (l/p/day)	**104.70**	
				External Water Use Allowance (l)	5.00	
				Total Comsumption Part G (l/p/day)	**109.70**	
				Assesment Result	**PASS**	

APPENDIX 3: Thermal Bridging Sheets

Linear Thermal Transmittance (Ψ) and Temperature Factor (f)

Technical Services from Xtratherm

Technical competency

The PSI value analysis has been undertaken by fully accredited BRE competent persons to EN 10211: 2007 and BR497. Our Xtratherm Technical team are qualified under the BBA calculation competency scheme CS/1006 to produce thermal and condensation calculations.

Certificate No
XT-FF- E3-XT-WDC-04-0015

Date
01-Aug-12

Calculation prepared by Xtratherm Technical Services
Source www.xtratherm.com

General Construction Specification

Wall

Plasterboard on Dabs
Lightweight block inner leaf (0.15)
Xtratherm CT/PIR (CavityTherm)
Brick outer leaf
Proprietary cavity closer

General Construction Specification

U value Range

0.12 W/m2 K to 0.20 W/m2 K

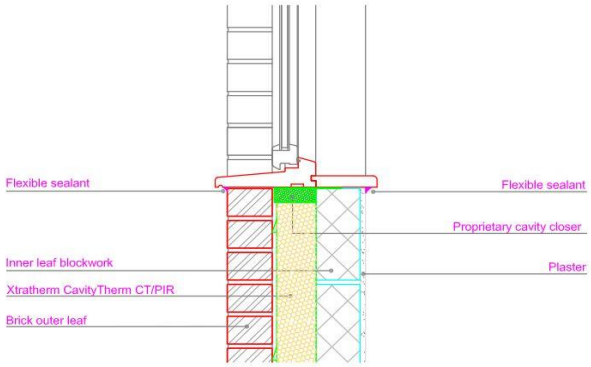
Description

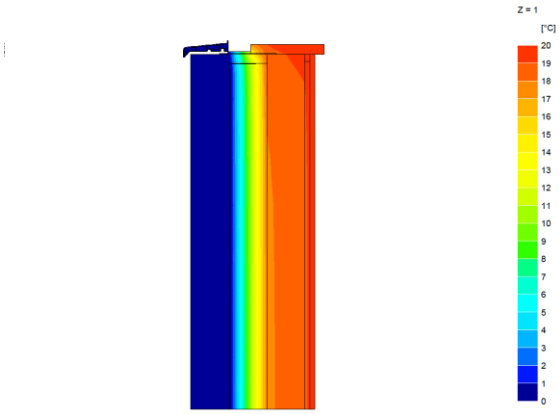
Sill with Proprietary cavity closer (Checked)

Reference

MCI-WD-04

Junction Detail





Linear Thermal Transmittance W.m.K

Ψ = **0.03**

Table K1 (Accredited)
0.04

Temperature Factor (for humidity and mould)

f = **0.88**

IP1/06 (Default)
0.75

Notes

Calculations are based on accredited construction detail MCI-WD-04

Notes: Calculations are based on a variation of accredited construction detail MCI-WD-04

- Ψ and *f* are only valid for the detail drawn and described above
- Calculations have been carried out in accordance with the following standards and guidance documents where relevant
- EN ISO 10211 2007
- EN ISO 13370 2007
- EN ISO 6846 2007
- BR 497
- BR 443
- BRE IP1/06

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Specification Clauses

Thin-R CT/PIR Full Fill Cavity-Wall

The built in full fill cavity wall insulation shall be Xtratherm Thin-R CT/PIR manufactured to BS EN 13165:2008 by Xtratherm, comprising a CFC/HCFC free rigid Polyisocyanurate (PIR) core between low emissivity foil facings with engineered HIPS outer skin. The CT/PIR_ _ _mm with a BBA certified Lambda value of 0.021 W/mK to achieve a U value of __ _ _W/m2K for the wall element. To be installed in accordance with instructions issued by Xtratherm.
Xtratherm PIR achieves an A+ rating under the BRE Green Guide.
Refer to NBS clause F30 151, F30 12

Insulation
Polyisocyanurate Rigid foam

Standard
BS EN 13165:2008

Certification
BBA Certification No. 10/4786.
Issue date: 31 March 2011
BS EN ISO 9001 Quality Management System
BS EN ISO 14001 Environmental Management System
BS OHSAS 18001 Health and Safety Management System

Manufacturer UK
Xtratherm UK Limited, Holmewood Industrial Park,
Holmewood Chesterfield, Derbyshire, S42 5UY.
Tel: 0371 222 1033. Fax: 0371 222 1044.
Email: info@xtratherm.com Web: www.xtratherm.com

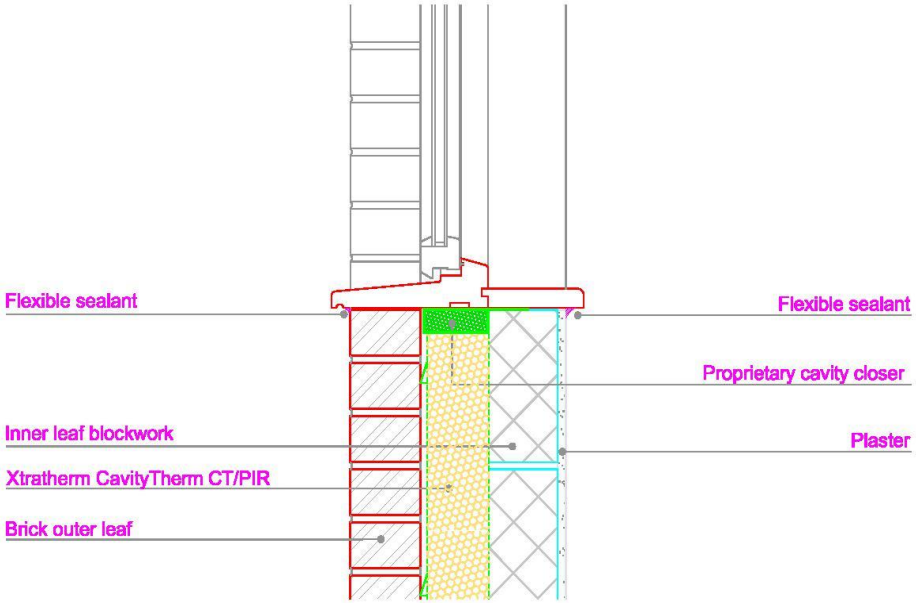
Product reference
Thin-R CT/PIR Full Fill Cavity-Wall

Face size
1200 x 450 mm

Edge profile
Rebated all four edges

Thickness
75 mm / 90 mm / 100 mm / 125 mm / 150mm

Manufacturer Ireland
Xtratherm Limited, Kells Road, Navan,
County Meath, Ireland.
Tel: 04690 66000. Fax: 04690 66090.
Email: info@xtratherm.com Web: www.xtratherm.com



Window cill. With Proprietary cavity closer (Checked)
SCALE 1:10

ACD REF	MCI-WD-04
REFERENCE	XT-FF-E3-MCI-WDC-04
SCALE	As noted at A4
REVISION	-
DATE	June 2013

Xtratherm®

Linear Thermal Transmittance (Ψ) and Temperature Factor (f)

Technical Services from Xtratherm

Technical competency

The PSI value analysis has been undertaken by fully accredited BRE competent persons to EN 10211: 2007 and BR497. Our Xtratherm Technical team are qualified under the BBA calculation competency scheme CS/1006 to produce thermal and condensation calculations.

Certificate No XT-FF-E4-MCI-WD-06-0015

Date 01-Aug-13

Calculation prepared by Xtratherm Technical Services

Source www.xtratherm.com

General Construction Specification

Wall

Plasterboard on Dabs

Lightweight block inner leaf (0.15)

Xtratherm CT/PIR (CavityTherm)

Brick outer leaf

Proprietary cavity closer

General Construction Specification

U value Range

0.12 W/m2 K to 0.20 W/m2 K

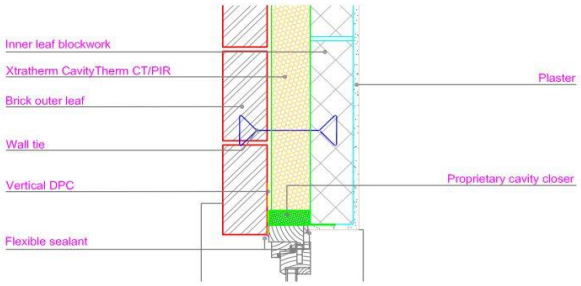
Description

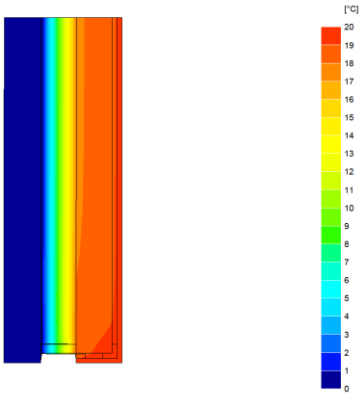
Jamb with Proprietary cavity closer (Checked)

Reference

MCI-WD-06

Junction Detail





Linear Thermal Transmittance W.m.K

Ψ = **0.01**

Table K1 (Accredited)

0.05

Temperature Factor (for humidity and mould)

f = **0.96**

IP1/06 (Default)

0.75

Notes

Calculations are based on accredited construction detail MCI-WD-06

Notes:

- Ψ and *f* are only valid for the detail drawn and described above
- Calculations have been carried out in accordance with the following standards and guidance documents where relevant
- EN ISO 10211 2007
- EN ISO 13370 2007
- EN ISO 6846 2007
- BR 497
- BR 443
- BRE IP1/06

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Linear Thermal Transmittance (Ψ) and Temperature Factor (f)

Xtratherm
More than insulation

Specification Clauses

Thin-R CT/PIR Full Fill Cavity-Wall

The built in full fill cavity wall insulation shall be Xtratherm Thin-R CT/PIR manufactured to BS EN 13165:2008 by Xtratherm, comprising a CFC/HCFC free rigid Polyisocyanurate (PIR) core between low emissivity foil facings with engineered HIPS outer skin. The CT/PIR_ _ _mm with a BBA certified Lambda value of 0.021 W/mK to achieve a U value of __ _ _W/m2K for the wall element. To be installed in accordance with instructions issued by Xtratherm.
Xtratherm PIR achieves an A+ rating under the BRE Green Guide.
Refer to NBS clause F30 151, F30 12

Insulation
Polyisocyanurate Rigid foam

Standard
BS EN 13165:2008

Certification
BBA Certification No. 10/4786.
Issue date: 31 March 2011
BS EN ISO 9001 Quality Management System
BS EN ISO 14001 Environmental Management System
BS OHSAS 18001 Health and Safety Management System

Manufacturer UK
Xtratherm UK Limited, Holmewood Industrial Park,
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Tel: 0371 222 1033. Fax: 0371 222 1044.
Email: info@xtratherm.com Web: www.xtratherm.com

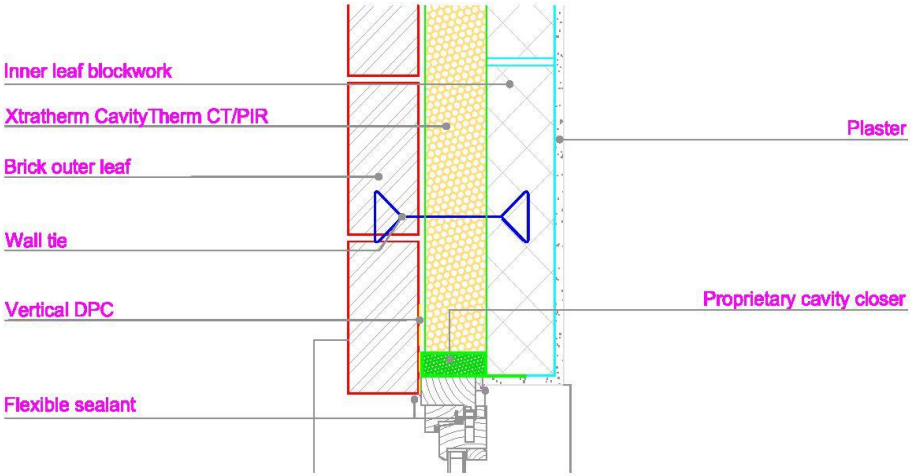
Product reference
Thin-R CT/PIR Full Fill Cavity-Wall

Face size
1200 x 450 mm

Edge profile
Rebated all four edges

Thickness
75 mm / 90 mm / 100 mm / 125 mm / 150mm

Manufacturer Ireland
Xtratherm Limited, Kells Road, Navan,
County Meath, Ireland.
Tel: 04690 66000. Fax: 04690 66090.
Email: info@xtratherm.com Web: www.xtratherm.com



Jamb with checked reveal and Cavity Closer
SCALE 1:10

ACD REF	
REFERENCE	XT-FF-E4-MCI-WD-06
SCALE	As noted at A4
REVISION	-
DATE	JUNE 2013

Xtratherm®

Linear Thermal Transmittance (Ψ) and Temperature Factor (f)

Technical Services from Xtratherm

Technical competency

The PSI value analysis has been undertaken by fully accredited BRE competent persons to EN 10211: 2007 and BR497. Our Xtratherm Technical team are qualified under the BBA calculation competency scheme CS/1006 to produce thermal and condensation calculations.

Certificate No
XT-FF-E6-MCI-IF-02-0015

Date
01-Aug-12

Calculation prepared by Xtratherm Technical Services
Source www.xtratherm.com

General Construction Specification

Wall

Plasterboard on Dabs
Lightweight block inner leaf (015)
Xtratherm CT/PIR (CavityTherm)
Brick outer leaf

General Construction Specification

Floor

Timber floor
Timber joists
Plasterboard

U value Range

Wall 0.12 W/m2 K to 0.20 W/m2 K

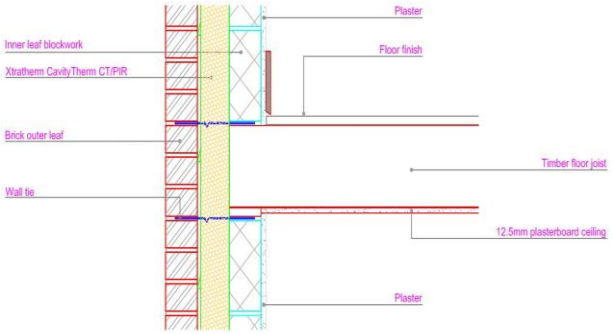
Description

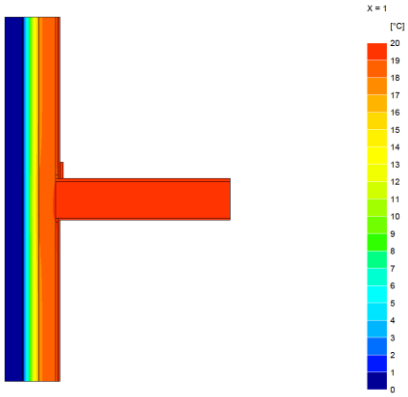
Intermediate timber floor within dwelling

Reference

MCI-IF-02

Junction Detail





Linear Thermal Transmittance W.m.K

Ψ = **0.00**

Table K1 (Accredited)
0.07

Temperature Factor (for humidity and mould)

f = **0.98**

IP1/06 (Default)
0.75

Notes

Calculations are based on accredited construction detail MCI-IF-02

Notes:

- Ψ and *f* are only valid for the detail drawn and described above
- Calculations have been carried out in accordance with the following standards and guidance documents where relevant
- EN ISO 10211 2007
- EN ISO 13370 2007
- EN ISO 6846 2007
- BR 497
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Specification Clauses

Thin-R CT/PIR Full Fill Cavity-Wall

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Xtratherm PIR achieves an A+ rating under the BRE Green Guide.
Refer to NBS clause F30 151, F30 12

Insulation
Polyisocyanurate Rigid foam

Standard
BS EN 13165:2008

Certification
BBA Certification No. 10/4786.
Issue date: 31 March 2011
BS EN ISO 9001 Quality Management System
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Manufacturer UK
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Email: info@xtratherm.com Web: www.xtratherm.com

Product reference
Thin-R CT/PIR Full Fill Cavity-Wall

Face size
1200 x 450 mm

Edge profile
Rebated all four edges

Thickness
75 mm / 90 mm / 100 mm / 125 mm / 150mm

Manufacturer Ireland
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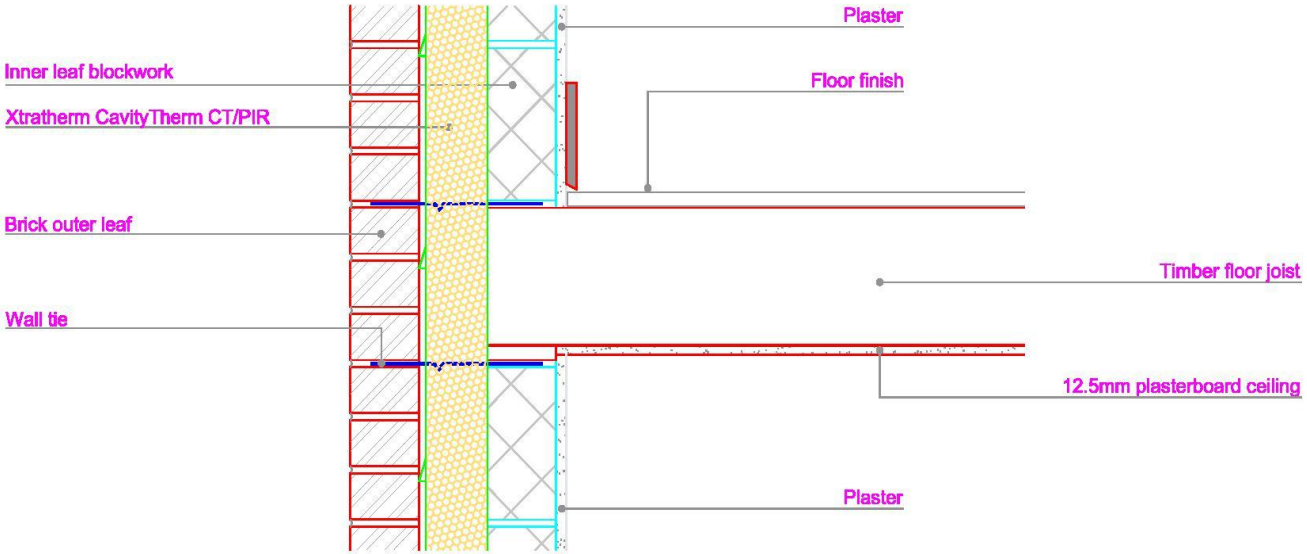
Tel: 04690 66000. Fax: 04690 66090.
Email: info@xtratherm.com Web: www.xtratherm.com



Intermediate floor with timber joists
SCALE 1:10

ACD REF	
REFERENCE	XT-FF-E6-MCI-IF-02
SCALE	As noted at A4
REVISION	-
DATE	JUNE 2013

Xtratherm®