SuperHomes

Adrian Pickering



Owners: J Adrian Pickering

House Type: Detached, chalet-style house built ca 1937, extended in 1984 and 2009 with two floors totalling 122sqm and a loft area.

Carbon Saving: 60%



Installed Measures:

About

The Network

- · Cavity wall insulation (original house and extension)
- Attic insulation (370mm fibreglass)
- Fully double-glazed

SuperHomes

DEFRA-approved woodburning stove (5kW)

Rating

Community

Events

- PV panels (2.35kWp)
- Battery storage (7.2kWh)
- Solar thermal water heating
- Fully LED lit
- Energy-efficient appliances
- · Modern condensing gas boiler with Nest thermostats
- · Well- and rainwater reuse (toilet flushing and washing machines)
- · Sun-tunnel interior lighting
- Passive stack ventilation (PSV) in bathrooms and kitchen
- · Remote monitoring and control

Owners Pr

Property Measures

I have been an academic electronic engineer all my working life. Having retired from university service, I was concerned to make my reduced income go as far as it can. Since a child, I was always concerned that a lifestyle relying on fossil fuels was unsustainable. Now I had the time and skills to work on minimising the use of these finite resources.

The 'green' systems were designed to permanently reduce the recurring costs of non-renewable energy supplies and water/sewerage. Each measure has a viable business case, though the payback can be 10-20 years. The measures also happen to permanently reduce my carbon impact on the environment.



Highfield Church Centre, Highfield Lane, SO17 1RL

Energy Saving in the Home

Insulation, Insulation, Insulation

Wednesday Sept 28th 7pm

Improving The Performance Of Your Home

Adrian Pickering.

- Why insulate, the facts (before considering heat pumps)
- What is wrong with the legacy housing stock
- Evidence from local IR surveys and experience
- Doing your own investigations
- Making a plan to cut your upcoming and enduring costs/carbon





Energy Performance Certificate



8704-6826-7200-2494-8902

RdSAP, existing dwelling

£ 2,073

122 m²

https://www.gov.uk/find-energy-certificate

15, Hilldown Road, SOUTHAMPTON, SO17 1SX

Dwelling type:	Detached house	Reference number:
Date of assessment:	04 June 2014	Type of assessment:
Date of certificate:	21 July 2014	Total floor area:

Use this document to:

Compare current ratings of properties to see which properties are more energy efficient

Estimated energy costs of dwelling for 3 years:

Estimated energy cos	sts of this home		
Lotinated energy cos			
	Current costs	Potential costs	Potential future savings
Lighting	£ 195 over 3 years	£ 195 over 3 years	
Heating	£ 1,638 over 3 years	£ 1,638 over 3 years	Natarriashis
Hot Water	£ 240 over 3 years	£ 240 over 3 years	ivot applicable
Totals	£ 2,073	£ 2,073	

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



The graph shows the current energy efficiency of your

The higher the rating the lower your fuel bills are likely

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

Your charges in deta	il				
4 Electricity	Supply number	S	1	801	100
•				20000231764	144
Supply Address: 15 Hilldo	wn Road, Southamptor	n, SO17	1SX		
Next Flex (7th August 202	22 - 6th September 202	22)			
Energy Charges for Meter	21L3636569				
7th Aug 2022	1096.4 Smart mete	1096.4 Smart meter reading			
7th Sep 2022	1137.0 Customer reading				
Energy Used	40.6 kWh @ 27.10p/kWh £1			£10.99	
Standing Charge	31 days @ 41.328p/day				£12.81
Subtotal of charges befor	e VAT				£23.80
VAT @ 5%					£1.19
Total Electricity Charges					£24.99

🚫 Gas	3931052401				
Supply Address: 15 Hilldown Road, Southampton, SO17 1SX					
Next Flex (7th August 202	22 - 6th September 2022)				
Energy Charges for Meter	E6E00733992020				
7th Aug. 2022	436.0 Smart meter reading				
7th Sept. 2022	438.0 Customer reading				
Consumption	2.0 Units (m ³)				
Energy Used*	22.4 kWh @ 7.123p/kWh	£1.59			
Standing Charge	31 days @ 25.923p/day	£8.04			
Subtotal of charges before VAT					
VAT @ 5%		£0.48			
Total Gas Charges £10					
Total charges before V	£33.43				
Total VAT		£1.67			
Total charges for bill £35.1					

Your electricity tariff Prices do not include VAT unless otherwise noted.					
Tariff Name	Next Flex				
Product Type	Variable				
Payment Method	Direct Debit				
Unit Rate	27.100p/kWh				
Standing Charge	41.328p/day (£150.85/year)				
Price Guaranteed Until	Not applicable				
Early Exit Fee	None				
Estimated Annual Usage	790.7 kWh				

Your gas tariff

Prices do not include VAT unless otherwise noted.
Gas
Tariff Name Next Flex
Product Type Variable

 Product Type
 Variable

 Payment Method
 Direct Debit

 Unit Rate
 7.123p/kWh

 Standing Charge
 25.923p/dat

 Price Guaranteed Until
 Not applic

 Early Exit Fee
 None

 Estimated Annual Usage*
 5233 kWh

2/year)

Total Energy consumption per year: = 790.7 + 5233 = 6023.7 kWh pa



Consumption per unit area: = 6023.7/122 = 49.4 kWh/m² pa



Figure 3 Average home heat loss over five hours (20C) internal temperature, OC external) 2020



Source: Institute for Government analysis of Tado, user survey, 2020.

From:



Tackling the UK's energy efficiency problem

What the Truss government should learn from other countries Rosa Hodgkin and Tom Sasse

The UK's progress has stalled in the last decade

As recently as 10 years ago, the UK was hitting more than two million annual installations of loft and cavity wall insulation. But in the last decade rates of installations under government schemes have collapsed due to a string of bad policy decisions.



Figure 6 UK home energy efficiency improvements 2010–2020

Source: Institute for Government analysis of Climate Change Committee, Progress in reducing emissions – 2021 report to parliament, charts and data, June 2021.







HM Government The Building Regulations 2010 **Conservation of** fuel and power **APPROVED DOCUMENT Volume 1: Dwellings** Requirement L1: Conservation of fuel and power Requirement L2: On-site generation of electricity Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26A, 26C, 27, 27A, 27C, 28, 40, 40A, 43, 44 and 44ZA 2021 edition – for use in England

2021 edition

Retrofit standards from 15 June 2022:

Table 4.2 Limiting U-values for new fabric elements in existing dwellings

Element type	Maximum U-value ⁽¹⁾ W/(m²·K)		
Roof ⁽²⁾	0.15		
Wall ⁽²⁾⁽³⁾	0.18		
Floor ⁽⁴⁾⁽⁵⁾	0.18		
Swimming pool basin ⁽⁶⁾	0.25		
Window ⁽⁷⁾⁽⁸⁾⁽⁹⁾	1.4 or Window Energy Rating ⁽¹⁰⁾ Band B minimum		
Rooflight ⁽¹¹⁾⁽¹²⁾	2.2		
Doors with >60% of internal face glazed ⁽¹³⁾	1.4 or Doorset Energy Rating ⁽¹⁰⁾ Band C minimum		
Other doors ⁽¹³⁾⁽¹⁴⁾	1.4 or Doorset Energy Rating ⁽¹⁰⁾ Band B minimum		

NOTES:

- 1. Area-weighted average values, except for windows, doors, roof windows and rooflights.
- 2. For dormer windows, 'roof' includes the roof parts of the windows and 'wall' includes the wall parts (cheeks).
- 3. If meeting such a standard would reduce the internal floor area of the room bounded by the wall by more than 5%, a lesser provision may be appropriate.
- 4. If meeting such a standard would create significant problems in relation to adjoining floor levels, a lesser provision may be appropriate.
- 5. The U-value of the floor of an extension may be calculated using the exposed perimeter and floor area of the whole enlarged dwelling.

This approved document supports Part L of Schedule 1 to the Building Regulations 2010.

This approved document takes effect on 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building is started before 15 lune 2023. Full detail of the transitional

CONCRETE BLOCK ASSOCIATION https://www.cba-blocks.org.uk/u-value-calculator/ HOME ABOUT US TECHNICAL

Note that the

2022 standard is 0.18W/m²K !!

HOME ABOUT US TECHNICAL SUPPORT SECTORS MEMBERS CONTACT US

U-value Calculator for Cavity Walls		1930s–1960s Brick	
+ How it works		2" Cavity	
		Concrete block	
Calculating the U-value of a cavity masonry wall construction		Plaster	
no render v this	ckness: 0	mm conductivity:	0 W/m?K
no external insulation v	ckness: 0	mm conductivity:	0 W/m?K
brick outer leaf v this	ckness: 102	mm conductivity:	0.77 W/m?K
cavity fully filled with mineral wool 0.042 W/m?K v residual cavity (if any):	mm resistance of residual cavity:	m ² K/W
cavity insulation this	ckness: 50	mm ? insul. conductivity:	0.042 W/m?K
brick inner leaf ~ this	ckness: 102	mm conductivity:	0.56 W/m?K
dense plaster v	ckness: 13	mm resistance:	0.023 m ² K/W
The user may adjust the above materials and thicknesses in the wall construction U-value of wall 0.59 W/m ² K (including corrections for air gaps and wall ties); Thickness of wall is 267 mm Adjustment for air gaps is 0.0000 W/m ² K; Adjustment for wall ties is 0.0021 W/m ² K; K- value of wall is 167.400 kJ/m ² K (thermal mass)			

Summary of the U-value calculation

Layer	Thickness (mm)	Conductivity (W/m.K)	Resistance (m ² V/W)			
External surface	-	-	0.040	20)°C	
Outer leaf	102	0.77	0.132, 0.132			
Cavity insulation	50	0.042	1.190		ido	
Inner leaf	102	0.56	0.182, 0.182		lue	
Internal finish	13	R = 0.02	0.023			
Internal surface	-	-	0.130	0°C		
Total thickness	267	-				
-						
U-value, prior to any corrections for wall ties and air gaps : 0.589W/m ² K						
Total cavity width	(including insula	tion): 50 mm				
Area of wall ties: 6	5.2 mm ²			Giving temperature profile for		
Wall ties per square metre: $2.5 / m^2$		old style filled south wall section				
Conductivity of wall ties: 17 W/m?K			old-style, filled cavity wall section			
Adjustment for air	gaps: 0.0000 W/	m ² K				
Adjustment for wall ties: 0.0021 W/m ² K						
U-value of the wa	ll, including any	adjustments for wall	ties and air gaps: 0.5	9 W/m²K (0.591 W/m ² K)		

Summary of the thermal mass (K-value) calculation

	Thickness(mm)	Density(kg/m ³)	Spec.ht.capacity(J/kg.K)	Thermal mass(kJ/m ² K)
Innermost layer	13	1500	1000	19.500
Inner leaf masonry	89	1700	1000	151.300

Thermal mass value (K-value): 167.400 kJ/m²K

Note: Only materials within 100 mm of the internal surface may contribute to the thermal mass. Note: Only materials to the internal side of any insulation layer may contribute to the thermal mass.

Delete this summary and create new calculation

Internal Wall Insulation (IWI) within a Listed building using wood fibre boards

Courtesy: **BACKTOEARTH** Building Performance Specialists

Wallrock Thermal Liner energy savin trust listed

https://www.anaglypta.co.uk/our-

papers/style/foundations/item/wallrock-thermal-liner-kv600

Technical Data Sheet

Product Description

Manufacturer

Erfurt & Sohn KG Hugo-Erfurt-Straße 1 42399 Wuppertal www.erfurt.com

Product designation

ERFURT KlimaTec Pro KV 600

Raw materials/Manufacture

ERFURT KlimaTec Pro KV 600 is a 4 mm thick smooth energy-saving interior wall covering, which is produced as a 2-component composite product from special textile fibres.

Product data

- Order no. 501
- · Roll dimensions: 15.00 m long x 1.00 m wide
- · Carton content: 1 roll
- · Weight: approx. 600 g/m²
- · Edge-cut and film-wrapped

Product characteristics

- · Energy-saving interior wall covering
- Perceptibly faster warming up of rooms
- Aids composite insulation systems
- Sound-absorbing
- Mould-inhibiting
- · Optimum base surface for wallpaper
- · Its water vapour permeability conforms to DIN 52615, corresponding
- to a diffusion-equivalent air layer thickness of 0.02 m
- $\cdot\,$ Conforms to DIN 4102-B2 "normal flammable building materials"
- $\cdot\,$ PVC-, softener- and solvent-free
- $\cdot \,$ No addition of heavy metal compounds or formal dehyde
- · Dimensionally stable and covers over cracks

Spot IWI: PIR board behind radiator

External wall insulation (Findhorn)

Comfort problem in a bedroom: temporary IWI fix

You don't need special equipment to spot heat loss!

Installing 'forgotten roof' insulation within a bay window.

No insulation at all before! Radiator immediately below! The old roof was rebuilt some years later with other works.

100mm Concrete

Earth

Concrete slab - 1963-90

From:

1930's suspended floor refurbishment

Source: Energy Efficiency and Historic Buildings, English Heritage 2011.

See also "Double Glazing In Listed Buildings" report for The City of Edinburgh Council, July 2010: https://www.changeworks.org.uk/sites/default/files/Double_Glazing_in_Listed_Building.pdf

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https://lcon.org.uk/

Your plan?

- Get a cheap, independent assessment by getting an EPC done.
- Know your house better. Find out how it is built and what you might be able to improve.
- Get an IR thermometer and use it to explore your walls, floors and ceilings from the inside on cold mornings. You may be surprised!
- Explore the options e.g. browse the 'Home Insulation Manual'.
- Concentrate on the 'big' issues ones that are going to make an impact on (a) your energy consumption and (b) best value-for-money comfort.
- It may cost to save and it may be disruptive. Plan now, execute when the weather permits, which may be Spring/Summer.

Questions?

