elmhurst energy systems

SAP Calculations

Client:

Project: Customized Project 1
Customized Project 2

Contact: Andrew Allison
Ryland Design Services Ltd
andrew@rylanddesign.co.uk

energy rating made easy

Building Regulation Compliance

Property Reference: 000150
Survey Reference: 001
Property: Plot 4, Kirby Hall, The Hill, Kirkby in Ashfield, Nottinghamshire, NG17 8JR

Issued on Date: 03.Oct.2014
Prop Type Ref:

SAP Rating:	85 B	**CO2 Emissions (t/year):**	1.56	**DER:** 15.82 Pass	**TER:** 16.01	**Percentage DER<TER:**	1.21 %
Environmental:	87 B	**General Requirements Compliance:**	Pass	**DFEE:** 42.03 Pass	**TFEE:** 47.61	**Percentage DFEE<TFEE:**	11.71 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Andrew Allison, Tel: 01673860100 Surveyor ID: 1276-0001
Address: Lincoln Road , Welton, Lincoln, Lincolnshire, LN2 3PZ
Client: Marshgate Properties , 4

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 2.01r14
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Dwelling As Designed

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	16.01 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	15.82 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.61 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	42.03 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.26 (max. 0.30)	0.28 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.12 (max. 0.25)	0.12 (max. 0.70)	OK
Roof	0.12 (max. 0.20)	0.15 (max. 0.35)	OK
Openings	1.33 (max. 2.00)	1.50 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	3.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from manufacturer ? ? Combi boiler Efficiency: 90.1% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	
Boiler interlock	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (East Pennines):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing East:	7.28 m^2, No overhang	
Windows facing West:	8.39 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Roof U-value	0.08 W/m^2K
Floor U-value	0.12 W/m^2K
Air permeability	3.0 m^3/m^2h

Predicted Energy Assessment

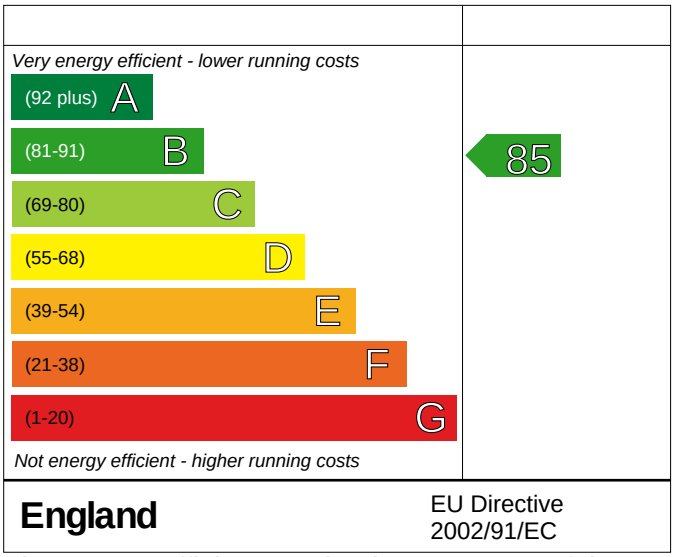
Plot 4, Kirby Hall, The Hill,
Kirkby in Ashfield,
Nottinghamshire,
NG17 8JR

Dwelling type:	House, Semi-Detached
Date of assessment:	03.Oct.2014
Produced by:	Ryland Design Services Ltd
Total floor area:	107.5 m^2

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

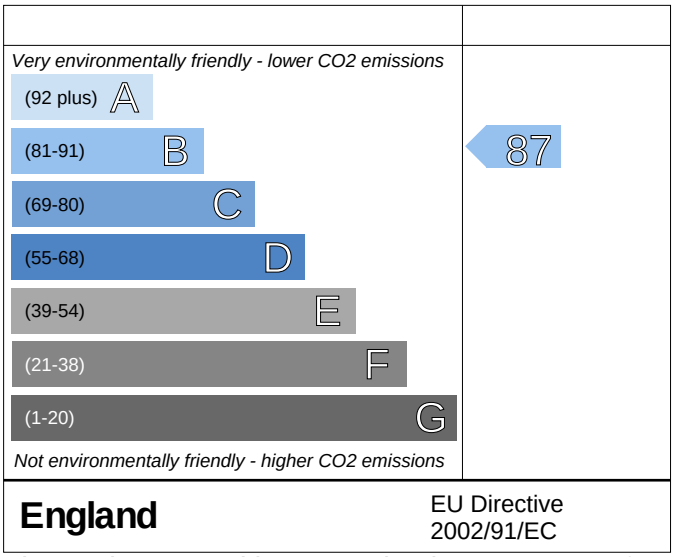
The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO2) Rating



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.

SURVEY NOTES

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1 of a 4 plot Developement

Sample Report Ltd
1 Sample Street
Sampletown

Summary Information

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SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	West
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	3
3.0 Date Built	2014
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	17.52	38.30	2.40
1st Storey:	17.52	38.30	2.65
2nd Storey:	17.50	30.90	2.33

7.0 Living Area 21.10

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
External Wall 1	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.26		99.75	84.08
External Wall 2	Timber framed wall (one layer of plasterboard)	0.28		1.40	1.40

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity		62.73

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
External Roof 1	Plasterboard, insulated at ceiling level	0.08		17.68	17.68
External Roof 2	Plasterboard, insulated slope	0.15		26.90	25.38

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Heat Loss Floor 1	Slab on ground, screed over insulation	0.12		38.30

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Opening Type 1	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.50
Opening Type 2	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.30
Opening Type 3	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Opening 1	Window	[1] External Wall 1	West	None	0.00					2.15	
Opening 2	Window	[1] External Wall 1	West	Light-coloured curtain or roller blind	0.00					6.24	5
Opening 3	Window	[1] External Wall 1	East	Light-coloured curtain or roller blind	0.00					7.28	5
Opening 4	Roof Window	[2] External Roof 2	East	Light-coloured curtain or roller blind						1.52	0

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	10.52	0.300	Yes
Independently assessed	E3 Sill	10.52	0.012	Yes
Independently assessed	E4 Jamb	22.50	0.009	Yes
Independently assessed	E5 Ground floor (normal)	17.52	0.078	Yes
Independently assessed	E6 Intermediate floor within a dwelling	35.02	-0.007	Yes
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	1.20	0.060	No
Table K1 - Approved	E11 Eaves (insulation at rafter level)	7.80	0.040	No
Table K1 - Approved	E12 Gable (insulation at ceiling level)	3.40	0.240	No
Table K1 - Approved	E13 Gable (insulation at rafter level)	5.60	0.040	No
Independently assessed	E16 Corner (normal)	14.76	0.057	Yes
Table K1 - Approved	E18 Party wall between dwellings	14.76	0.060	Yes
Independently assessed	P1 Party wall - Ground floor	8.50	0.068	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	8.50	0.000	No
Table K1 - Default	P7 Party Wall - Exposed floor (normal)	11.00	0.160	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	3.40	0.240	No
Table K1 - Default	P5 Party wall - Roof (insulation at rafter level)	3.40	0.080	No
Table K1 - Default	R1 Head of roof window	1.56	0.080	Yes
Table K1 - Default	R2 Sill of roof window	1.56	0.060	Yes
Table K1 - Default	R3 Jamb of roof window	3.92	0.080	Yes
Table K1 - Default	R7 Flat ceiling (inverted)	1.20	0.040	No
Table K1 - Default	R9 Roof to wall (flat ceiling)	3.60	0.040	No

18.0 Pressure Testing	Yes
Designed q50	3.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	Yes
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				3

Number of passive vents	0
Number of flueless gas fires	0
21.0 Cooling System	No
22.0 Lighting	
Internal	
Total number of light fittings	12
Total number of L.E.L. fittings	12
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	Yes
Light and motion sensors	Yes
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Manufacturer
Description	GAS
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	None
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	
Fuel Type	
Main Heating	BGW
TestMethod	
SAP Code	104
Efficiency (Sedbuk 2009) %	90.1
Efficiency (Sedbuk 2009) %	
In Winter	
In Summer	
Model Name	?
Manufacturer	?
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	On/Off
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	No
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	
Electric CPSU Temperature	
Combi boiler type	Standard Combi
Combi keep hot type	None
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	

Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	None
Cylinder Stat	
Cylinder In Heated Space	
Independent Time Control	
Insulation Type	
Insulation Thickness	
Cylinder Volume	
Loss (kwh/day)	
Pipes insulation	
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	
Recommendations	
None	

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£36	B 86	B 88
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£252	A 95	A 96

Thermal Bridging

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	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Table K1 - Approved	0.300	10.52	3.16	
External wall	E3 Sill	Independently assessed	0.012	10.52	0.13	
External wall	E4 Jamb	Independently assessed	0.009	22.50	0.20	
External wall	E5 Ground floor (normal)	Independently assessed	0.078	17.52	1.37	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	-0.007	35.02	-0.25	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	1.20	0.07	
External wall	E11 Eaves (insulation at rafter level)	Table K1 - Approved	0.040	7.80	0.31	
External wall	E12 Gable (insulation at ceiling level)	Table K1 - Approved	0.240	3.40	0.82	
External wall	E13 Gable (insulation at rafter level)	Table K1 - Approved	0.040	5.60	0.22	
External wall	E16 Corner (normal)	Independently assessed	0.057	14.76	0.84	
External wall	E18 Party wall between dwellings	Table K1 - Approved	0.060	14.76	0.89	
Party wall	P1 Party wall - Ground floor	Independently assessed	0.068	8.50	0.58	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	8.50	0.00	
Party wall	P7 Party Wall - Exposed floor (normal)	Table K1 - Default	0.160	11.00	1.76	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Table K1 - Default	0.240	3.40	0.82	
Party wall	P5 Party wall - Roof (insulation at rafter level)	Table K1 - Default	0.080	3.40	0.27	
External roof	R1 Head of roof window	Table K1 - Default	0.080	1.56	0.12	
External roof	R2 Sill of roof window	Table K1 - Default	0.060	1.56	0.09	
External roof	R3 Jamb of roof window	Table K1 - Default	0.080	3.92	0.31	
External roof	R7 Flat ceiling (inverted)	Table K1 - Default	0.040	1.20	0.05	
External roof	R9 Roof to wall (flat ceiling)	Table K1 - Default	0.040	3.60	0.14	

Total W/mK: 11.91
Y-Value W/m2K: 0.065

Sample Report Ltd
1 Sample Street
Sampletown

U-value calculator report

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Building Elements:

Roof 000003

Roof Type: Pitched Roof, insulated sloping ceiling

Layer	Description	Thickness	Conductivity	Resistance	Fraction
Ext surface				0.040	
Layer 1	**Earthwool Loft Roll 40**				
	Main construction	100 mm	0.040	2.500	100.00 %
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	**Plasterboard, standard**				
	Main construction	12.5 mm	0.210	0.060	100.00 %
Layer 3	**Earthwool Loft Roll 40**				
	Main construction	200 mm	0.040	5.000	100.00 %
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**Earthwool Loft Roll 40**				
	Main construction	200 mm	0.040	5.000	100.00 %
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Int surface				0.100	

Total resistance: Upper limit = 12.700 m^2 K/W Lower limit = 12.700 m^2 K/W Average = 12.700 m^2 K/W
U-value (unrounded) = 0.08 W/m^2 K

Unheated space: None

Total thickness: 513 mm **U-value: 0.08 W/m^2 K**

U-value calculator report

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Building Elements:

Wall 000001

Layer	Description	Thickness	Conductivity	Resistance	Fraction
Ext surface				0.040	
Layer 1	**Brick, outer leaf**				
	Main construction	100 mm	0.770	0.130	82.81 %
	Bridging - Mortar	100 mm	0.941		17.19 %
Layer 2	**Earthwool Dritherm 32 Ultimate**				
	Main construction	100 mm	0.032	3.125	100.00 %
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Aglite 4.2 N**				
	Main construction	100 mm	0.320	0.313	93.43 %
	Bridging - Mortar	100 mm	0.880		6.57 %
Layer 4	**airspace/plaster dabs**				
	Main construction	15 mm	0.100	0.150	80.00 %
	Bridging - Mortar	15 mm	0.088		20.00 %
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	**Plasterboard, standard**				
	Main construction	12.5 mm	0.210	0.060	100.00 %
Int surface				0.130	

Total resistance: Upper limit = 3.933 m^2 K/W Lower limit = 3.914 m^2 K/W Average = 3.923 m^2 K/W
U-value (unrounded) = 0.26 W/m^2 K

Unheated space: None

Total thickness: 328 mm **U-value: 0.26 W/m^2 K**

Sample Report Ltd
1 Sample Street
Sampletown

U-value calculator report

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Building Elements:

Floor 000002

Floor Type: Slab On Ground Floor
Area = 38.30 m^2, Perimeter = 17.52 m, Wall thickness = 300.00 mm, Soil: Unknown
Horizontal edge insulation: none
Vertical edge insulation: none

Layer	Description	Thickness	Conductivity	Resistance	Fraction
Ext surface				0.040	
Layer 1	**Screed**				
	Main construction	75 mm	1.150	0.065	100.00 %
Layer 2	**Kooltherm K3 Floorboard (45mm +)**				
	Main construction	140 mm	0.020	7.000	100.00 %
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Concrete, medium density**				
	Main construction	100 mm	1.350	0.074	100.00 %
Int surface				0.170	

Total resistance: Upper limit = 7.139 m^2 K/W Lower limit = 7.139 m^2 K/W Average = 7.139 m^2 K/W
U-value (unrounded) = 0.12 W/m^2 K

Unheated space: None

Total thickness: 315 mm **U-value: 0.12 W/m^2 K**