

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 2 Derby Road				Issued on Date	19/07/2021
Assessment Reference	Notional		Prop Type Ref			
Property	Flat 2, 7 Derby Road, Leek, ST13 6HN					
SAP Rating	70 C	DER	N/A	TER	N/A	
Environmental	79 C	% DER<TER	N/A			
CO ₂ Emissions (t/year)	1.06	DFEE	N/A	TFEE	N/A	
General Requirements Compliance	N/A	% DFEE<TFEE	N/A			
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ratedenergy.co.uk				Assessor ID	p977-0001
Client						

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Orientation	North					
Property Tenure	Owner-occupied					
Transaction Type	New dwelling					
Terrain Type	Urban					
1.0 Property Type	Flat, Detached					
2.0 Number of Storeys	1					
3.0 Date Built	2021					
4.0 Sheltered Sides	4					
5.0 Sunlight/Shade	Average or unknown					
6.0 Measurements						
Ground Floor:		Heat Loss Perimeter		Internal Floor Area		Average Storey Height
		19.85 m		20.65 m ²		2.90 m
7.0 Living Area	18.11		m ²			
8.0 Thermal Mass Parameter	Precise calculation					
Thermal Mass	77.89		kJ/m ² K			
9.0 External Walls						
Description	Type	Construction		U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)
						Nett Area (m ²)
External Wall 1	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.30	9.00	38.92
Wall To Corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure		0.30	9.00	6.76
WTC 2	Timber Frame	Timber framed wall (one layer of plasterboard)		0.30	9.00	11.89
9.2 Internal Walls						
Description	Construction				Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame				9.00	13.92
10.1 Party Ceilings						
Description	Construction				Kappa (kJ/m ² K)	Area (m ²)
Party Ceilings 1	Timber I-joists, carpeted				20.00	20.65
11.0 Heat Loss Floors						
Description	Type	Construction		U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Exposed	Exposed Floor - Timber	Timber exposed floor, insulation between joists		0.25	20.00	20.65

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12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Door to Corridor	Manufacturer	Door to Corridor							1.80
New Glazing	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.60

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front	Door to Corridor	[2] Wall To Corridor	North							1.89	
Rear	Window	[1] External Wall 1	South	None	0.00					4.20	
Side	Window	[1] External Wall 1	West	None	0.00					1.40	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

Yes

17.0 Thermal Bridging

Default

Y-value

0.150

W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Windows fully open

Cross ventilation possible

Yes

Night Ventilation

Yes

Air change rate

6.00

Mechanical Ventilation

Mechanical Ventilation System Present

No

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				2
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings

8

Total number of L.E.L. fittings

6

Percentage of L.E.L. fittings

75.00

%

External

External lights fitted

Yes

Light and motion sensor

Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

Manufacturer

Percentage of Heat

100

%

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Main Heating	BGB	
SAP Code	102	
Efficiency (Manufacturer)	89.5	%
Model Name		
Manufacturer		
Controls	CBE Programmer, room thermostat and TRVs	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2106	
Burner Control	On/Off	
Flue Type	None or Unknown	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
25.0 Main Heating 2	None	

Community Heating	None
28.0 Water Heating	HES Instantaneous at point of use
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
SAP Code	909

29.0 Hot Water Cylinder	None
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

U-VALUE CALCULATOR REPORT

Property Reference	Flat 2 Derby Road	Issued on Date	19/07/2021
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Project	Flat 2, 7 Derby Road, Leek, ST13 6HN		
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SAP Rating	70 C	DER	N/A	TER	N/A
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Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ratedenergy.co.uk	Assessor ID	p977-0001
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Building Elements

Wall 000002

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)	Density (kg/m ³)	Heat Cap. (J/kgK)
Ext surface				0.0400			
Layer 1	Plaster, standard						
	Main construction	15	0.4000	0.0375	100.00		
Layer 2	Brick, outer leaf						
	Main construction	100	0.7700	0.1299	82.81		
	Main construction	100	0.9407	0.1063	17.19		
Layer 3	Plaster, standard						
	Main construction	15	0.4000	0.0375	100.00		
Layer 4	Celotex PL4065 [77.5mm]						
	Main construction	77.5	0.0258	3.0000	100.00	30	1400
	Corrections - Air Gap: Level 1, Fasteners: None or plastic						
Int surface				0.1300			

Total resistance: Upper limit = 3.371 m² K/W Lower limit = 3.370 m² K/W Average = 3.370 m² K/W
Total correction = 0.0079 m² K/W U-value (unrounded) = 0.3 W/m² K

Unheated space: None

Total thickness: 208 mm

U-value: 0.30 W/m² K

Kappa: 0.00 kJ/m² K

PREDICTED ENERGY ASSESSMENT

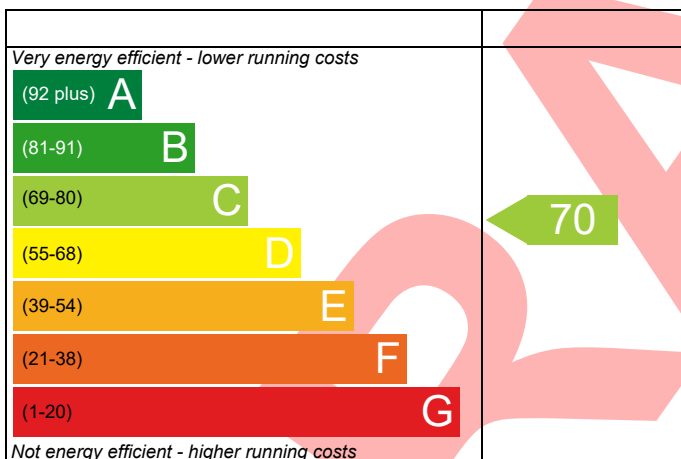
Flat 2, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 20.65 m²

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

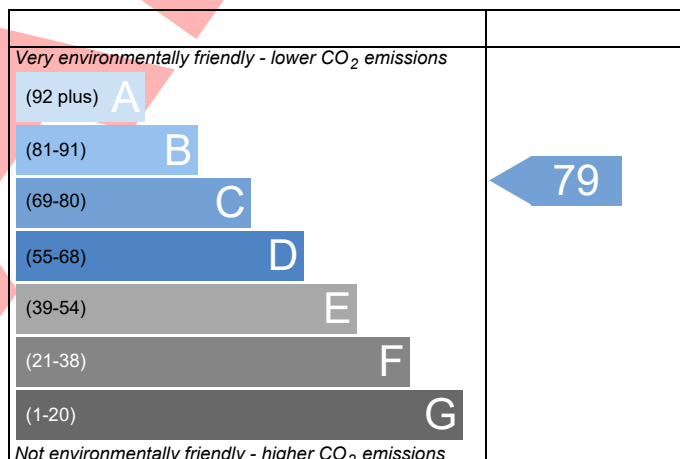


England

EU Directive
2002/91/EC

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



England

EU Directive
2002/91/EC

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.

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

FULL SAP CALCULATION PRINTOUT

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Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ aratedenergy.co.uk			Assessor ID	p977-0001
Client					

CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 59.8850 (5)
Dwelling volume			

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					2 * 10 = 20.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					Air changes per hour 20.0000 / (5) = 0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (18)
Number of sides sheltered					4 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.7000 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.7588 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.1000	4.2000	4.1000	3.6000	3.7000	3.3000	3.1000	3.1000	3.2000	3.5000	3.7000	3.9000 (22)
Wind factor	1.0250	1.0500	1.0250	0.9000	0.9250	0.8250	0.7750	0.7750	0.8000	0.8750	0.9250	0.9750 (22a)
Adj infilt rate	0.7778	0.7967	0.7778	0.6829	0.7019	0.6260	0.5881	0.5881	0.6070	0.6639	0.7019	0.7398 (22b)
Effective ac	0.8024	0.8174	0.8024	0.7332	0.7463	0.6959	0.6729	0.6729	0.6842	0.7204	0.7463	0.7737 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Door to Corridor			1.8900	1.8000	3.4020		(26)
New Glazing (Uw = 1.60)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1250	2.5813	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.3000	9.9960	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2679	3.1848	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.8896		(33)
Party Ceilings 1			20.6500			20.0000	413.0000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1402.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							67.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss						(33) + (36) =	40.6226 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	15.8580	16.1531	15.8580	14.4891	14.7487	13.7531	13.2980	13.2980	13.5220	14.2367	14.7487	15.2891 (38)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	56.4806	56.7757	56.4806	55.1117	55.3713	54.3757	53.9206	53.9206	54.1446	54.8592	55.3713	55.9117 (39)
Average = Sum(39)m / 12 =												55.2270 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.7351	2.7494	2.7351	2.6688	2.6814	2.6332	2.6112	2.6112	2.6220	2.6566	2.6814	2.7076 (40)
Days in month												2.6744 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy content (annual)	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		974.1404 (45)
Water storage loss:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
RHI water heating demand												828.0194 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.4709	19.0703	15.5090	11.7413	8.7768	7.4097	8.0065	10.4071	13.9684	17.7361	20.7006	22.0677 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616 (71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365 (72)
Total internal gains	231.3316	229.2106	220.7433	207.9918	195.2687	183.9457	177.4621	181.2381	188.7200	201.5620	215.6255	225.9429 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
South				4.2000	44.4251	0.6300	0.7000	0.7700	57.0229 (78)			
West				1.4000	18.8263	0.6300	0.7000	0.7700	8.0550 (80)			
Solar gains	65.0779	111.3795	147.5770	183.0519	190.5336	192.3127	186.6785	174.9342	162.1082	126.0524	78.2850	58.1411 (83)
Total gains	296.4096	340.5901	368.3204	391.0436	385.8023	376.2583	364.1406	356.1722	350.8282	327.6144	293.9105	284.0840 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	6.8952	6.8593	6.8952	7.0665	7.0333	7.1621	7.2226	7.2226	7.1927	7.0990	7.0333	6.9653
util living area	1.4597	1.4573	1.4597	1.4711	1.4689	1.4775	1.4815	1.4815	1.4795	1.4733	1.4689	1.4644
	0.8727	0.8463	0.8116	0.7562	0.6978	0.6082	0.5351	0.5526	0.6546	0.7678	0.8443	0.8782 (86)
MIT	16.6428	16.9751	17.6251	18.5040	19.2735	19.9982	20.3693	20.3147	19.7759	18.7476	17.5665	16.6112 (87)
Th 2	18.8883	18.8805	18.8883	18.9247	18.9177	18.9446	18.9570	18.9570	18.9509	18.9315	18.9177	18.9033 (88)
util rest of house	0.8525	0.8221	0.7803	0.7119	0.6325	0.5069	0.3975	0.4199	0.5660	0.7182	0.8159	0.8587 (89)
MIT 2	15.2074	15.5221	16.1567	17.0201	17.7382	18.3963	18.6988	18.6616	18.2204	17.2736	16.1332	15.1870 (90)
Living area fraction									fLA = Living area / (4) =			0.8770 (91)
MIT	16.4663	16.7964	17.4445	18.3215	19.0847	19.8012	20.1638	20.1114	19.5846	18.5663	17.3902	16.4360 (92)
Temperature adjustment												-0.1500

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adjusted MIT 16.3163 16.6464 17.2945 18.1715 18.9347 19.6512 20.0138 19.9614 19.4346 18.4163 17.2402 16.2860 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8195	0.7889	0.7505	0.6925	0.6332	0.5459	0.4753	0.4916	0.5899	0.7031	0.7862	0.8261	(94)
Useful gains	242.9137	268.7069	276.4345	270.8144	244.2724	205.3845	173.0849	175.1101	206.9664	230.3411	231.0731	234.6831	(95)
Ext temp.	3.5000	4.0000	5.7000	8.2000	11.0000	13.8000	15.5000	15.3000	13.1000	9.7000	6.3000	3.5000	(96)
Heat loss rate W													
	723.8696	718.0094	654.8642	549.5465	439.3536	318.1607	243.3862	251.3445	342.9842	478.1706	605.7731	714.8872	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	357.8312	301.9313	281.5517	200.6871	145.1404	0.0000	0.0000	0.0000	0.0000	184.3852	269.7840	357.2718	(98)
Space heating												2098.5828	(98)
RHI space heating demand												2099	(98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 59.8850 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					2 * 10 = 20.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =					20.0000 / (5) = 0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (18)
Number of sides sheltered					4 (19)
Shelter factor					(20) = 1 - [0.075 x (19)] = 0.7000 (20)
Infiltration rate adjusted to include shelter factor					(21) = (18) x (20) = 0.7588 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
	0.9674	0.9485	0.9295	0.8347	0.8157	0.7208	0.7208	0.7019	0.7588	0.8157	0.8536	0.8916 (22b)
Effective ac	0.9680	0.9498	0.9320	0.8483	0.8327	0.7598	0.7598	0.7463	0.7879	0.8327	0.8643	0.8974 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Door to Corridor			1.8900	1.8000	3.4020		(26)
New Glazing (Uw = 1.60)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1250	2.5813	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.3000	9.9960	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2679	3.1848	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.8896		(33)
Party Ceilings 1			20.6500			30.0000	619.5000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 1608.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							77.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss							(33) + (36) = 40.6226 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	19.1292	18.7701	18.4181	16.7647	16.4554	15.0153	15.0153	14.7487	15.5700	16.4554	17.0812	17.7354 (38)
Heat transfer coeff	59.7518	59.3927	59.0407	57.3873	57.0780	55.6379	55.6379	55.3713	56.1926	57.0780	57.7037	58.3580 (39)
Average = Sum(39)m / 12 =												57.3858 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.8935	2.8762	2.8591	2.7790	2.7641	2.6943	2.6943	2.6814	2.7212	2.7641	2.7944	2.8261 (40)
HLP (average)												2.7790 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy conte	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Energy content (annual)										Total = Sum(45)m =		974.1404 (45)
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.4709	19.0703	15.5090	11.7413	8.7768	7.4097	8.0065	10.4071	13.9684	17.7361	20.7006	22.0677 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616 (71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365 (72)
Total internal gains	231.3316	229.2106	220.7433	207.9918	195.2687	183.9457	177.4621	181.2381	188.7200	201.5620	215.6255	225.9429 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W	
South				4.2000	46.7521	0.6300		0.7000			0.7700			60.0098 (78)
West				1.4000	19.6403	0.6300		0.7000			0.7700			8.4032 (80)
Solar gains	68.4130	114.7191	152.2639	180.9769	195.8332	191.4297	185.7991	175.1478	162.2636	125.5105	81.6099			58.7644 (83)
Total gains	299.7447	343.9297	373.0072	388.9686	391.1020	375.3754	363.2612	356.3859	350.9836	327.0724	297.2354			284.7072 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	7.4777	7.5229	7.5678	7.7858	7.8280	8.0306	8.0306	8.0693	7.9513	7.8280	7.7431	7.6563
alpha	1.4985	1.5015	1.5045	1.5191	1.5219	1.5354	1.5354	1.5380	1.5301	1.5219	1.5162	1.5104
util living area	0.8786	0.8505	0.8153	0.7624	0.6922	0.5895	0.4843	0.5027	0.6346	0.7669	0.8477	0.8852 (86)
MIT	16.9183	17.2940	17.9031	18.7173	19.5010	20.2076	20.5951	20.5540	20.0374	19.0247	17.8571	16.8756 (87)
Th 2	18.8042	18.8132	18.8221	18.8645	18.8726	18.9106	18.9106	18.9177	18.8959	18.8726	18.8563	18.8395 (88)
util rest of house	0.8566	0.8238	0.7804	0.7133	0.6172	0.4681	0.3039	0.3292	0.5237	0.7090	0.8162	0.8646 (89)
MIT 2	15.4150	15.7811	16.3738	17.1753	17.9044	18.5336	18.8039	18.7875	18.3961	17.4878	16.3666	15.3958 (90)
Living area fraction									fLA = Living area / (4) =			0.8770 (91)
MIT	16.7334	17.1079	17.7150	18.5276	19.3046	20.0017	20.3748	20.3367	19.8355	18.8356	17.6738	16.6935 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.5834	16.9579	17.5650	18.3776	19.1546	19.8517	20.2248	20.1867	19.6855	18.6856	17.5238	16.5435 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.8269	0.7944	0.7552	0.6998	0.6287	0.5287	0.4261	0.4435	0.5707	0.7028	0.7908	0.8351 (94)
Useful gains	247.8647	273.2133	281.7027	272.2094	245.8824	198.4435	154.7817	158.0728	200.2984	229.8612	235.0445	237.7709 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	733.9567	716.1489	653.2841	543.8952	425.4956	292.1917	201.6738	209.6768	313.8635	461.5118	601.4923	720.3439 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	361.6525	297.6527	276.4566	195.6138	133.6323	0.0000	0.0000	0.0000	0.0000	172.3481	263.8425	359.0343 (98)
Space heating												2060.2326 (98)
Space heating per m2										(98) / (4) =		99.7691 (99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS 09 Jan 2014

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													89.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2301.9359 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	361.6525	297.6527	276.4566	195.6138	133.6323	0.0000	0.0000	0.0000	0.0000	172.3481	263.8425	359.0343	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	404.0810	332.5729	308.8900	218.5629	149.3098	0.0000	0.0000	0.0000	0.0000	192.5677	294.7961	401.1557	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(64)
Efficiency of water heater (217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(219)
Water heating fuel used												828.0194	(219)
Annual totals kWh/year													
Space heating fuel - main system												2301.9359	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												151.6734	(232)
Total delivered energy for all uses												3356.6286	(238)

10a. Fuel costs - using Table 12 prices

	Fuel	Fuel price	Fuel cost	
	kWh/year	p/kWh	£/year	
Space heating - main system 1	2301.9359	3.4800	80.1074	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	828.0194	13.1900	109.2158	(247)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Energy for lighting	151.6734	13.1900	20.0057	(250)
Additional standing charges			120.0000	(251)
Total energy cost			339.2213	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	2.1702 (257)
SAP value		69.7259
SAP rating (Section 12)		70 (258)
SAP band		C

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy	Emission factor	Emissions	
	kWh/year	kg CO2/kWh	kg CO2/year	
Space heating - main system 1	2301.9359	0.2160	497.2182	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	828.0194	0.5190	429.7421	(264)
Space and water heating			926.9602	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	151.6734	0.5190	78.7185	(268)
Total kg/year			1044.6037	(272)
CO2 emissions per m2			50.5900	(273)
EI value			78.6783	
EI rating			79 (274)	
EI band			C	

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.8950 = 3.888$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.8950 = 0.2413$, stars = 4
Water heating energy efficiency	$13.19 / 1.0000 = 13.190$, stars = 1
Water heating environmental impact	$0.519 / 1.0000 = 0.5190$, stars = 2

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	20.6500 (1b)	x 2.9000 (2b)	= 59.8850 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	20.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 59.8850 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					2 * 10 = 20.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) = 0.3340 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.0840 (18)
Number of sides sheltered					4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.7588 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.1000	4.2000	4.1000	3.6000	3.7000	3.3000	3.1000	3.1000	3.2000	3.5000	3.7000	3.9000 (22)
Wind factor	1.0250	1.0500	1.0250	0.9000	0.9250	0.8250	0.7750	0.7750	0.8000	0.8750	0.9250	0.9750 (22a)
Adj infilt rate	0.7778	0.7967	0.7778	0.6829	0.7019	0.6260	0.5881	0.5881	0.6070	0.6639	0.7019	0.7398 (22b)
Effective ac	0.8024	0.8174	0.8024	0.7332	0.7463	0.6959	0.6729	0.6729	0.6842	0.7204	0.7463	0.7737 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Door to Corridor			1.8900	1.8000	3.4020		(26)
New Glazing (Uw = 1.60)			5.6000	1.5038	8.4211		(27)
Exposed			20.6500	0.1250	2.5813	20.0000	413.0000 (28b)
External Wall 1	38.9200	5.6000	33.3200	0.3000	9.9960	9.0000	299.8800 (29a)
Wall To Corridor	6.7600	1.8900	4.8700	0.2679	1.3045	9.0000	43.8300 (29a)
WTC 2	11.8900		11.8900	0.2679	3.1848	9.0000	107.0100 (29a)
Total net area of external elements Aum(A, m ²)			78.2200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.8896		(33)
Party Ceilings 1			20.6500			30.0000	619.5000 (32b)
Internal Wall 1			13.9200			9.0000	125.2800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1608.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							77.8935 (35)
Thermal bridges (Default value 0.150 * total exposed area)							11.7330 (36)
Total fabric heat loss						(33) + (36) =	40.6226 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	15.8580	16.1531	15.8580	14.4891	14.7487	13.7531	13.2980	13.2980	13.5220	14.2367	14.7487	15.2891 (38)
Heat transfer coeff	56.4806	56.7757	56.4806	55.1117	55.3713	54.3757	53.9206	53.9206	54.1446	54.8592	55.3713	55.9117 (39)
Average = Sum(39)m / 12 =												55.2270 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.7351	2.7494	2.7351	2.6688	2.6814	2.6332	2.6112	2.6112	2.6220	2.6566	2.6814	2.7076 (40)
HLP (average)												2.6744 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0365 (42)
Average daily hot water use (litres/day)												61.9135 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	68.1048	65.6283	63.1518	60.6752	58.1987	55.7221	55.7221	58.1987	60.6752	63.1518	65.6283	68.1048 (44)
Energy conte	100.9975	88.3331	91.1518	79.4684	76.2518	65.7995	60.9729	69.9673	70.8029	82.5140	90.0705	97.8107 (45)
Energy content (annual)										Total = Sum(45)m =		974.1404 (45)
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												

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CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Total heat required for water heating calculated for each month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391 (64)
Heat gains from water heating, kWh/month	21.4620	18.7708	19.3698	16.8870	16.2035	13.9824	12.9567	14.8681	15.0456	17.5342	19.1400	20.7848 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924	62.1924 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.4709	19.0703	15.5090	11.7413	8.7768	7.4097	8.0065	10.4071	13.9684	17.7361	20.7006	22.0677 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	115.0274	116.2210	113.2131	106.8097	98.7265	91.1294	86.0541	84.8604	87.8683	94.2718	102.3550	109.9521 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558	42.2558 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616	-41.4616 (71)
Water heating gains (Table 5)	28.8467	27.9327	26.0346	23.4542	21.7789	19.4200	17.4150	19.9839	20.8967	23.5675	26.5833	27.9365 (72)
Total internal gains	231.3316	229.2106	220.7433	207.9918	195.2687	183.9457	177.4621	181.2381	188.7200	201.5620	215.6255	225.9429 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
South				4.2000	44.4251	0.6300	0.7000	0.7700	57.0229 (78)			
West				1.4000	18.8263	0.6300	0.7000	0.7700	8.0550 (80)			
Solar gains	65.0779	111.3795	147.5770	183.0519	190.5336	192.3127	186.6785	174.9342	162.1082	126.0524	78.2850	58.1411 (83)
Total gains	296.4096	340.5901	368.3204	391.0436	385.8023	376.2583	364.1406	356.1722	350.8282	327.6144	293.9105	284.0840 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	7.9108	7.8697	7.9108	8.1073	8.0693	8.2170	8.2864	8.2864	8.2521	8.1446	8.0693	7.9913
alpha	1.5274	1.5246	1.5274	1.5405	1.5380	1.5478	1.5524	1.5524	1.5501	1.5430	1.5380	1.5328
util living area	0.8832	0.8575	0.8236	0.7687	0.7102	0.6195	0.5450	0.5629	0.6667	0.7804	0.8558	0.8885 (86)
MIT	16.7780	17.1048	17.7414	18.6023	19.3493	20.0519	20.4089	20.3563	19.8360	18.8348	17.6809	16.7478 (87)
Th 2	18.8883	18.8805	18.8883	18.9247	18.9177	18.9446	18.9570	18.9570	18.9509	18.9315	18.9177	18.9033 (88)
util rest of house	0.8636	0.8338	0.7926	0.7244	0.6442	0.5161	0.4040	0.4269	0.5766	0.7307	0.8279	0.8697 (89)
MIT 2	15.3255	15.6350	16.2564	17.1018	17.7972	18.4325	18.7204	18.6851	18.2633	17.3442	16.2307	15.3064 (90)
Living area fraction									fLA = Living area / (4) =			0.8770 (91)
MIT	16.5993	16.9240	17.5588	18.4177	19.1584	19.8527	20.2012	20.1507	19.6426	18.6515	17.5025	16.5705 (92)
Temperature adjustment												-0.1500
adjusted MIT	16.4493	16.7740	17.4088	18.2677	19.0084	19.7027	20.0512	20.0007	19.4926	18.5015	17.3525	16.4205 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.8333	0.8033	0.7653	0.7075	0.6475	0.5587	0.4863	0.5031	0.6038	0.7182	0.8008	0.8398 (94)
Useful gains	246.9997	273.5891	281.8797	276.6823	249.8211	210.2099	177.0908	179.1942	211.8147	235.2879	235.3644	238.5768 (95)
Ext temp.	3.5000	4.0000	5.7000	8.2000	11.0000	13.8000	15.5000	15.3000	13.1000	9.7000	6.3000	3.5000 (96)
Heat loss rate W	731.3858	725.2546	661.3193	554.8498	443.4351	320.9658	245.4034	253.4655	346.1237	482.8424	611.9902	722.4072 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh	360.3833	303.5192	282.3031	200.2806	144.0488	0.0000	0.0000	0.0000	0.0000	184.1806	271.1706	359.9698 (98)
Space heating												2105.8560 (98)
Space heating per m2										(98) / (4) =		101.9785 (99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													89.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2352.9117 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	360.3833	303.5192	282.3031	200.2806	144.0488	0.0000	0.0000	0.0000	0.0000	184.1806	271.1706	359.9698	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	402.6629	339.1276	315.4224	223.7772	160.9484	0.0000	0.0000	0.0000	0.0000	205.7884	302.9839	402.2009	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	85.8479	75.0831	77.4791	67.5481	64.8140	55.9296	51.8270	59.4722	60.1825	70.1369	76.5599	83.1391	(219)
Water heating fuel used												828.0194	(219)
Annual totals kWh/year													
Space heating fuel - main system												2352.9117	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												151.6734	(232)
Total delivered energy for all uses												3407.6044	(238)

10a. Fuel costs - using BEDF prices (479)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2352.9117	3.7400	87.9989 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	828.0194	19.1200	158.3173 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	151.6734	19.1200	28.9999 (250)
Additional standing charges			94.0000 (251)
Total energy cost			383.6561 (255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2352.9117	0.2160	508.2289 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	828.0194	0.5190	429.7421 (264)
Space and water heating			937.9710 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	151.6734	0.5190	78.7185 (268)
Total kg/year			1055.6145 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2352.9117	1.2200	2870.5523 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	828.0194	3.0700	2542.0194 (264)
Space and water heating			5412.5717 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	151.6734	3.0700	465.6373 (268)
Primary energy kWh/year			6108.4590 (272)
Primary energy kWh/m2/year			295.8092 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: C 70
Current environmental impact rating: C 79

(For testing purposes):

A Not considered
B Not considered

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

C		Not considered
D		Not considered
E	Low energy lighting	Already installed
F		Not considered
G		Not considered
H		Not considered
I		Not considered
J		Not considered
K		Not considered
M		Not considered
N	Solar water heating	Not applicable
O		Not considered
P		Not considered
R		Not considered
S		Not considered
T		Not considered
U	Solar photovoltaic panels	Not applicable
A2		Not considered
A3		Not considered
T2		Not considered
W		Not considered
X		Not considered
Y		Not considered
J2		Not considered
Q2		Not considered
Z1		Not considered
Z2		Not considered
Z3		Not considered
Z4		Not considered
Z5		Not considered
V2	Wind turbine	Not applicable
L2		Not considered
Q3		Not considered
O3		Not considered

Recommended measures: (none)	SAP change	Cost change	CO2 change
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Recommended measures (none)	Typical annual savings	Energy efficiency	Environmental impact
	Total Savings £0		0.00 kg/m²

Potential energy efficiency rating: C 70
 Potential environmental impact rating: C 79

Fuel prices for cost data on this page from database revision number 479 TEST (30 Jun 2021)
 Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Thames Valley):

	Current	Potential	Saving
Electricity	£202	£202	£0
Mains gas	£182	£182	£0
Space heating	£196	£196	£0
Water heating	£158	£158	£0
Lighting	£29	£29	£0
Total cost of fuels	£384	£384	£0
Total cost of uses	£383	£383	£0
Delivered energy	165 kWh/m²	165 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	51 kg/m²	51 kg/m²	0 kg/m²
Primary energy	296 kWh/m²	296 kWh/m²	0 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Designed) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

CONDENSATION RISK ANALYSIS

Property Reference	Flat 2 Derby Road			Issued on Date	19/07/2021
Assessment Reference	Notional	Prop Type Ref			
Project	Flat 2, 7 Derby Road, Leek, ST13 6HN				
Calculation Type	Conversion (As Designed)				
SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	79 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.06	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ratedenergy.co.uk			Assessor ID	p977-0001
Client					

Wall - 000002

Environmental conditions

External conditions	Temperature:	5	°C	Relative Humidity:	95	%
Internal conditions	Temperature:	15	°C	Relative Humidity:	65	%

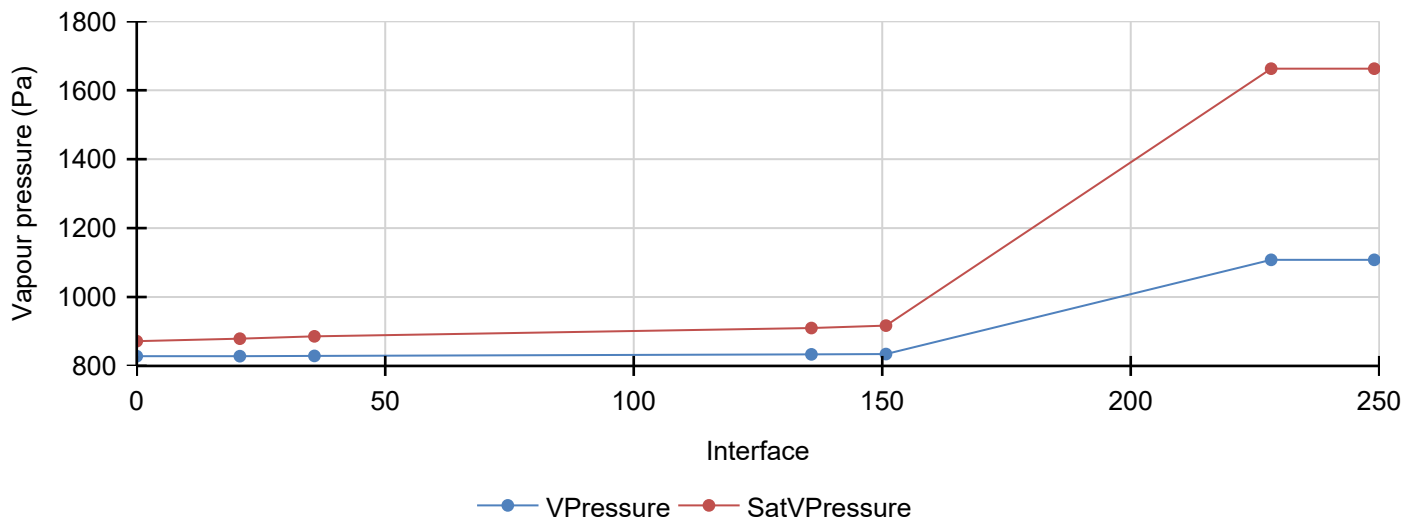
Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m ² .K/W	Cumulative thermal resistance m ² .K/W	Vapour resistivity GN.s/kg.m	Vapour resistance GN.s/kg.m	Cumulative vapour resistance GN.s/kg.m
External surface	-	0.0000	0.0400	0.0400	0.0	0.00	0.00
1.Plaster, standard	15.0	0.4000	0.0375	0.0775	60.0	0.90	0.90
2.Brick, outer leaf	100.0	0.7700	0.1299	0.2074	50.0	5.00	5.90
3.Plaster, standard	15.0	0.4000	0.0375	0.2449	60.0	0.90	6.80
4.Celotex PL4065 [77.5mm]	77.5	0.0000	3.0000	3.2449	0.000	300.00	306.80
Internal surface	-	0.0000	0.1300	3.2449	0.0	0.00	306.80

Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/m ² h	Cond. rate 60 days g/m ² h	Cond. risk Y/N
External surface	5.00	828.3	871.9	4.27	0.00	0.00	No
1. External surface / Plaster, standard	5.12	828.3	879.1	4.3	0.00	0.00	No
2. Plaster, standard / Brick, outer leaf	5.23	829.1	885.9	4.3	0.00	0.00	No
3. Brick, outer leaf / Plaster, standard	5.61	833.6	910.0	4.4	0.00	0.00	No
4. Plaster, standard / Celotex PL4065 [77.5mm]	5.73	834.5	917.0	4.4	0.00	0.00	No
Celotex PL4065 [77.5mm] / Internal surface	14.61	1107.9	1662.6	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1662.6	8.48	0.00	0.00	No

CONDENSATION RISK ANALYSIS



Interface temperature / Dew point graphical representation

