

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 4 Derby Road			Issued on Date	19/07/2021
Assessment Reference	Notional	Prop Type Ref			
Property	Flat 4, 7 Derby Road, Leek, ST13 6HN				
SAP Rating	68 D	DER	N/A	TER	N/A
Environmental	80 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	0.85	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@ a-ratedenergy.co.uk			Assessor ID	p977-0001
Client					

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Orientation	West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Semi-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

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	10.50 m	10.98 m ²	2.90 m

7.0 Living Area	8.43	m ²
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8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	175.29	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	13.05	10.20
Wall To Corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.30	9.00	17.40	15.51

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing	Other	0.00	20.00	17.63

9.2 Internal Walls

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Other	75.00	13.63

10.0 External Roofs

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Plane Roof	Plasterboard, insulated at ceiling level	0.16	9.00	10.98	10.98

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11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Exposed to Corridor	Exposed Floor - Timber	Timber exposed floor, insulation between joists	0.25	20.00	10.98

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	West							1.89	
Rear	Window	[1] External Wall 1	East	None	0.00					2.85	

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

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24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100	%
Main Heating	BGB	
SAP Code	102	
Efficiency (Sedbuk 2009)	88.0	%
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
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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 4 Derby Road	Issued on Date	19/07/2021
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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

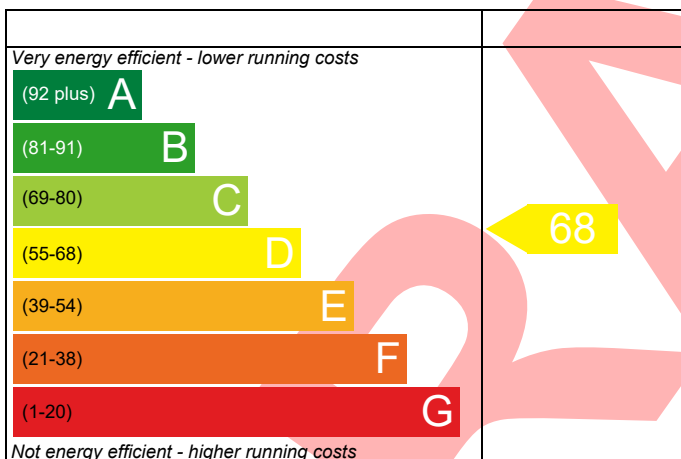
Flat 4, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Semi-Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 10.98 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

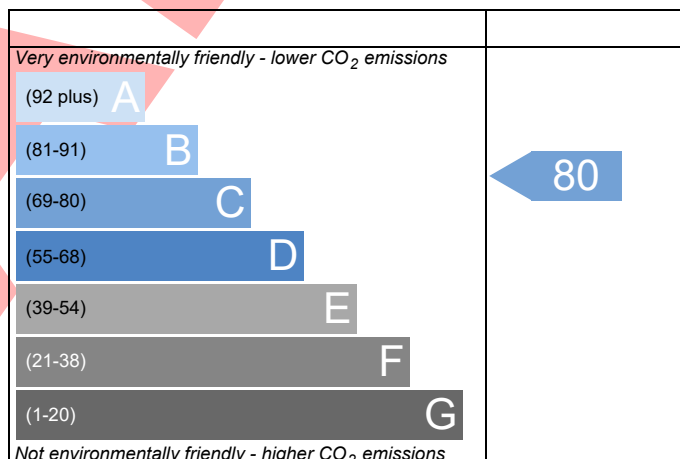


England

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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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	10.9800 (1b)	x 2.9000 (2b)	= 31.8420 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	10.9800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 31.8420 (5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour					
Number of chimneys		0	+	0	+	0	=	0 * 40 =	0.0000 (6a)				
Number of open flues		0	+	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)				
Air changes per hour													
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(7a)+(7b)+(7c) =							20.0000 / (5) =	0.6281 (8)				
Pressure test								No					
Measured/design AP50								15.0000					
Infiltration rate									1.3781 (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) =	0.9647 (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	0.9888	1.0129	0.9888	0.8682	0.8923	0.7959	0.7476	0.7476	0.7717	0.8441	0.8923	0.9406	(22b)
Effective ac	0.9889	1.0129	0.9889	0.8769	0.8981	0.8167	0.7795	0.7795	0.7978	0.8562	0.8981	0.9423	(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)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2273	2.4955	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.3000	3.0600	9.0000	91.8000 (29a)
Wall To Corridor	17.4000	1.8900	15.5100	0.2679	4.1545	9.0000	139.5900 (29a)
External Roof 1	10.9800		10.9800	0.1600	1.7568	9.0000	98.8200 (30)
Total net area of external elements Aum(A, m ²)			52.4100				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.1544		(33)
Party Wall 1			17.6300	0.0000	0.0000	20.0000	352.6000 (32)
Internal Wall 1			13.6300			75.0000	1022.2500 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		1924.6600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							175.2878 (35)
Thermal bridges (Default value 0.150 * total exposed area)							7.8615 (36)
Total fabric heat loss						(33) + (36) =	27.0159 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	10.3907	10.6435	10.3907	9.2142	9.4373	8.5817	8.1905	8.1905	8.3831	8.9973	9.4373	9.9018

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	37.4066	37.6594	37.4066	36.2302	36.4532	35.5976	35.2065	35.2065	35.3990	36.0132	36.4532	36.9177 (39)
Average = Sum(39)m / 12 =												36.3291 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	3.4068	3.4298	3.4068	3.2997	3.3200	3.2420	3.2064	3.2064	3.2240	3.2799	3.3200	3.3623 (40)
Days in month												3.3087 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0000 (42)
Average daily hot water use (litres/day)												61.0000 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.1000	64.6600	62.2200	59.7800	57.3400	54.9000	54.9000	57.3400	59.7800	62.2200	64.6600	67.1000 (44)
Energy content (annual)	99.5074	87.0298	89.8069	78.2959	75.1267	64.8287	60.0733	68.9350	69.7583	81.2965	88.7415	96.3676 (45)
Distribution loss (46)m = 0.15 x (45)m												959.7675 (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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (64)
RHI water heating demand												815.8024 (64)
Heat gains from water heating, kWh/month	21.1453	18.4938	19.0840	16.6379	15.9644	13.7761	12.7656	14.6487	14.8236	17.2755	18.8576	20.4781 (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	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.6744	13.9218	11.3220	8.5715	6.4073	5.4093	5.8449	7.5975	10.1973	12.9478	15.1120	16.1100 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	83.9732	84.8446	82.6487	77.9740	72.0731	66.5270	62.8219	61.9505	64.1463	68.8210	74.7220	80.2681 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000 (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)	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000 (71)
Water heating gains (Table 5)	28.4211	27.5206	25.6505	23.1082	21.4576	19.1335	17.1580	19.6891	20.5884	23.2198	26.1911	27.5243 (72)
Total internal gains	193.0687	191.2870	184.6212	174.6537	164.9379	156.0697	150.8248	154.2370	159.9320	169.9886	181.0251	188.9024 (73)

6. Solar gains

[Jan]				Area	Solar flux	g	FF				Access	Gains
			m2	Table 6a	Specific data	Specific data	Specific data	Specific data	Specific data	factor	W	
				W/m2	or Table 6b	or Table 6b	or Table 6c	or Table 6c	or Table 6c	Table 6d		
East			2.8500	18.8263	0.6300	0.7000	0.7700	16.3976 (76)				
Solar gains	16.3976	32.7481	53.8227	81.8090	96.2861	101.6908	96.8606	82.8258	64.4974	40.1961	20.6203	14.0235 (83)
Total gains	209.4663	224.0351	238.4440	256.4626	261.2240	257.7605	247.6855	237.0628	224.4294	210.1847	201.6454	202.9259 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	14.2923	14.1964	14.2923	14.7564	14.6661	15.0186	15.1855	15.1855	15.1029	14.8453	14.6661	14.4816
alpha	1.9528	1.9464	1.9528	1.9838	1.9777	2.0012	2.0124	2.0124	2.0069	1.9897	1.9777	1.9654
util living area	0.9239	0.9118	0.8859	0.8336	0.7670	0.6649	0.5833	0.6111	0.7376	0.8492	0.9045	0.9272 (86)
MIT	17.6491	17.8439	18.3758	19.1511	19.7898	20.3659	20.6307	20.5808	20.1453	19.3047	18.3943	17.6479 (87)
Th 2	18.5604	18.5505	18.5604	18.6077	18.5985	18.6339	18.6503	18.6503	18.6422	18.6166	18.5985	18.5798 (88)
util rest of house	0.9038	0.8883	0.8535	0.7821	0.6834	0.5269	0.3939	0.4277	0.6217	0.7931	0.8751	0.9080 (89)
MIT 2	15.8422	16.0242	16.5433	17.3023	17.8727	18.3631	18.5501	18.5259	18.2178	17.4707	16.5945	15.8531 (90)
Living area fraction									fLA = Living area / (4) =			0.7678 (91)
MIT	17.2295	17.4213	17.9503	18.7217	19.3446	19.9008	20.1475	20.1036	19.6977	18.8788	17.9763	17.2310 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.0795	17.2713	17.8003	18.5717	19.1946	19.7508	19.9975	19.9536	19.5477	18.7288	17.8263	17.0810 (93)

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CALCULATION OF HEAT DEMAND 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8876	0.8723	0.8406	0.7812	0.7076	0.5997	0.5127	0.5399	0.6730	0.7963	0.8628	0.8920	(94)
Useful gains	185.9207	195.4154	200.4440	200.3465	184.8459	154.5730	126.9787	127.9985	151.0481	167.3756	173.9860	181.0112	(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	507.9622	499.7872	452.6297	375.7696	298.7181	211.8342	158.3409	163.8355	228.2414	325.1553	420.1723	501.3812	(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	239.5989	204.5379	187.6262	126.3047	84.7209	0.0000	0.0000	0.0000	0.0000	117.3881	177.2542	238.3553	(98)
Space heating												1375.7862	(98)
RHI space heating demand												1376	(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	10.9800 (1b)	x 2.9000 (2b)	= 31.8420 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	10.9800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 31.8420 (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) =				Air changes per hour
Pressure test					20.0000 / (5) = 0.6281 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.3781 (18)
					4 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.9647 (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	1.2300	1.2058	1.1817	1.0611	1.0370	0.9164	0.9164	0.8923	0.9647	1.0370	1.0853	1.1335 (22b)
Effective ac	1.2300	1.2058	1.1817	1.0611	1.0370	0.9199	0.9199	0.8981	0.9653	1.0370	1.0853	1.1335 (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)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2273	2.4955	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.3000	3.0600	9.0000	91.8000 (29a)
Wall To Corridor	17.4000	1.8900	15.5100	0.2679	4.1545	9.0000	139.5900 (29a)
External Roof 1	10.9800		10.9800	0.1600	1.7568	9.0000	98.8200 (30)
Total net area of external elements Aum(A, m ²)			52.4100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.1544		(33)
Party Wall 1			17.6300	0.0000	0.0000	20.0000	352.6000 (32)
Internal Wall 1			13.6300			75.0000	1022.2500 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1924.6600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							175.2878 (35)
Thermal bridges (Default value 0.150 * total exposed area)							7.8615 (36)
Total fabric heat loss						(33) + (36) =	27.0159 (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	12.9242	12.6708	12.4174	11.1503	10.8969	9.6665	9.6665	9.4373	10.1432	10.8969	11.4037	11.9105 (38)
Heat transfer coeff	39.9401	39.6867	39.4333	38.1662	37.9128	36.6824	36.6824	36.4532	37.1591	37.9128	38.4196	38.9265 (39)
Average = Sum(39)m / 12 =												38.1146 (39)
HLP	3.6375	3.6145	3.5914	3.4760	3.4529	3.3408	3.3408	3.3200	3.3843	3.4529	3.4991	3.5452 (40)
HLP (average)												3.4713 (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												1.0000 (42)
Average daily hot water use (litres/day)												61.0000 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.1000	64.6600	62.2200	59.7800	57.3400	54.9000	54.9000	57.3400	59.7800	62.2200	64.6600	67.1000 (44)
Energy content (annual)	99.5074	87.0298	89.8069	78.2959	75.1267	64.8287	60.0733	68.9350	69.7583	81.2965	88.7415	96.3676 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		959.7675 (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)

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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (64)
Heat gains from water heating, kWh/month	21.1453	18.4938	19.0840	16.6379	15.9644	13.7761	12.7656	14.6487	14.8236	17.2755	18.8576	20.4781 (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
(66)m	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.6744	13.9218	11.3220	8.5715	6.4073	5.4093	5.8449	7.5975	10.1973	12.9478	15.1120	16.1100	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	83.9732	84.8446	82.6487	77.9740	72.0731	66.5270	62.8219	61.9505	64.1463	68.8210	74.7220	80.2681	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	(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)	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	(71)
Water heating gains (Table 5)	28.4211	27.5206	25.6505	23.1082	21.4576	19.1335	17.1580	19.6891	20.5884	23.2198	26.1911	27.5243	(72)
Total internal gains	193.0687	191.2870	184.6212	174.6537	164.9379	156.0697	150.8248	154.2370	159.9320	169.9886	181.0251	188.9024	(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

East					2.8500	19.6403	0.6300	0.7000			0.7700			17.1066 (76)

Solar gains	17.1066	33.4642	55.1107	80.3757	98.5034	100.8358	95.9998	82.4624	64.0960	39.7080	21.3299	14.0676 (83)		
Total gains	210.1753	224.7511	239.7319	255.0293	263.4413	256.9055	246.8246	236.6994	224.0281	209.6967	202.3550	202.9701 (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	13.3857	13.4712	13.5578	14.0079	14.1015	14.5745	14.5745	14.6661	14.3875	14.1015	13.9155	13.7343	
alpha	1.8924	1.8981	1.9039	1.9339	1.9401	1.9716	1.9716	1.9777	1.9592	1.9401	1.9277	1.9156	
util living area	0.9202	0.9062	0.8793	0.8278	0.7504	0.6332	0.5173	0.5456	0.7057	0.8370	0.8984	0.9242	(86)
MIT	17.6853	17.9421	18.4546	19.1987	19.8828	20.4703	20.7523	20.7160	20.2829	19.4221	18.4786	17.6865	(87)
Th 2	18.4651	18.4742	18.4835	18.5309	18.5406	18.5893	18.5893	18.5985	18.5702	18.5406	18.5212	18.5022	(88)
util rest of house	0.8977	0.8795	0.8427	0.7705	0.6547	0.4701	0.2763	0.3112	0.5598	0.7702	0.8648	0.9029	(89)
MIT 2	15.8259	16.0784	16.5759	17.3016	17.9141	18.4015	18.5542	18.5508	18.2734	17.5341	16.6328	15.8488	(90)
Living area fraction	17.2535	17.5093	18.0183	18.7581	19.4256	19.9899	20.2418	20.2131	19.8162	18.9836	18.0499	17.2597	(92)
Temperature adjustment	17.1035	17.3593	17.8683	18.6081	19.2756	19.8399	20.0918	20.0631	19.6662	18.8336	17.8999	17.1097	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8815	0.8640	0.8313	0.7726	0.6880	0.5641	0.4391	0.4673	0.6353	0.7800	0.8538	0.8870	(94)
Ext temp.	185.2605	194.1943	199.2894	197.0470	181.2371	144.9253	108.3758	110.6021	142.3306	163.5653	172.7703	180.0318	(95)
Heat loss rate W	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)
Month fracti	511.3722	494.4684	448.2889	370.5212	287.2124	192.2110	128.0876	133.5321	206.8350	312.1597	414.9294	502.5298	(97)
Space heating kWh	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 per m2	242.6271	201.7842	185.2556	124.9014	78.8456	0.0000	0.0000	0.0000	0.0000	110.5542	174.3546	239.9385	(98)
												1358.2614	(98)
												123.7032	(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 %)													88.9000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1527.8531 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	242.6271	201.7842	185.2556	124.9014	78.8456	0.0000	0.0000	0.0000	0.0000	110.5542	174.3546	239.9385	(98)
Space heating efficiency (main heating system 1)	88.9000	88.9000	88.9000	88.9000	88.9000	0.0000	0.0000	0.0000	0.0000	88.9000	88.9000	88.9000	(210)
Space heating fuel (main heating system)	272.9214	226.9789	208.3865	140.4966	88.6903	0.0000	0.0000	0.0000	0.0000	124.3580	196.1244	269.8971	(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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124	(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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124	(219)
Water heating fuel used												815.8024	(219)
Annual totals kWh/year													
Space heating fuel - main system													1527.8531 (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)													110.7258 (232)
Total delivered energy for all uses													2529.3812 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1527.8531	3.4800	53.1693 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	815.8024	13.1900	107.6043 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	110.7258	13.1900	14.6047 (250)
Additional standing charges			120.0000 (251)
Total energy cost			305.2709 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.2903 (257)
SAP value		68.0496
SAP rating (Section 12)		68 (258)
SAP band		D

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	1527.8531	0.2160	330.0163 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	815.8024	0.5190	423.4014 (264)
Space and water heating			753.4177 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	110.7258	0.5190	57.4667 (268)
Total kg/year			849.8094 (272)
CO2 emissions per m2			77.4000 (273)
EI value			79.6580
EI rating			80 (274)
EI band			C

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.8890 = 3.915$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.8890 = 0.2430$, 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	10.9800 (1b)	x 2.9000 (2b)	= 31.8420 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	10.9800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 31.8420 (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) =				Air changes per hour
Pressure test					20.0000 / (5) = 0.6281 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.3781 (18)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7000 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.9647 (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	0.9888	1.0129	0.9888	0.8682	0.8923	0.7959	0.7476	0.7476	0.7717	0.8441	0.8923	0.9406 (22b)
Effective ac	0.9889	1.0129	0.9889	0.8769	0.8981	0.8167	0.7795	0.7795	0.7978	0.8562	0.8981	0.9423 (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)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2273	2.4955	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.3000	3.0600	9.0000	91.8000 (29a)
Wall To Corridor	17.4000	1.8900	15.5100	0.2679	4.1545	9.0000	139.5900 (29a)
External Roof 1	10.9800		10.9800	0.1600	1.7568	9.0000	98.8200 (30)
Total net area of external elements Aum(A, m ²)			52.4100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.1544		(33)
Party Wall 1			17.6300	0.0000	0.0000	20.0000	352.6000 (32)
Internal Wall 1			13.6300			75.0000	1022.2500 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	1924.6600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							175.2878 (35)
Thermal bridges (Default value 0.150 * total exposed area)							7.8615 (36)
Total fabric heat loss						(33) + (36) =	27.0159 (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	10.3907	10.6435	10.3907	9.2142	9.4373	8.5817	8.1905	8.1905	8.3831	8.9973	9.4373	9.9018 (38)
Heat transfer coeff	37.4066	37.6594	37.4066	36.2302	36.4532	35.5976	35.2065	35.2065	35.3990	36.0132	36.4532	36.9177 (39)
Average = Sum(39)m / 12 =												36.3291 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	3.4068	3.4298	3.4068	3.2997	3.3200	3.2420	3.2064	3.2064	3.2240	3.2799	3.3200	3.3623 (40)
HLP (average)												3.3087 (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												1.0000 (42)
Average daily hot water use (litres/day)												61.0000 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	67.1000	64.6600	62.2200	59.7800	57.3400	54.9000	54.9000	57.3400	59.7800	62.2200	64.6600	67.1000 (44)
Energy conte	99.5074	87.0298	89.8069	78.2959	75.1267	64.8287	60.0733	68.9350	69.7583	81.2965	88.7415	96.3676 (45)
Energy content (annual)										Total = Sum(45)m =		959.7675 (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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124 (64)
Heat gains from water heating, kWh/month	21.1453	18.4938	19.0840	16.6379	15.9644	13.7761	12.7656	14.6487	14.8236	17.2755	18.8576	20.4781 (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)
(66)m	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	15.6744	13.9218	11.3220	8.5715	6.4073	5.4093	5.8449	7.5975	10.1973	12.9478	15.1120	16.1100	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	83.9732	84.8446	82.6487	77.9740	72.0731	66.5270	62.8219	61.9505	64.1463	68.8210	74.7220	80.2681	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	42.0000	(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)	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	-40.0000	(71)
Water heating gains (Table 5)	28.4211	27.5206	25.6505	23.1082	21.4576	19.1335	17.1580	19.6891	20.5884	23.2198	26.1911	27.5243	(72)
Total internal gains	193.0687	191.2870	184.6212	174.6537	164.9379	156.0697	150.8248	154.2370	159.9320	169.9886	181.0251	188.9024	(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
East				2.8500	18.8263	0.6300	0.7000			0.7700			16.3976 (76)
Solar gains	16.3976	32.7481	53.8227	81.8090	96.2861	101.6908	96.8606	82.8258	64.4974	40.1961	20.6203	14.0235	(83)
Total gains	209.4663	224.0351	238.4440	256.4626	261.2240	257.7605	247.6855	237.0628	224.4294	210.1847	201.6454	202.9259	(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	14.2923	14.1964	14.2923	14.7564	14.6661	15.0186	15.1855	15.1855	15.1029	14.8453	14.6661	14.4816	
alpha	1.9528	1.9464	1.9528	1.9838	1.9777	2.0012	2.0124	2.0124	2.0069	1.9897	1.9777	1.9654	
util living area	0.9239	0.9118	0.8859	0.8336	0.7670	0.6649	0.5833	0.6111	0.7376	0.8492	0.9045	0.9272	(86)
MIT	17.6491	17.8439	18.3758	19.1511	19.7898	20.3659	20.6307	20.5808	20.1453	19.3047	18.3943	17.6479	(87)
Th 2	18.5604	18.5505	18.5604	18.6077	18.5985	18.6339	18.6503	18.6503	18.6422	18.6166	18.5985	18.5798	(88)
util rest of house	0.9038	0.8883	0.8535	0.7821	0.6834	0.5269	0.3939	0.4277	0.6217	0.7931	0.8751	0.9080	(89)
MIT 2	15.8422	16.0242	16.5433	17.3023	17.8727	18.3631	18.5501	18.5259	18.2178	17.4707	16.5945	15.8531	(90)
Living area fraction	17.2295	17.4213	17.9503	18.7217	19.3446	19.9008	20.1475	20.1036	19.6977	18.8788	17.9763	17.2310	(92)
Temperature adjustment	17.0795	17.2713	17.8003	18.5717	19.1946	19.7508	19.9975	19.9536	19.5477	18.7288	17.8263	17.0810	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8876	0.8723	0.8406	0.7812	0.7076	0.5997	0.5127	0.5399	0.6730	0.7963	0.8628	0.8920	(94)
Ext temp.	185.9207	195.4154	200.4440	200.3465	184.8459	154.5730	126.9787	127.9985	151.0481	167.3756	173.9860	181.0112	(95)
Heat loss rate W	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)
Month fracti	507.9622	499.7872	452.6297	375.7696	298.7181	211.8342	158.3409	163.8355	228.2414	325.1553	420.1723	501.3812	(97)
Space heating kWh	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	239.5989	204.5379	187.6262	126.3047	84.7209	0.0000	0.0000	0.0000	0.0000	117.3881	177.2542	238.3553	(98)
Space heating per m2												1375.7862	(98)
												125.2993	(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 %)													88.9000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1547.5660 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	239.5989	204.5379	187.6262	126.3047	84.7209	0.0000	0.0000	0.0000	0.0000	117.3881	177.2542	238.3553	(98)
Space heating efficiency (main heating system 1)	88.9000	88.9000	88.9000	88.9000	88.9000	0.0000	0.0000	0.0000	0.0000	88.9000	88.9000	88.9000	(210)
Space heating fuel (main heating system)	269.5151	230.0764	211.0530	142.0750	95.2991	0.0000	0.0000	0.0000	0.0000	132.0451	199.3860	268.1162	(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	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124	(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)
(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	(217)
Fuel for water heating, kWh/month	84.5813	73.9753	76.3359	66.5515	63.8577	55.1044	51.0623	58.5947	59.2945	69.1021	75.4303	81.9124	(219)
Water heating fuel used												815.8024	(219)
Annual totals kWh/year													
Space heating fuel - main system												1547.5660	(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)												110.7258	(232)
Total delivered energy for all uses												2549.0942	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1547.5660	3.7400	57.8790 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	815.8024	19.1200	155.9814 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	110.7258	19.1200	21.1708 (250)
Additional standing charges			94.0000 (251)
Total energy cost			343.3712 (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	1547.5660	0.2160	334.2743 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	815.8024	0.5190	423.4014 (264)
Space and water heating			757.6757 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	110.7258	0.5190	57.4667 (268)
Total kg/year			854.0674 (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	1547.5660	1.2200	1888.0306 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	815.8024	3.0700	2504.5134 (264)
Space and water heating			4392.5439 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	110.7258	3.0700	339.9281 (268)
Primary energy kWh/year			4962.7220 (272)
Primary energy kWh/m2/year			451.9783 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: D 68
Current environmental impact rating: C 80

(For testing purposes):

A Not considered
B Not considered
C Not considered

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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

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: SAP change Cost change CO2 change
(none)

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

Potential energy efficiency rating: D 68
Potential environmental impact rating: C 80

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	£191	£191	£0
Mains gas	£152	£152	£0
Space heating	£166	£166	£0
Water heating	£156	£156	£0
Lighting	£21	£21	£0
Total cost of fuels	£343	£343	£0
Total cost of uses	£343	£343	£0
Delivered energy	232 kWh/m²	232 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m²	78 kg/m²	78 kg/m²	0 kg/m²
Primary energy	452 kWh/m²	452 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 4 Derby Road			Issued on Date	19/07/2021
Assessment Reference	Notional	Prop Type Ref			
Project	Flat 4, 7 Derby Road, Leek, ST13 6HN				
Calculation Type	Conversion (As Designed)				
SAP Rating	68 D	DER	N/A	TER	N/A
Environmental	80 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	0.85	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	%

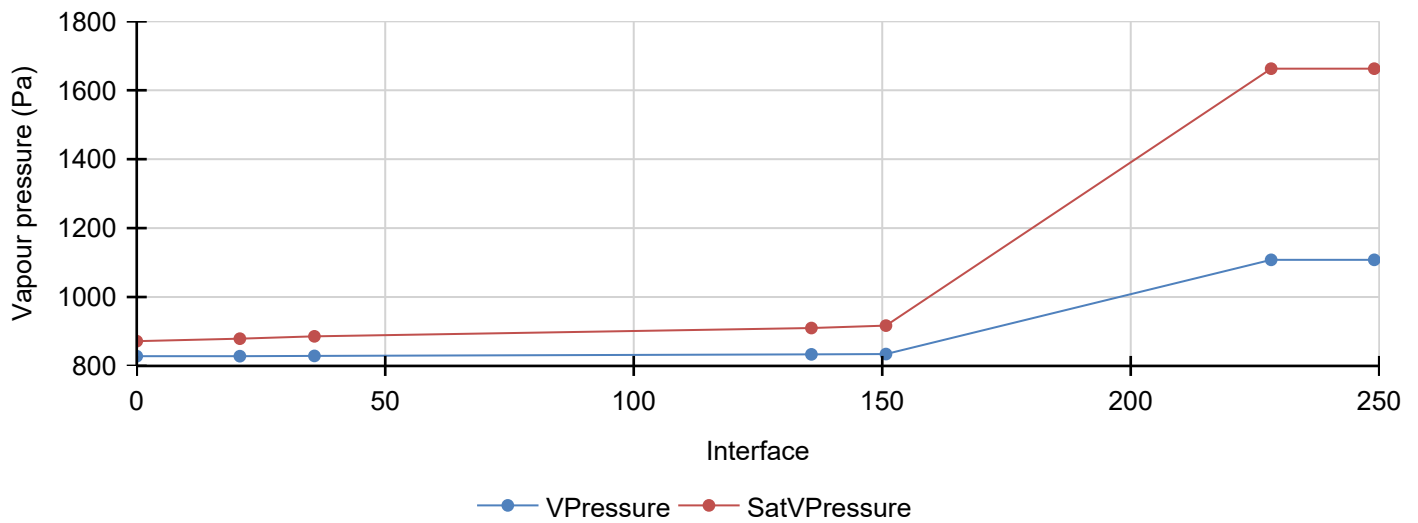
Table of layers

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

