

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 5 Derby Road				Issued on Date	19/07/2021
Assessment Reference	Notional		Prop Type Ref			
Property	Flat 5, 7 Derby Road, Leek, ST13 6HN					
SAP Rating	69 C	DER	N/A	TER	N/A	
Environmental	78 C	% DER<TER	N/A			
CO ₂ Emissions (t/year)	1.07	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	South
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				
	Ground Floor:	Heat Loss Perimeter 18.20 m	Internal Floor Area 18.50 m ²	Average Storey Height 2.90 m

7.0 Living Area	11.36	m ²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	206.53	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	41.76	37.63
Wall To Corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.30	9.00	11.02	9.13

9.1 Party Walls					
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Party Wall 1	Solid Wall	Other	0.00	180.00	7.63

9.2 Internal Walls					
Description	Construction		Kappa (kJ/m ² K)	Area (m ²)	
Internal Wall 1	Other		75.00	17.40	

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	18.50	18.50

11.1 Party Floors

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Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Timber I-joists, carpeted	30.00	18.50

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	South							1.89	
Rear	Window	[1] External Wall 1	North	None	0.00					2.70	
Side	Window	[1] External Wall 1	East	None	0.00					1.43	

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	SAP table	
Percentage of Heat	100	%
Main Heating	BGB	
SAP Code	102	
Efficiency (SAP Table)	84.0	%
Controls	CBE Programmer, room thermostat and TRVs	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2106	
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 5 Derby Road	Issued on Date	19/07/2021
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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

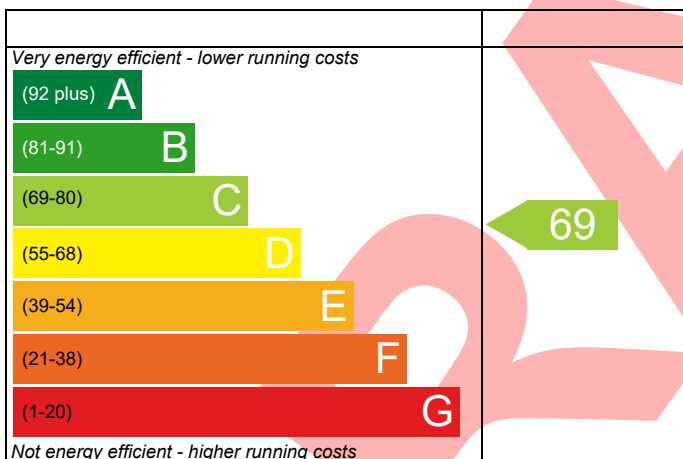
Flat 5, 7 Derby Road,
Leek,
ST13 6HN

Dwelling type: Flat, Semi-Detached
Date of assessment: 19/07/2021
Produced by: A-Rated Energy Services
Total floor area: 18.5 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

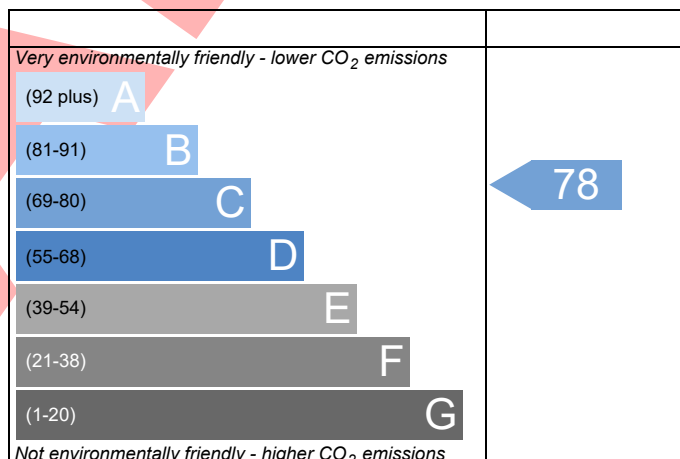


England

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	18.5000 (1b)	x 2.9000 (2b)	= 53.6500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	18.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 53.6500 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				20.0000 / (5) =	0.3728 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					1.1228 (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) =		0.7860 (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	0.8056	0.8252	0.8056	0.7074	0.7270	0.6484	0.6091	0.6091	0.6288	0.6877	0.7270	0.7663 (22b)
Effective ac	0.8245	0.8405	0.8245	0.7502	0.7643	0.7102	0.6855	0.6855	0.6977	0.7365	0.7643	0.7936 (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)			4.1300	1.5038	6.2105		(27)
External Wall 1	41.7600	4.1300	37.6300	0.3000	11.2890	9.0000	338.6700 (29a)
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)
External Roof 1	18.5000		18.5000	0.1600	2.9600	9.0000	166.5000 (30)
Total net area of external elements Aum(A, m ²)			71.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	26.3071			(33)
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)
Party Floor 1			18.5000			30.0000	555.0000 (32d)
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)
Heat capacity Cm = Sum (A x k)						(28)...(30) + (32) + (32a)...(32e) =	3820.7400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.5265 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)
Total fabric heat loss						(33) + (36) =	36.9991 (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	14.5973	14.8809	14.5973	13.2815	13.5310	12.5740	12.1366	12.1366	12.3519	13.0388	13.5310	14.0505 (38)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	51.5963	51.8800	51.5963	50.2806	50.5300	49.5731	49.1356	49.1356	49.3510	50.0379	50.5300	51.0495 (39)
Average = Sum(39)m / 12 =												50.3913 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	2.7890	2.8043	2.7890	2.7179	2.7314	2.6796	2.6560	2.6560	2.6676	2.7048	2.7314	2.7594 (40)
Days in month												2.7239 (40)
	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy content (annual)	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		967.2134 (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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
RHI water heating demand												822.1314 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (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	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.2220	17.9610	14.6068	11.0583	8.2662	6.9787	7.5407	9.8017	13.1559	16.7044	19.4965	20.7840 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325 (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)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572 (71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379 (72)
Total internal gains	222.7136	220.6693	212.5976	200.4559	188.3872	177.6022	171.3933	175.0808	182.1741	194.4056	207.8052	217.5917 (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	
North				2.7000	10.1716		0.6300	0.7000	0.7700		8.3931 (74)	
East				1.4300	18.8263		0.6300	0.7000	0.7700		8.2276 (76)	

Solar gains	16.6207	32.8381	54.9004	87.8193	108.8320	117.8537	111.0311	90.8692	66.9465	40.3915	20.7942	14.3092 (83)
Total gains	239.3343	253.5074	267.4980	288.2752	297.2192	295.4559	282.4244	265.9499	249.1206	234.7971	228.5994	231.9010 (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)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	20.5696	20.4571	20.5696	21.1079	21.0037	21.4091	21.5997	21.5997	21.5055	21.2103	21.0037	20.7899
util living area	2.3713	2.3638	2.3713	2.4072	2.4002	2.4273	2.4400	2.4400	2.4337	2.4140	2.4002	2.3860
	0.9681	0.9620	0.9478	0.9146	0.8621	0.7717	0.6935	0.7274	0.8454	0.9263	0.9583	0.9700 (86)
MIT	18.0651	18.2168	18.6570	19.3200	19.9010	20.4265	20.6678	20.6132	20.2010	19.4583	18.6892	18.0639 (87)
Th 2	18.8592	18.8510	18.8592	18.8977	18.8903	18.9187	18.9319	18.9319	18.9254	18.9049	18.8903	18.8751 (88)
util rest of house	0.9585	0.9503	0.9304	0.8826	0.8009	0.6527	0.5148	0.5593	0.7576	0.8929	0.9433	0.9610 (89)
MIT 2	16.3972	16.5412	16.9788	17.6443	18.1815	18.6477	18.8281	18.7992	18.4852	17.7930	17.0348	16.4062 (90)
Living area fraction									fLA = Living area / (4) =			0.6141 (91)
MIT	17.4214	17.5701	18.0093	18.6733	19.2374	19.7400	19.9578	19.9131	19.5388	18.8156	18.0507	17.4241 (92)
Temperature adjustment												-0.1500

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adjusted MIT 17.2714 17.4201 17.8593 18.5233 19.0874 19.5900 19.8078 19.7631 19.3888 18.6656 17.9007 17.2741 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9485	0.9396	0.9195	0.8752	0.8080	0.6979	0.6018	0.6383	0.7819	0.8878	0.9337	0.9514	(94)
Useful gains	226.9977	238.1973	245.9540	252.3112	240.1452	206.2000	169.9668	169.7502	194.7817	208.4626	213.4339	220.6206	(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													
	710.5533	696.2348	627.3736	519.0618	408.6563	287.0265	211.6658	219.2973	310.3579	448.6178	586.1843	703.1606	(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													
	359.7654	307.8012	283.7761	192.0605	125.3722	0.0000	0.0000	0.0000	0.0000	178.6755	268.3803	359.0098	(98)
Space heating												2074.8409	(98)
RHI space heating demand												2075	(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	18.5000 (1b)	x 2.9000 (2b)	= 53.6500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	18.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 53.6500 (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) = 0.3728 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.1228 (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) =				0.7860 (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	1.0021	0.9824	0.9628	0.8645	0.8449	0.7467	0.7467	0.7270	0.7860	0.8449	0.8842	0.9235 (22b)
Effective ac	1.0021	0.9826	0.9635	0.8737	0.8569	0.7787	0.7787	0.7643	0.8089	0.8569	0.8909	0.9264 (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)			4.1300	1.5038	6.2105		(27)
External Wall 1	41.7600	4.1300	37.6300	0.3000	11.2890	9.0000	338.6700 (29a)
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)
External Roof 1	18.5000		18.5000	0.1600	2.9600	9.0000	166.5000 (30)
Total net area of external elements Aum(A, m ²)			71.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =	26.3071			(33)
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)
Party Floor 1			18.5000			30.0000	555.0000 (32d)
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	3820.7400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.5265 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)
Total fabric heat loss						(33) + (36) =	36.9991 (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	17.7414	17.3963	17.0580	15.4688	15.1714	13.7873	13.7873	13.5310	14.3204	15.1714	15.7729	16.4018 (38)
Heat transfer coeff	54.7405	54.3954	54.0570	52.4678	52.1705	50.7864	50.7864	50.5300	51.3195	52.1705	52.7720	53.4008 (39)
Average = Sum(39)m / 12 =												52.4664 (39)
HLP	2.9589	2.9403	2.9220	2.8361	2.8200	2.7452	2.7452	2.7314	2.7740	2.8200	2.8525	2.8865 (40)
HLP (average)												2.8360 (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												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy content (annual)	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		967.2134 (45)
	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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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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (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	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.2220	17.9610	14.6068	11.0583	8.2662	6.9787	7.5407	9.8017	13.1559	16.7044	19.4965	20.7840 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325 (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)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572 (71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379 (72)
Total internal gains	222.7136	220.6693	212.5976	200.4559	188.3872	177.6022	171.3933	175.0808	182.1741	194.4056	207.8052	217.5917 (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	
North				2.7000	10.6334	0.6300	0.7000		0.7700		8.7742 (74)	
East				1.4300	19.6403	0.6300	0.7000		0.7700		8.5833 (76)	

Solar gains	17.3575	33.5587	56.1449	86.0956	111.0766	116.5951	109.7881	90.2633	66.4181	39.8837	21.5265	14.3731 (83)
Total gains	240.0711	254.2280	268.7425	286.5515	299.4638	294.1974	281.1813	265.3440	248.5922	234.2893	229.3317	231.9648 (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	19.3881	19.5112	19.6333	20.2280	20.3432	20.8977	20.8977	21.0037	20.6806	20.3432	20.1114	19.8745
alpha	2.2925	2.3007	2.3089	2.3485	2.3562	2.3932	2.3932	2.4002	2.3787	2.3562	2.3408	2.3250
util living area	0.9652	0.9581	0.9428	0.9089	0.8469	0.7396	0.6209	0.6579	0.8158	0.9165	0.9538	0.9677 (86)
MIT	18.0936	18.2999	18.7281	19.3750	19.9924	20.5269	20.7848	20.7447	20.3369	19.5734	18.7714	18.1032 (87)
Th 2	18.7707	18.7802	18.7895	18.8342	18.8427	18.8828	18.8828	18.8903	18.8672	18.8427	18.8255	18.8078 (88)
util rest of house	0.9540	0.9443	0.9224	0.8723	0.7743	0.5934	0.3817	0.4291	0.6984	0.8749	0.9360	0.9574 (89)
MIT 2	16.3725	16.5808	17.0059	17.6568	18.2302	18.6938	18.8449	18.8374	18.5559	17.8634	17.0760	16.4048 (90)
Living area fraction									fLA = Living area / (4) =			0.6141 (91)
MIT	17.4293	17.6364	18.0634	18.7119	19.3123	19.8194	20.0361	20.0086	19.6495	18.9135	18.1171	17.4477 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.2793	17.4864	17.9134	18.5619	19.1623	19.6694	19.8861	19.8586	19.4995	18.7635	17.9671	17.2977 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9434	0.9331	0.9115	0.8664	0.7876	0.6570	0.5101	0.5498	0.7412	0.8729	0.9263	0.9473 (94)
Useful gains	226.4771	237.2220	244.9587	248.2547	235.8507	193.2782	143.4279	145.8861	184.2587	204.4996	212.4367	219.7404 (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	710.4943	684.6422	616.9767	506.9377	389.3119	257.4583	166.8889	174.7624	277.1021	425.8926	573.4778	699.4296 (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	360.1088	300.6664	276.7814	186.2518	114.1751	0.0000	0.0000	0.0000	0.0000	164.7164	259.9496	356.8888 (98)
Space heating												2019.5383 (98)
Space heating per m2										(98) / (4) =		109.1642 (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 %)												84.0000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												2404.2122	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	360.1088	300.6664	276.7814	186.2518	114.1751	0.0000	0.0000	0.0000	0.0000	164.7164	259.9496	356.8888	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	428.7009	357.9362	329.5016	221.7284	135.9228	0.0000	0.0000	0.0000	0.0000	196.0910	309.4638	424.8676	(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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(219)
Water heating fuel used												822.1314	(219)
Annual totals kWh/year													
Space heating fuel - main system												2404.2122	(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)												142.8506	(232)
Total delivered energy for all uses												3444.1941	(238)

10a. Fuel costs - using Table 12 prices

	Fuel	Fuel price	Fuel cost
	kWh/year	p/kWh	£/year
Space heating - main system 1	2404.2122	3.4800	83.6666 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	822.1314	13.1900	108.4391 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	142.8506	13.1900	18.8420 (250)
Additional standing charges			120.0000 (251)
Total energy cost			340.8402 (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] =	2.2544 (257)
SAP value	68.5515	
SAP rating (Section 12)	69	(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	2404.2122	0.2160	519.3098 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	0.5190	426.6862 (264)
Space and water heating			945.9960 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	142.8506	0.5190	74.1394 (268)
Total kg/year			1059.0605 (272)
CO2 emissions per m2			57.2500 (273)
EI value			77.6513
EI rating			78 (274)
EI band			C

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.8400 = 4.143$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.8400 = 0.2571$, 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

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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	18.5000 (1b)	x 2.9000 (2b)	= 53.6500 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	18.5000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 53.6500 (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) = 0.3728 (8)
Measured/design AP50					No
Infiltration rate					15.0000
Number of sides sheltered					1.1228 (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) =	0.7860 (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												
	0.8056	0.8252	0.8056	0.7074	0.7270	0.6484	0.6091	0.6091	0.6288	0.6877	0.7270	0.7663 (22b)
Effective ac	0.8245	0.8405	0.8245	0.7502	0.7643	0.7102	0.6855	0.6855	0.6977	0.7365	0.7643	0.7936 (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)			4.1300	1.5038	6.2105		(27)
External Wall 1	41.7600	4.1300	37.6300	0.3000	11.2890	9.0000	338.6700 (29a)
Wall To Corridor	11.0200	1.8900	9.1300	0.2679	2.4455	9.0000	82.1700 (29a)
External Roof 1	18.5000		18.5000	0.1600	2.9600	9.0000	166.5000 (30)
Total net area of external elements Aum(A, m ²)			71.2800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	26.3071		(33)
Party Wall 1			7.6300	0.0000	0.0000	180.0000	1373.4000 (32)
Party Floor 1			18.5000			30.0000	555.0000 (32d)
Internal Wall 1			17.4000			75.0000	1305.0000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 3820.7400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							206.5265 (35)
Thermal bridges (Default value 0.150 * total exposed area)							10.6920 (36)
Total fabric heat loss							(33) + (36) = 36.9991 (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	14.5973	14.8809	14.5973	13.2815	13.5310	12.5740	12.1366	12.1366	12.3519	13.0388	13.5310	14.0505 (38)
Heat transfer coeff	51.5963	51.8800	51.5963	50.2806	50.5300	49.5731	49.1356	49.1356	49.3510	50.0379	50.5300	51.0495 (39)
Average = Sum(39)m / 12 =												50.3913 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	2.7890	2.8043	2.7890	2.7179	2.7314	2.6796	2.6560	2.6560	2.6676	2.7048	2.7314	2.7594 (40)
HLP (average)												2.7239 (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												1.0189 (42)
Average daily hot water use (litres/day)												61.4732 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	67.6206	65.1616	62.7027	60.2438	57.7848	55.3259	55.3259	57.7848	60.2438	62.7027	65.1616	67.6206 (44)
Energy conte	100.2793	87.7049	90.5037	78.9033	75.7096	65.3316	60.5393	69.4698	70.2995	81.9272	89.4300	97.1152 (45)
Energy content (annual)										Total = Sum(45)m =		967.2134 (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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479 (64)
Heat gains from water heating, kWh/month	21.3094	18.6373	19.2320	16.7669	16.0883	13.8830	12.8646	14.7623	14.9386	17.4095	19.0039	20.6370 (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	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	61.1358	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.2220	17.9610	14.6068	11.0583	8.2662	6.9787	7.5407	9.8017	13.1559	16.7044	19.4965	20.7840	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	108.3389	109.4632	106.6302	100.5990	92.9858	85.8305	81.0503	79.9261	82.7591	88.7902	96.4034	103.5587	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	42.1325	(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)	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	-40.7572	(71)
Water heating gains (Table 5)	28.6416	27.7341	25.8495	23.2874	21.6240	19.2819	17.2911	19.8418	20.7481	23.3999	26.3943	27.7379	(72)
Total internal gains	222.7136	220.6693	212.5976	200.4559	188.3872	177.6022	171.3933	175.0808	182.1741	194.4056	207.8052	217.5917	(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				
North				2.7000	10.1716	0.6300	0.7000	0.7700	8.3931 (74)				
East				1.4300	18.8263	0.6300	0.7000	0.7700	8.2276 (76)				

Solar gains	16.6207	32.8381	54.9004	87.8193	108.8320	117.8537	111.0311	90.8692	66.9465	40.3915	20.7942	14.3092	(83)
Total gains	239.3343	253.5074	267.4980	288.2752	297.2192	295.4559	282.4244	265.9499	249.1206	234.7971	228.5994	231.9010	(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	20.5696	20.4571	20.5696	21.1079	21.0037	21.4091	21.5997	21.5997	21.5055	21.2103	21.0037	20.7899	
alpha	2.3713	2.3638	2.3713	2.4072	2.4002	2.4273	2.4400	2.4400	2.4337	2.4140	2.4002	2.3860	
util living area	0.9681	0.9620	0.9478	0.9146	0.8621	0.7717	0.6935	0.7274	0.8454	0.9263	0.9583	0.9700	(86)
MIT	18.0651	18.2168	18.6570	19.3200	19.9010	20.4265	20.6678	20.6132	20.2010	19.4583	18.6892	18.0639	(87)
Th 2	18.8592	18.8510	18.8592	18.8977	18.8903	18.9187	18.9319	18.9319	18.9254	18.9049	18.8903	18.8751	(88)
util rest of house	0.9585	0.9503	0.9304	0.8826	0.8009	0.6527	0.5148	0.5593	0.7576	0.8929	0.9433	0.9610	(89)
MIT 2	16.3972	16.5412	16.9788	17.6443	18.1815	18.6477	18.8281	18.7992	18.4852	17.7930	17.0348	16.4062	(90)
Living area fraction									fLA = Living area / (4) =			0.6141	(91)
MIT	17.4214	17.5701	18.0093	18.6733	19.2374	19.7400	19.9578	19.9131	19.5388	18.8156	18.0507	17.4241	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.2714	17.4201	17.8593	18.5233	19.0874	19.5900	19.8078	19.7631	19.3888	18.6656	17.9007	17.2741	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9485	0.9396	0.9195	0.8752	0.8080	0.6979	0.6018	0.6383	0.7819	0.8878	0.9337	0.9514	(94)
Ext temp.	226.9977	238.1973	245.9540	252.3112	240.1452	206.2000	169.9668	169.7502	194.7817	208.4626	213.4339	220.6206	(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	710.5533	696.2348	627.3736	519.0618	408.6563	287.0265	211.6658	219.2973	310.3579	448.6178	586.1843	703.1606	(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	359.7654	307.8012	283.7761	192.0605	125.3722	0.0000	0.0000	0.0000	0.0000	178.6755	268.3803	359.0098	(98)
Space heating per m2												2074.8409	(98)
										(98) / (4) =		112.1536	(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 %)													84.0000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2470.0487 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	359.7654	307.8012	283.7761	192.0605	125.3722	0.0000	0.0000	0.0000	0.0000	178.6755	268.3803	359.0098	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	428.2921	366.4300	337.8287	228.6434	149.2526	0.0000	0.0000	0.0000	0.0000	212.7089	319.5003	427.3926	(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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(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	85.2374	74.5492	76.9281	67.0678	64.3531	55.5319	51.4584	59.0493	59.7545	69.6382	76.0155	82.5479	(219)
Water heating fuel used												822.1314	(219)
Annual totals kWh/year													
Space heating fuel - main system												2470.0487	(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)												142.8506	(232)
Total delivered energy for all uses												3510.0306	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2470.0487	3.7400	92.3798 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	822.1314	19.1200	157.1915 (247)
Pumps and fans for heating	75.0000	19.1200	14.3400 (249)
Energy for lighting	142.8506	19.1200	27.3130 (250)
Additional standing charges			94.0000 (251)
Total energy cost			385.2244 (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	2470.0487	0.2160	533.5305 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	0.5190	426.6862 (264)
Space and water heating			960.2167 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	142.8506	0.5190	74.1394 (268)
Total kg/year			1073.2811 (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	2470.0487	1.2200	3013.4594 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	822.1314	3.0700	2523.9433 (264)
Space and water heating			5537.4027 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	142.8506	3.0700	438.5512 (268)
Primary energy kWh/year			6206.2039 (272)
Primary energy kWh/m2/year			335.4705 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: C 69
Current environmental impact rating: C 78

(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 69
 Potential environmental impact rating: C 78

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	£199	£199	£0
Mains gas	£186	£186	£0
Space heating	£201	£201	£0
Water heating	£157	£157	£0
Lighting	£27	£27	£0
Total cost of fuels	£385	£385	£0
Total cost of uses	£385	£385	£0
Delivered energy	190 kWh/m²	190 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	58 kg/m²	58 kg/m²	0 kg/m²
Primary energy	335 kWh/m²	335 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 5 Derby Road			Issued on Date	19/07/2021
Assessment Reference	Notional	Prop Type Ref			
Project	Flat 5, 7 Derby Road, Leek, ST13 6HN				
Calculation Type	Conversion (As Designed)				
SAP Rating	69 C	DER	N/A	TER	N/A
Environmental	78 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.07	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	%

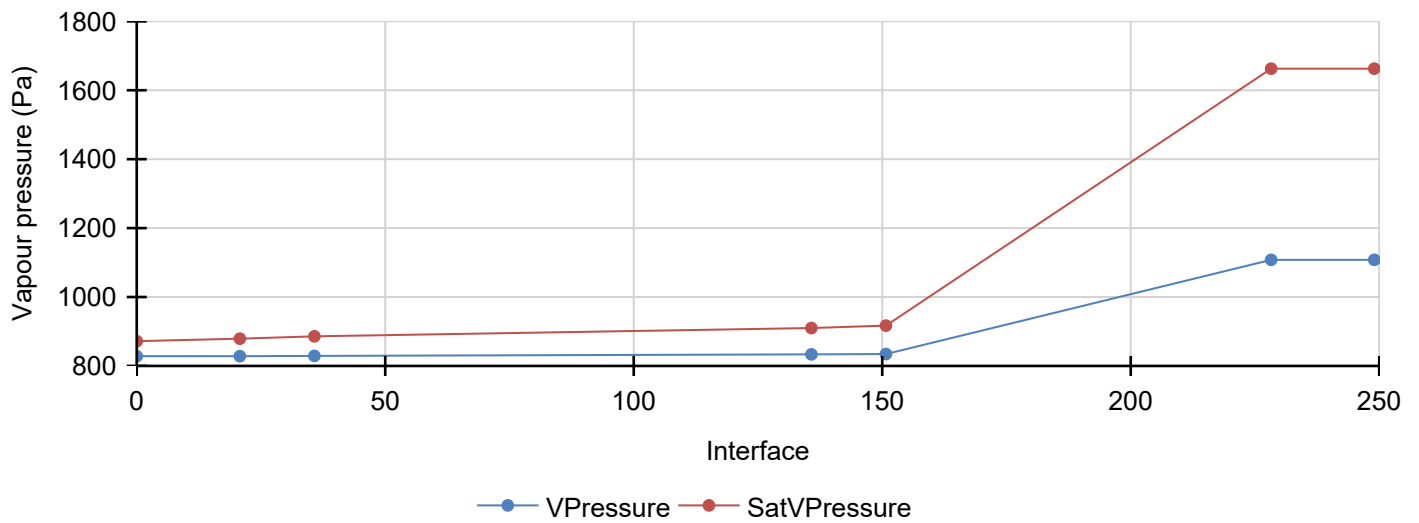
Table of layers

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

