

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Flat 4 Derby Road				Issued on Date	19/07/2021
Assessment Reference	Design Stage		Prop Type Ref			
Property	Flat 4, 7 Derby Road, Leek, ST13 6HN					
SAP Rating	69 C	DER	N/A	TER	N/A	
Environmental	80 C	% DER<TER	N/A			
CO ₂ Emissions (t/year)	0.82	DFEE	N/A	TFEE	N/A	
General Requirements Compliance	N/A	% DFEE<TFEE	N/A			
Assessor Details	Mr. William Linley, A-Rated Energy Services, Tel: 07976 408446, info@ratedenergy.co.uk				Assessor ID	p977-0001
Client						

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

7.0 Living Area	8.43	m ²
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	0.29	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	0.15	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	0.24	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							1.00
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

6

Total number of L.E.L. fittings

6

Percentage of L.E.L. fittings

100.00

%

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

25.0 Main Heating 2	None
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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

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Building Elements

Roof 000005

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Mineral wool				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 2	Mineral wool				
	Main construction	150	0.0400	3.7500	87.50
	Main construction	150	0.1300	1.1538	12.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Int surface				0.1000	

Total resistance:	Upper limit = 7.246 m ² K/W	Lower limit = 6.883 m ² K/W	Average = 7.064 m ² K/W
	Total correction = 0.0045 m ² K/W	U-value (unrounded) = 0.15 W/m ² K	

Unheated space: None

Total thickness: 313 mm

U-value: 0.15 W/m² K

Kappa: n/a

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Client	
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Building Elements

Wall 000001

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	Brick, outer leaf						
	Main construction	230	0.7700	0.2987	82.81		
	Main construction	230	0.9407	0.2445	17.19		
Layer 2	Plaster, standard						
	Main construction	15	0.4000	0.0375	100.00		
Layer 3	airspace/plaster dabs						
	Main construction	15	0.0882	0.1700	80.00		
	Main construction	15	0.0882	0.1700	20.00		
	Corrections - Cavity Unventilated, Emissivity: Normal						
Layer 4	Celotex PL4060 [72.5mm]						
	Main construction	72.5	0.0264	2.7500	100.00	30	1400
	Corrections - Air Gap: Level 1, Fasteners: None or plastic						
Int surface				0.1300			

Total resistance:	Upper limit = 3.417 m ² K/W	Lower limit = 3.415 m ² K/W	Average = 3.416 m ² K/W
	Total correction = 0.0065 m ² K/W	U-value (unrounded) = 0.29 W/m ² K	

Unheated space: None		
Total thickness: 333 mm	U-value: 0.29 W/m² K	Kappa: 0.00 kJ/m² K

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General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

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Client	
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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	airspace/plaster dabs						
	Main construction	15	0.0882	0.1700	80.00		
	Main construction	15	0.0882	0.1700	20.00		
	Corrections - Cavity Unventilated, Emissivity: Normal						
Layer 5	Celotex PL4060 [72.5mm]						
	Main construction	72.5	0.0264	2.7500	100.00	30	1400
	Corrections - Air Gap: Level 1, Fasteners: None or plastic						
Int surface				0.1300			

Total resistance:	Upper limit = 3.291 m ² K/W	Lower limit = 3.290 m ² K/W	Average = 3.290 m ² K/W
	Total correction = 0.0070 m ² K/W	U-value (unrounded) = 0.3 W/m ² K	

Unheated space: None		
Total thickness: 218 mm	U-value: 0.30 W/m² K	Kappa: 0.00 kJ/m² K

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Client	
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Building Elements

Floor 000003

Floor Type: Exposed Floor

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Chipboard				
	Main construction	22	0.1300	0.1692	100.00
Layer 2	Standard cavity				
	Main construction	50	0.2381	0.2100	87.50
	Main construction	50	0.1300	0.3846	12.50
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 3	ROCKWOOL RWA45 slab				
	Main construction	100	0.0350	2.8571	87.50
	Main construction	100	0.1300	0.7692	12.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	ROCKWOOL RWA45 slab				
	Main construction	50	0.0350	1.4286	87.50
	Main construction	50	0.1300	0.3846	12.50
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 5	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 6	Gyproc Wallboard (12.5mm)				
	Main construction	12.5	0.1900	0.0658	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Int surface				0.1700	

Total resistance:	Upper limit = 4.441 m ² K/W	Lower limit = 3.933 m ² K/W	Average = 4.187 m ² K/W
	Total correction = 0.0032 m ² K/W	U-value (unrounded) = 0.24 W/m ² K	

Unheated space: None

Total thickness: 247 mm

U-value: 0.24 W/m² K

Kappa: n/a

PREDICTED ENERGY ASSESSMENT

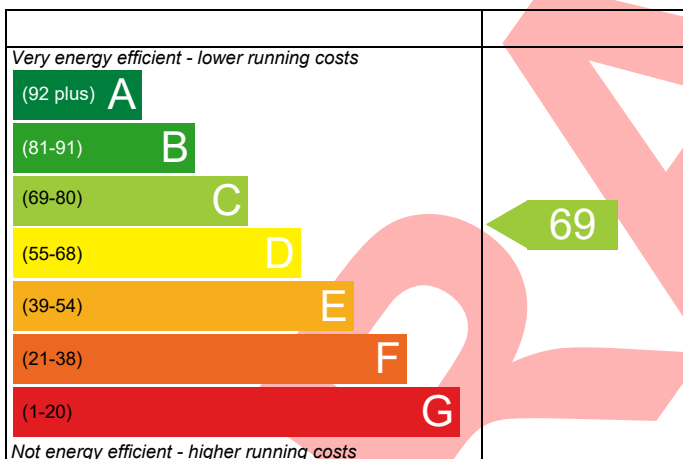
Flat 4, 7 Derby Road,
Leek,
ST13 6HN

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

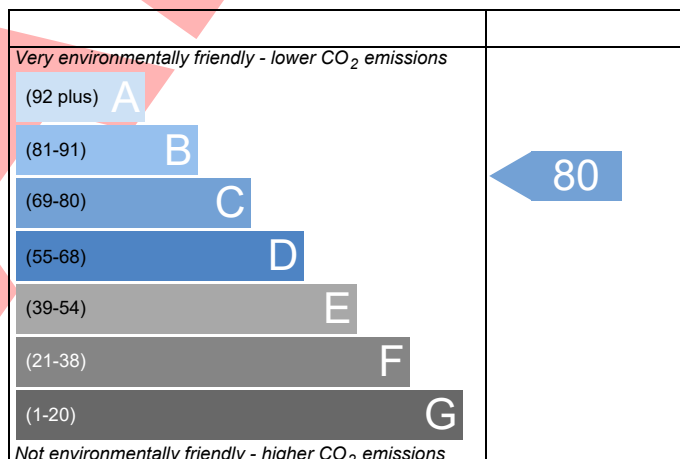


England

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		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 31.8420 (5)
Dwelling volume			

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
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)			
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
	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	1.0000	1.8900		(26)
New Glazing (Uw = 1.60)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2190	2.4044	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.2900	2.9580	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	0.1500	1.6470	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) =		17.3396		(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) =	25.2011 (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 (38)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

Heat transfer coeff	35.5918	35.8445	35.5918	34.4153	34.6384	33.7827	33.3916	33.3916	33.5841	34.1983	34.6384	35.1028 (39)
Average = Sum(39)m / 12 =												34.5143 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	3.2415	3.2645	3.2415	3.1344	3.1547	3.0768	3.0411	3.0411	3.0587	3.1146	3.1547	3.1970 (40)
Days in month												3.1434 (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	12.5395	11.1375	9.0576	6.8572	5.1258	4.3274	4.6760	6.0780	8.1579	10.3583	12.0896	12.8880 (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	189.9338	188.5026	182.3568	172.9394	163.6565	154.9879	149.6558	152.7175	157.8926	167.3991	178.0027	185.6804 (73)

6. Solar gains

[Jan]			Area	Solar flux	g	FF	Access	Gains						
			m2	Table 6a	Specific data	Specific data	factor	W						
				W/m2	or Table 6b	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			206.3315	221.2507	236.1796	254.7483	259.9425	256.6786	246.5165	235.5433	222.3899	207.5951	198.6230	199.7039 (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	15.0211	14.9152	15.0211	15.5346	15.4346	15.8255	16.0108	16.0108	15.9191	15.6332	15.4346	15.2303
alpha	2.0014	1.9943	2.0014	2.0356	2.0290	2.0550	2.0674	2.0674	2.0613	2.0422	2.0290	2.0154
util living area	0.9240	0.9113	0.8842	0.8293	0.7601	0.6544	0.5712	0.6000	0.7306	0.8468	0.9042	0.9274 (86)
MIT	17.7724	17.9667	18.4929	19.2576	19.8727	20.4225	20.6692	20.6218	20.2086	19.3936	18.5032	17.7721 (87)
Th 2	18.6341	18.6236	18.6341	18.6843	18.6747	18.7121	18.7296	18.7296	18.7210	18.6938	18.6747	18.6547 (88)
util rest of house	0.9042	0.8881	0.8520	0.7782	0.6773	0.5198	0.3891	0.4230	0.6168	0.7912	0.8752	0.9085 (89)
MIT 2	16.0049	16.1858	16.6990	17.4485	17.9946	18.4626	18.6375	18.6147	18.3239	17.6009	16.7444	16.0178 (90)
Living area fraction									fLA = Living area / (4) =			0.7678 (91)
MIT	17.3619	17.5531	18.0763	18.8374	19.4365	19.9673	20.1974	20.1557	19.7709	18.9773	18.0947	17.3647 (92)
Temperature adjustment												-0.1500
adjusted MIT	17.2119	17.4031	17.9263	18.6874	19.2865	19.8173	20.0474	20.0057	19.6209	18.8273	17.9447	17.2147 (93)

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Calculation Type: Conversion (As Designed)

CALCULATION OF HEAT DEMAND 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8885	0.8726	0.8398	0.7782	0.7024	0.5918	0.5037	0.5319	0.6681	0.7951	0.8634	0.8931	(94)
Useful gains	183.3331	193.0596	198.3519	198.2554	182.5937	151.8966	124.1712	125.2764	148.5896	165.0689	171.5005	178.3617	(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													
	488.0309	480.4277	435.1542	360.9281	287.0318	203.2823	151.8449	157.1307	218.9972	312.1378	403.3540	481.4245	(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													
	226.6952	193.1113	176.1809	117.1243	77.7019	0.0000	0.0000	0.0000	0.0000	109.4192	166.9346	225.4787	(98)
Space heating													
RHI space heating demand												1292.6461	(98)
												1293	(98)

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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	1.0000	1.8900		(26)
New Glazing (Uw = 1.60)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2190	2.4044	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.2900	2.9580	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	0.1500	1.6470	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) =	17.3396		(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) =	25.2011 (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	38.1253	37.8718	37.6184	36.3513	36.0979	34.8675	34.8675	34.6384	35.3442	36.0979	36.6048	37.1116 (39)
Average = Sum(39)m / 12 =												36.2997 (39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	3.4722	3.4492	3.4261	3.3107	3.2876	3.1756	3.1756	3.1547	3.2190	3.2876	3.3338	3.3799 (40)
HLP (average)												3.3060 (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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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	12.5395	11.1375	9.0576	6.8572	5.1258	4.3274	4.6760	6.0780	8.1579	10.3583	12.0896	12.8880	(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	189.9338	188.5026	182.3568	172.9394	163.6565	154.9879	149.6558	152.7175	157.8926	167.3991	178.0027	185.6804	(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	207.0404	221.9668	237.4675	253.3150	262.1599	255.8236	245.6556	235.1799	221.9886	207.1071	199.3326	199.7481	(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	14.0229	14.1168	14.2119	14.7072	14.8105	15.3331	15.3331	15.4346	15.1263	14.8105	14.6054	14.4060	
alpha	1.9349	1.9411	1.9475	1.9805	1.9874	2.0222	2.0222	2.0290	2.0084	1.9874	1.9737	1.9604	
util living area	0.9203	0.9057	0.8777	0.8238	0.7434	0.6225	0.5053	0.5343	0.6984	0.8345	0.8980	0.9244	(86)
MIT	17.7922	18.0505	18.5583	19.2933	19.9563	20.5176	20.7788	20.7449	20.3342	19.4987	18.5743	17.7968	(87)
Th 2	18.5325	18.5422	18.5521	18.6027	18.6131	18.6648	18.6648	18.6747	18.6445	18.6131	18.5924	18.5721	(88)
util rest of house	0.8981	0.8793	0.8412	0.7667	0.6487	0.4641	0.2753	0.3099	0.5557	0.7684	0.8649	0.9035	(89)
MIT 2	15.9681	16.2221	16.7148	17.4326	18.0241	18.4911	18.6319	18.6299	18.3652	17.6488	16.7663	15.9962	(90)
Living area fraction	17.3686	17.6258	18.1302	18.8611	19.5076	20.0469	20.2802	20.2537	19.8769	19.0690	18.1544	17.3787	(91)
Temperature adjustment	17.2186	17.4758	17.9802	18.7111	19.3576	19.8969	20.1302	20.1037	19.7269	18.9190	18.0044	17.2287	(92)
adjusted MIT												-0.1500	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.8824	0.8643	0.8305	0.7698	0.6827	0.5561	0.4305	0.4592	0.6303	0.7788	0.8544	0.8881	(94)
Ext temp.	182.6887	191.8516	197.2102	195.0098	178.9811	142.2711	105.7589	108.0059	139.9203	161.2938	170.3062	177.3962	(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	492.5244	476.2700	431.8654	356.6481	276.4233	184.6910	123.0904	128.2896	198.8793	300.3004	399.1537	483.5141	(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	230.5178	191.1291	174.5835	116.3795	72.4970	0.0000	0.0000	0.0000	0.0000	103.4209	164.7702	227.7517	(98)
Space heating per m2												1281.0498	(98)
												116.6712	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													89.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1431.3405 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	230.5178	191.1291	174.5835	116.3795	72.4970	0.0000	0.0000	0.0000	0.0000	103.4209	164.7702	227.7517	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	257.5617	213.5521	195.0654	130.0330	81.0022	0.0000	0.0000	0.0000	0.0000	115.5541	184.1008	254.4712	(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													1431.3405 (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)													88.5806 (232)
Total delivered energy for all uses													2410.7236 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1431.3405	3.4800	49.8107 (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	88.5806	13.1900	11.6838 (250)
Additional standing charges			120.0000 (251)
Total energy cost			298.9913 (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] =	2.2432 (257)
SAP value		68.7069
SAP rating (Section 12)		69 (258)
SAP band		C

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	1431.3405	0.2160	309.1696 (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			732.5710 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	88.5806	0.5190	45.9733 (268)
Total kg/year			817.4693 (272)
CO2 emissions per m2			74.4500 (273)
EI value			80.4321
EI rating			80 (274)
EI band			C

Calculation of stars for heating and DHW

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

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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

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

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	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	1.0000	1.8900		(26)
New Glazing (Uw = 1.60)			2.8500	1.5038	4.2857		(27)
Exposed to Corridor			10.9800	0.2190	2.4044	20.0000	219.6000 (28b)
External Wall 1	13.0500	2.8500	10.2000	0.2900	2.9580	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	0.1500	1.6470	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) =	17.3396		(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) =	25.2011 (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	35.5918	35.8445	35.5918	34.4153	34.6384	33.7827	33.3916	33.3916	33.5841	34.1983	34.6384	35.1028 (39)
Average = Sum(39)m / 12 =												34.5143 (39)
HLP	3.2415	3.2645	3.2415	3.1344	3.1547	3.0768	3.0411	3.0411	3.0587	3.1146	3.1547	3.1970 (40)
HLP (average)												3.1434 (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 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)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	12.5395	11.1375	9.0576	6.8572	5.1258	4.3274	4.6760	6.0780	8.1579	10.3583	12.0896	12.8880	(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	189.9338	188.5026	182.3568	172.9394	163.6565	154.9879	149.6558	152.7175	157.8926	167.3991	178.0027	185.6804	(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	206.3315	221.2507	236.1796	254.7483	259.9425	256.6786	246.5165	235.5433	222.3899	207.5951	198.6230	199.7039 (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	15.0211	14.9152	15.0211	15.5346	15.4346	15.8255	16.0108	16.0108	15.9191	15.6332	15.4346	15.2303	
alpha	2.0014	1.9943	2.0014	2.0356	2.0290	2.0550	2.0674	2.0674	2.0613	2.0422	2.0290	2.0154	
util living area	0.9240	0.9113	0.8842	0.8293	0.7601	0.6544	0.5712	0.6000	0.7306	0.8468	0.9042	0.9274	(86)
MIT	17.7724	17.9667	18.4929	19.2576	19.8727	20.4225	20.6692	20.6218	20.2086	19.3936	18.5032	17.7721	(87)
Th 2	18.6341	18.6236	18.6341	18.6843	18.6747	18.7121	18.7296	18.7296	18.7210	18.6938	18.6747	18.6547	(88)
util rest of house	0.9042	0.8881	0.8520	0.7782	0.6773	0.5198	0.3891	0.4230	0.6168	0.7912	0.8752	0.9085	(89)
MIT 2	16.0049	16.1858	16.6990	17.4485	17.9946	18.4626	18.6375	18.6147	18.3239	17.6009	16.7444	16.0178	(90)
Living area fraction									fLA = Living area / (4) =			0.7678	(91)
MIT	17.3619	17.5531	18.0763	18.8374	19.4365	19.9673	20.1974	20.1557	19.7709	18.9773	18.0947	17.3647	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.2119	17.4031	17.9263	18.6874	19.2865	19.8173	20.0474	20.0057	19.6209	18.8273	17.9447	17.2147	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	183.3331	193.0596	198.3519	198.2554	182.5937	151.8966	124.1712	125.2764	148.5896	165.0689	171.5005	178.3617	(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	488.0309	480.4277	435.1542	360.9281	287.0318	203.2823	151.8449	157.1307	218.9972	312.1378	403.3540	481.4245	(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	226.6952	193.1113	176.1809	117.1243	77.7019	0.0000	0.0000	0.0000	0.0000	109.4192	166.9346	225.4787	(98)
Space heating												1292.6461	(98)
Space heating per m2										(98) / (4) =		117.7273	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Designed)

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

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													89.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													1444.2974 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	226.6952	193.1113	176.1809	117.1243	77.7019	0.0000	0.0000	0.0000	0.0000	109.4192	166.9346	225.4787	(98)
Space heating efficiency (main heating system 1)	89.5000	89.5000	89.5000	89.5000	89.5000	0.0000	0.0000	0.0000	0.0000	89.5000	89.5000	89.5000	(210)
Space heating fuel (main heating system)	253.2907	215.7669	196.8502	130.8651	86.8178	0.0000	0.0000	0.0000	0.0000	122.2561	186.5191	251.9315	(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												1444.2974	(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)												88.5806	(232)
Total delivered energy for all uses												2423.6804	(238)

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

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	1444.2974	3.7400	54.0167 (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	88.5806	19.1200	16.9366 (250)
Additional standing charges			94.0000 (251)
Total energy cost			335.2748 (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	1444.2974	0.2160	311.9682 (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			735.3697 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	88.5806	0.5190	45.9733 (268)
Total kg/year			820.2680 (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	1444.2974	1.2200	1762.0428 (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			4266.5562 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	88.5806	3.0700	271.9425 (268)
Primary energy kWh/year			4768.7486 (272)
Primary energy kWh/m2/year			434.3123 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: C 69
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: C 69
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	£187	£187	£0
Mains gas	£148	£148	£0
Space heating	£162	£162	£0
Water heating	£156	£156	£0
Lighting	£17	£17	£0
Total cost of fuels	£335	£335	£0
Total cost of uses	£335	£335	£0
Delivered energy	221 kWh/m²	221 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	75 kg/m²	75 kg/m²	0 kg/m²
Primary energy	434 kWh/m²	434 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	Design Stage		Prop Type Ref			
Project	Flat 4, 7 Derby Road, Leek, ST13 6HN					
Calculation Type	Conversion (As Designed)					
SAP Rating	69 C	DER	N/A	TER	N/A	
Environmental	80 C	% DER<TER	N/A			
CO ₂ Emissions (t/year)	0.82	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						

Roof - 000005

Environmental conditions

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

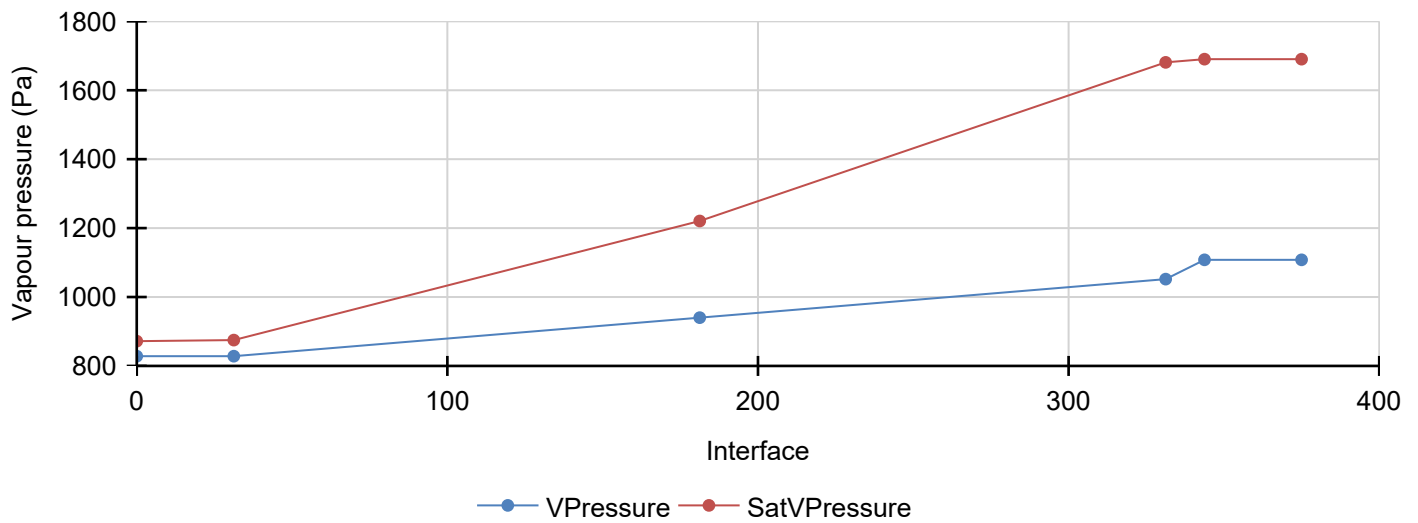
Table of layers

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.Mineral wool	150.0	0.0400	3.7500	3.7900	10.0	1.50	1.50
2.Mineral wool	150.0	0.0400	3.7500	7.5400	10.0	1.50	3.00
3.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	7.6058	60.0	0.75	3.75
Internal surface	-	0.0000	0.1000	7.6058	0.0	0.00	3.75

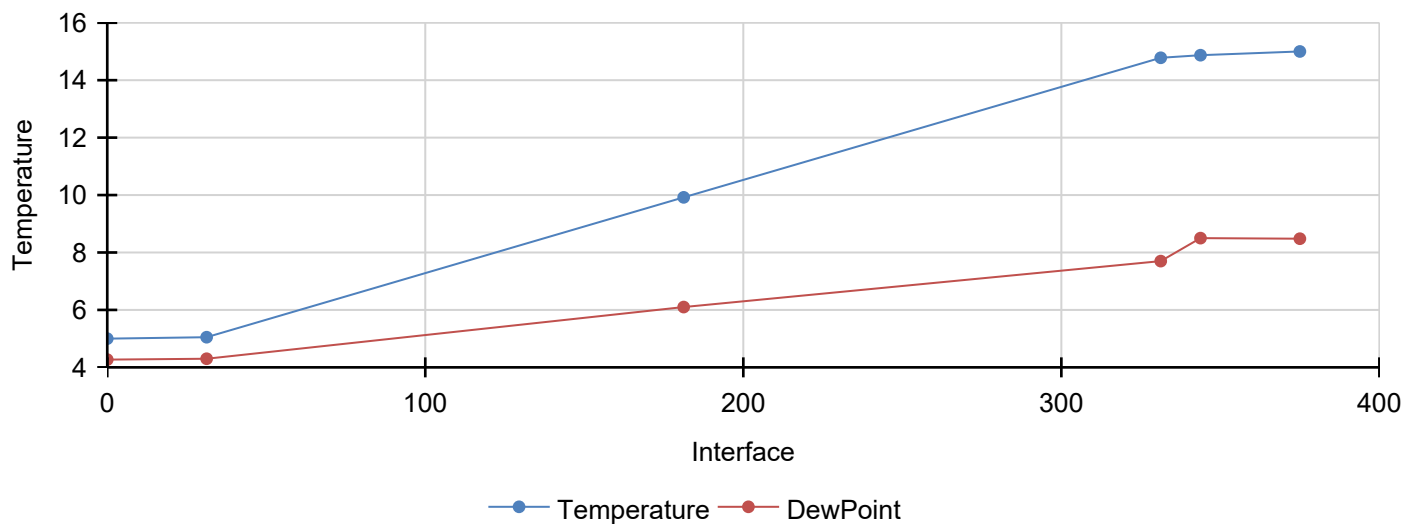
Vapour pressure table

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 / Mineral wool	5.05	828.3	875.0	4.3	0.00	0.00	No
2. Mineral wool / Mineral wool	9.92	940.1	1220.6	6.1	0.00	0.00	No
3. Mineral wool / Gyproc Wallboard (12.5mm)	14.78	1051.9	1680.9	7.7	0.00	0.00	No
Gyproc Wallboard (12.5mm) / Internal surface	14.87	1107.9	1690.2	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1690.2	8.48	0.00	0.00	No

CONDENSATION RISK ANALYSIS



Interface temperature / Dew point graphical representation



CONDENSATION RISK ANALYSIS

Wall - 000001

Environmental conditions

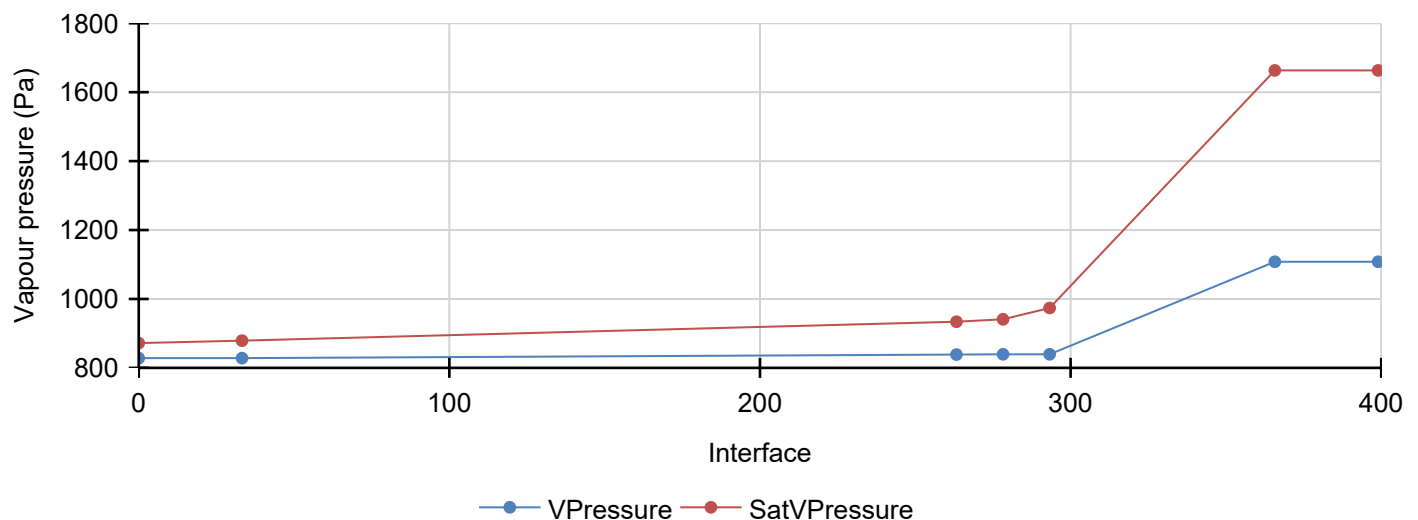
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m².K/W	Cumulative thermal resistance m².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.Brick, outer leaf	230.0	0.7700	0.2987	0.3387	50.0	11.50	11.50
2.Plaster, standard	15.0	0.4000	0.0375	0.3762	60.0	0.90	12.40
3.airspace/plaster dabs	15.0	0.0000	0.1700	0.5462	0.0	0.00	12.40
4.Celotex PL4060 [72.5mm]	72.5	0.0000	2.7500	3.2962	0.000	300.00	312.40
Internal surface	-	0.0000	0.1300	3.2962	0.0	0.00	312.40

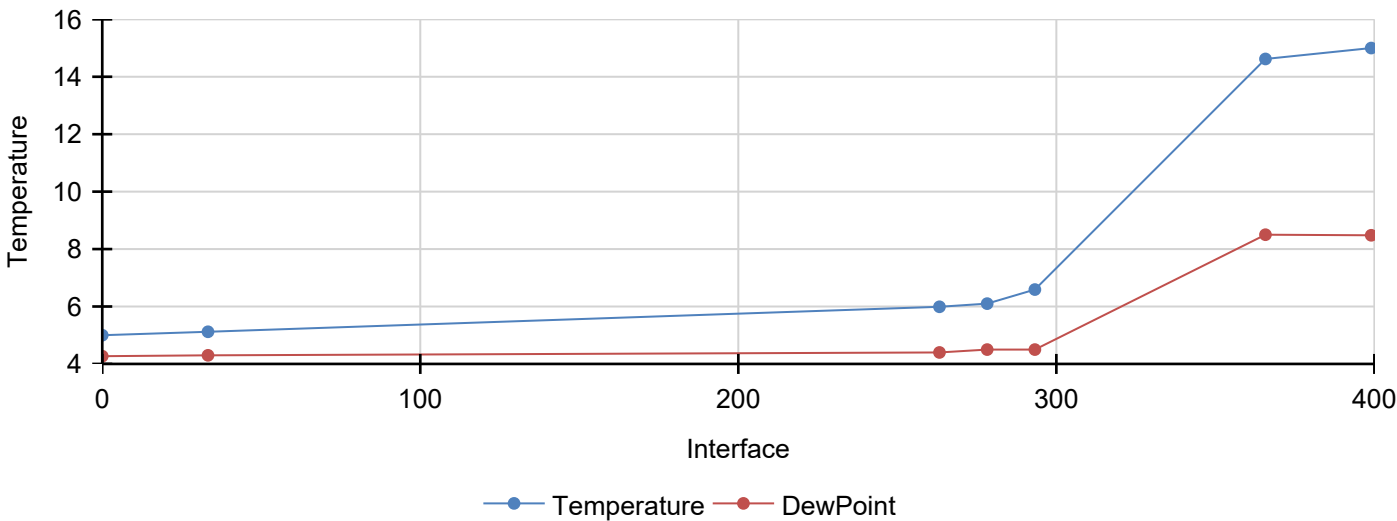
Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/m² h	Cond. rate 60 days g/m² h	Cond. risk Y/N
External surface	5.00	828.3	871.9	4.27	0.00	0.00	No
1. External surface / Brick, outer leaf	5.12	828.3	879.0	4.3	0.00	0.00	No
2. Brick, outer leaf / Plaster, standard	5.99	838.6	933.9	4.4	0.00	0.00	No
3. Plaster, standard / airspace/plaster dabs	6.10	839.4	941.0	4.5	0.00	0.00	No
4. airspace/plaster dabs / Celotex PL4060 [72.5mm]	6.59	839.4	973.8	4.5	0.00	0.00	No
Celotex PL4060 [72.5mm] / Internal surface	14.62	1107.9	1663.2	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1663.2	8.48	0.00	0.00	No



Interface temperature / Dew point graphical representation

CONDENSATION RISK ANALYSIS



CONDENSATION RISK ANALYSIS

Wall - 000002

Environmental conditions

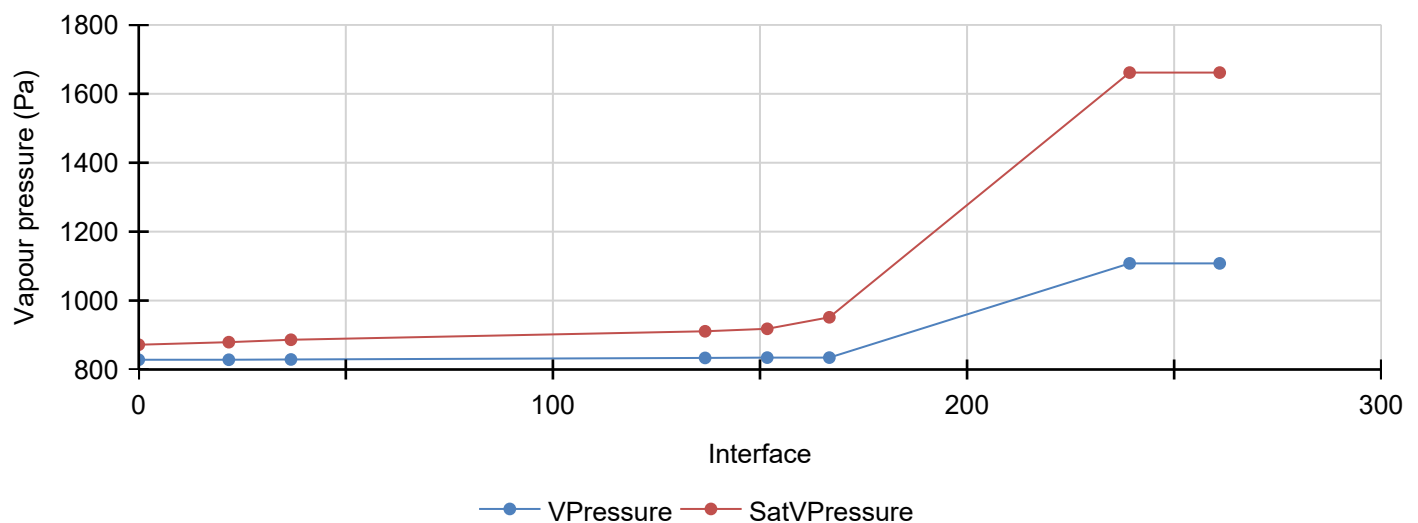
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m².K/W	Cumulative thermal resistance m².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.airspace/plaster dabs	15.0	0.0000	0.1700	0.4149	0.0	0.00	6.80
5.Celotex PL4060 [72.5mm]	72.5	0.0000	2.7500	3.1649	0.000	300.00	306.80
Internal surface	-	0.0000	0.1300	3.1649	0.0	0.00	306.80

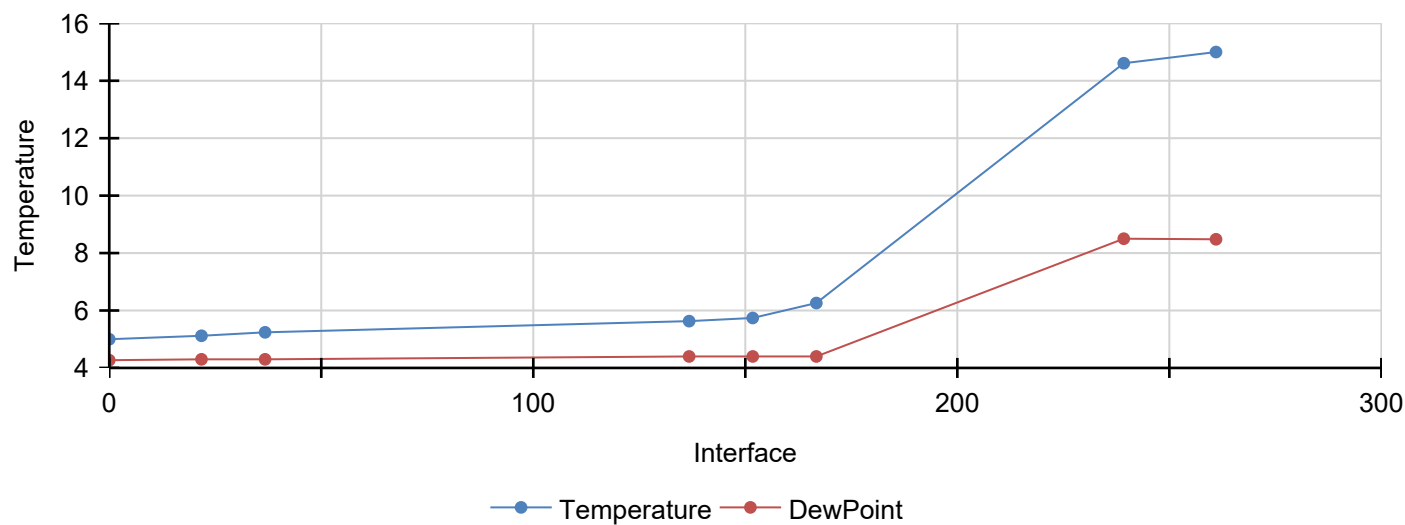
Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/m² h	Cond. rate 60 days g/m² 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	879.3	4.3	0.00	0.00	No
2. Plaster, standard / Brick, outer leaf	5.24	829.1	886.3	4.3	0.00	0.00	No
3. Brick, outer leaf / Plaster, standard	5.63	833.6	910.9	4.4	0.00	0.00	No
4. Plaster, standard / airspace/plaster dabs	5.74	834.5	918.1	4.4	0.00	0.00	No
5. airspace/plaster dabs / Celotex PL4060 [72.5mm]	6.26	834.5	951.5	4.4	0.00	0.00	No
Celotex PL4060 [72.5mm] / Internal surface	14.61	1107.9	1661.6	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1661.6	8.48	0.00	0.00	No



Interface temperature / Dew point graphical representation

CONDENSATION RISK ANALYSIS



CONDENSATION RISK ANALYSIS

Floor - 000003

Environmental conditions

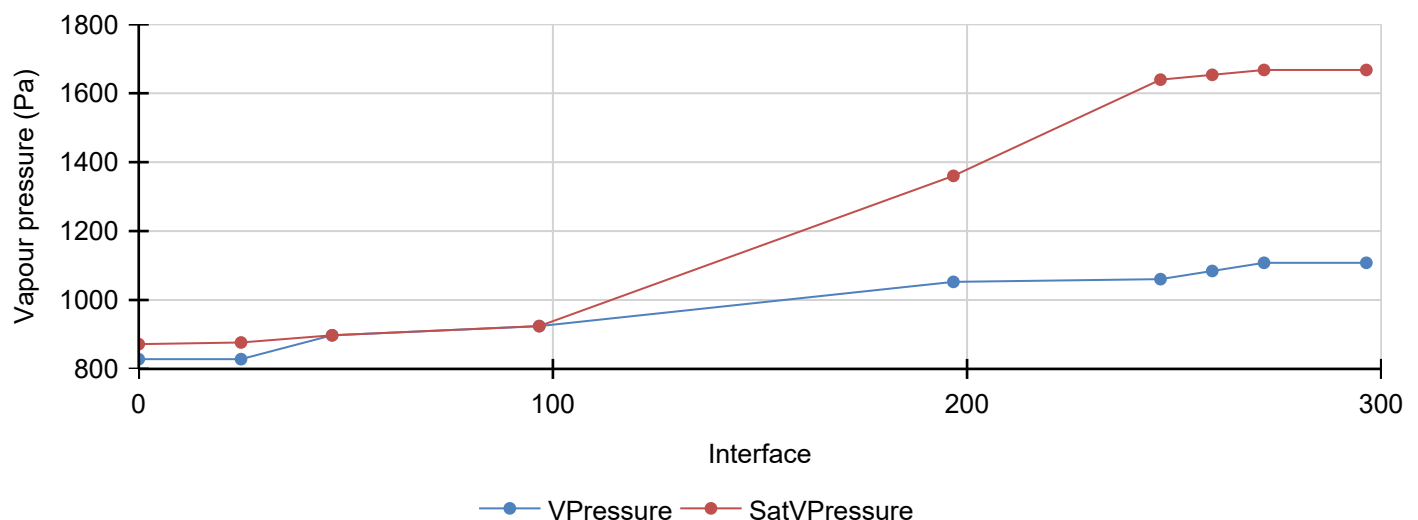
External conditions Temperature: °C Relative Humidity: %
Internal conditions Temperature: °C Relative Humidity: %

Table of layers

Layer	Thickness mm	Thermal conduct. W/m.K	Thermal resistance m².K/W	Cumulative thermal resistance m².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.Chipboard	22.0	0.1300	0.1692	0.2092	300.0	6.60	6.60
2.Standard cavity	50.0	0.0000	0.2100	0.4192	0.0	0.00	6.60
3.ROCKWOOL RWA45 slab	100.0	0.0350	2.8571	3.2764	5.0	0.50	7.10
4.ROCKWOOL RWA45 slab	50.0	0.0350	1.4286	4.7049	5.0	0.25	7.35
5.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	4.7707	60.0	0.75	8.10
6.Gyproc Wallboard (12.5mm)	12.5	0.1900	0.0658	4.8365	60.0	0.75	8.85
Internal surface	-	0.0000	0.1700	4.8365	0.0	0.00	8.85

Vapour pressure table

Interface - between layers	Interface temp. °C	Vapour pressure Pa	Satur. vapour pressure Pa	Dew point °C	Cond. rate g/m² h	Cond. rate 60 days g/m² h	Cond. risk Y/N
External surface	5.00	828.3	871.9	4.27	0.00	0.00	No
1. External surface / Chipboard	5.08	828.3	876.7	4.3	0.00	0.00	No
2. Chipboard / Standard cavity	5.42	897.6	897.6	5.4	0.30	429.91	Yes
3. Standard cavity / ROCKWOOL RWA45 slab	5.84	924.2	924.2	5.8	0.24	347.95	Yes
4. ROCKWOOL RWA45 slab / ROCKWOOL RWA45 slab	11.54	1052.6	1360.2	7.7	0.00	0.00	No
5. ROCKWOOL RWA45 slab / Gyproc Wallboard (12.5mm)	14.40	1060.5	1639.4	7.8	0.00	0.00	No
6. Gyproc Wallboard (12.5mm) / Gyproc Wallboard (12.5mm)	14.53	1084.2	1653.4	8.2	0.00	0.00	No
Gyproc Wallboard (12.5mm) / Internal surface	14.66	1107.9	1667.5	8.5	0.00	0.00	No
Internal surface	15.00	1107.9	1667.5	8.48	0.00	0.00	No



Interface temperature / Dew point graphical representation

